Total No. of Printed Pages: 29

# (DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

## CPG-EE-2017 (Forensic Science)-(SET-B)

A used ?	or mustry start	Sr. No. 10161
Time: 11/2 Hours	Total Questions : 166	Max. Marks: 100
Roll No. (in figures)	(in words)	
Candidate's Name		Date of Birth
Father's Name	Mother's Name	
Date of Exam :		
(Signature of the Candidate)		(Signature of the Invigilator)

## CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

- 1. All questions of Section-"A" are compulsory. Students are required to attempt either Section "B" or Section "C". Students of Medical Group are required to attempt Section "B". Students of Non-Medical Group are required to attempt Section "C". All questions carry equal marks i.e. one mark each.
- 2. The candidates must return the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means/misbehaviour will be registered against him/her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
- 3. The candidate *must not* do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself.
- 4. In case there is any discrepancy in any question(s) in the Question Booklet, the same may be brought to the notice of the Controller of Examinations in writing within two hours after the test is over. No such complaint(s) will be entertained thereafter.
- 5. Use only blue or black ball point pen of good quality in the OMR Answer-Sheet.
- 6. There will be negative marking. Each correct answer will be awarded one full mark and each incorrect answer will be negatively marked for which the candidate will get ¼ discredit. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. Before answering the questions, the candidates should ensure that they have been supplied correct & complete question booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after the start of examination.

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### SECTION - A

1.	The difference betw	veen	ΔH and ΔU at c	onst	ant volume is ec	ual to:
	(1) R		pΔV		VΔp.	(4) 3/2R
2.						8K are 82 and 90 kJ mol <sup>-1</sup> .
	The enthalpy of the	reac	tion $N_2O(g)$ +	$\frac{1}{2}O_{2}$	$\rightarrow$ 2NO(g) is:	
	(1) -8 kJ	(2)	98 kJ	(3)	–74 kJ	(4) 8 kJ
3.	The overall energy	chan	ge during Carn	ot cy	rcle is:	
	(1) equal to w	(2)	zero	(3)	maximum	(4) equal to q
4.	initial state is called	la/a	e system, after n:	und	lergoing various	s processes, returns to its
	(1) reversible proc	ess			irreversible pro	ocess
	(3) cyclic process			(4)	Hess law	
5.	The diameter of m $(\lambda_A/\lambda_B)$ will be:	oleci	ale B is half th	at of	molecule A, th	e ratio of mean free path
	(1) 1/2	(2)	1/4	(3)	4	(4) 2
6.	The SI units of the	Vand	er Waals b term	are		多。這是可以
	(1) m <sup>3</sup> mol	(2)	m <sup>2</sup> /mol	(3)	m <sup>3</sup> / mol	(4) m <sup>2</sup> mol
7.		tes th	ne solubility of a	gas	to its pressure is	s called :
	(1) Raoults law			(2)		n law
	(3) Henry's law			(4)	Ostwald's law	
8.	By adding a non-vo (1) will increase	olatile	e solute to a solv	vent,	the boiling poir will decrease	at of the solvent :
	(3) will not change			(4)	may increase or	r decrease
9.	If $2.303RT/F = 0.05$ $Zn   Zn^{2+} (a_1)   Cu$			of the	e solids are cons	tant, then e.m.f. of the cell
	(1) $E = E^{\circ} - 0.059 \text{ lo}$	og (a2	$(a_1)$	(2)	$E = E^{\circ} + 0.0591$	$og(a_2/a_1)$
	(3) $E = E^{\circ} - \frac{0.059}{2} \log x$	og (a	$(a_1)$	(4)	$E = E^{\circ} + \frac{0.059}{2}  10^{\circ}$	$og (a_2/a_1)$

	The Hybridization	TOTAL III ACOZI Z IS			
	$(1)  sp^3d$	$(2)  sp^3d^2$	(3) $sp^3d^3$	$(4) dsp^3$	ry.
11.	$O_2^{2-}$ is isoelectron	ic with:			
	(1) H <sub>2</sub>	(2) N <sub>2</sub>	(3) F <sub>2</sub>	(4) S	
12.	Which one of the	following species is	paramagnetic ?		T. Indian
	(1) $O_2^-$	(2) CN-	(3) CO	(4) F <sub>2</sub>	
13.	In NaCl type stru	cture, the coordinati	on numbers of catior	and anion are:	
	(1) 6 and 4	(2) 6 and 6	(3) 4 and 4	(4) 8 and 4	
14.	Which one of the	following complex of	can exhibit coordinat	ion isomers?	
	(1) $[Co(NH_3)_6][$	$Cr(CN)_6$ ]	(2) $[Cr(NH_3)_6]$ (	213	101.50
	(3) [Co (en) <sub>2</sub> Cl <sub>2</sub> ]	+	(4) $[Cr(en)_2 Cl_2]$	+	
15.	$Cr(CO)_{x}$ has EAN	I of $Cr = 36$ , hence x	=:		got Er
	(1) 2	(2) 4	(3) 6	(4) 5	
16.	IUPAC name of [	Cr(CO) <sub>5</sub> {P(C <sub>6</sub> H <sub>5</sub> ) <sub>3</sub> }	] is:		
	(1) Triphenylpho	osphine pentacarbon	nyl chromium (0)		
		l triphenylphosphir			
		ol triphenylphosphir Osphine pentacarbon			(B) - 1
	(i) Implicity ip it	opiune pentacarbon	iyi cironate (iii)		6.V. 67
17.	Which one of the	following ions is col	lourless?		
	(1) $U^{3+}$	(2) $Cm^{4+}$	(3) $Th^{4+}$	(4) Pu <sup>4+</sup>	
18.	Solubility of iodithe formation of:		ncreased on addition	n of <i>KI</i> . This is at	tributed to
	(1) KI <sub>3</sub>	(2) I <sub>2</sub> .SO <sub>2</sub>	(3) KI.4SO <sub>2</sub>	(4) SOI <sub>2</sub>	

19. 
$$PbI_2 + KNH_2 \xrightarrow{liq.NH_3} \rightarrow$$

Products of the Reaction are:

(1)  $PbNH_2 \downarrow + I_2 + KI$ 

(2)  $PbNH \downarrow + HI + KI$ 

(3)  $PbNH_2 \downarrow + KI_3$ 

- (4) None of the above
- 20. Which gives red colour with Fehling solution?
  - (1) Glucose

(2) Cellulose

(3) Benzaldehyde

- (4) Cane sugar
- 21. A substance which can act both as an antiseptic and disinfectant is:
  - (1) Aspirin

(2) Phenol

(3) Analgin

- (4) Sodium pentothal
- 22. Out of the following which does not exhibit IR spectra?
  - (1) O<sub>2</sub>
- (2) CO<sub>2</sub>
- (3) SO<sub>2</sub>
- (4) HBr
- 23. Hyperconjugation involves overlap of the following orbitals:
  - (1) σ-σ
- (2)  $\sigma p$
- (3) p p
- (4)  $\pi \pi$
- **24.** The correct order of reactivity towards electrophilic substitution of the compound amongst the following aniline (I), benzene (II) and nitrobenzene (III) is:
  - (1) II > III > I

(2) I < II > III

(3) I > II > III

(4) III > II > I

- 25. Vitamin B<sub>12</sub> contains:
  - (1) cobalt
- (2) magnesium
- (3) iron
- (4) nickel
- **26.** Compound A undergoes formation of cynohydrin which on hydrolysis gives lactic acid. Therefore, compound A is:
  - (1) formaldehyde

(2) acetaldehyde

(3) acetone

(4) benzaldehyde

27.	Which of the following polym	er is thermose	etting polyme	r?	
	(1) Nylon-6	(2)	Nylon-6,6		girl 138
	(3) Bakelite	(4)	None of thes	e	1 0
28.	Which of the following is useful	ıl in treatmen	t of cyanide p	ooisoning?	3648
	(1) Amyl nitrite	(2)	Sodium nitr	ite	
	(3) Nitrite thiosulphate	(4)	All of the ab	ove.	5.0
29.	Enthalpies of combustion of and 285.7 kJ respectively. Enth				kJ, 393.4 k
	(1) -211.1 kJ mol <sup>-1</sup>	(2)	-890.2 kJ m	nol-1	10.00
	(3) -74.6 kJ mol <sup>-1</sup>	(4)	85.7 kJ mol-	1	
30.	Containers A, B and C of respectively at the same temper is:				
	(1) $A < B < C$ (2) $B < C$	< A (3)	C < A < B	(4) $C < B < A$	APAL ST
31.	The root mean square velocity 'd' is:	of an ideal ga	s at constant	pressure varies v	vith density
	(1) $d^2$ (2) b. d	(3)	$\sqrt{d}$	$(4) 1/\sqrt{d}$	ant es
32.	For the reaction 2Cl(g)Cl <sub>2</sub> (g) th	e signs of ΔH	and $\Delta S$ respe	ctively are:	1 44 1
	(1) +, - (2) +, +	(3)	-,-	(4) -, +	Laur Dr
33.	The principal buffer present in	human blood	is		
	(1) $H_3PO_4 + NaH_2PO_4$	(2)	CH <sub>3</sub> COOH	+ CH <sub>3</sub> COONa	
	$(3) Na_2HPO_4 + Na_3PO_4$	(4)	$H_2CO_3 + HC$	O <sub>3</sub>	
34.	If a neutral solution has pK <sub>w</sub> =	13.36 at 50°C	, then pH of t	ne solution is:	
	(1) 6.68 (2) 7	(3)	7.63	(4) d3.5	

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### SECTION - B

35.	The pigments found in polysiphonia (algae) are:			
	(1)	Chlorophyll only	(2)	Phycocyanin only
	(3)	Phycocyanin and chlorophyll	(4)	Phycocyanin and phycoerythrine
36.	Life	e cycle which contain a dominant mu	ltice	ellular diploid stage, are called :
	(1)	Gametic type	(2)	Zygotic type
	(3)	Sporic type	(4)	Gametophytic type
37.	Wh	nich of the following statements are c	orre	ect?
	(A)	Puccinia graminis is known as stem-r	ust	of wheat
	(B)	D-glutamic acid and D-lysin are for	ind i	in bacterial cell wall
	(C)	80s ribosomes are found in bacteria		
	(D)	E. Coli. is found in cluster form		
Hausi 	The	e correct answer is :		
	(1)	A and B (2) B and C	(3)	C and D (4) B, C and D
38.	Wh	nich of the following cells are involved	d in	fight against cancer?
	(1)	B Cells	(2)	Natural killer cells
12.15	(3)	Memory cells	(4)	Plasma cells
39.	Wh	nich of the following cancers are associated	ciate	d with Human Papilloma virus?
	(1)	Lung	(2)	Cervical
	(3)	Ovarian	(4)	Liver
40.	The	e true skeleton of a cell is formed by:		
	(1)	Actin filaments	(2)	Microtubules
	(3)	Intermediate filaments	(4)	Actin filaments and microtubules
41.		en in a eukaryotic cell all the copies ed:	of :	its mitochondrial DNA are identical, it is
	(1)	Homoplasmy .	(2)	Heteroplasmy
	(3)	Apospory	(4)	None of the above

42.	<ul> <li>Oxydative phosphorylation enzyme s mitochondria?</li> </ul>	system is found in which part of the						
	(1) Cytosol (	2) Outer membrane of mitochondria						
	(3) Inner membrane of mitochondria (	4) Mitochondrial fluid						
43.	<ul> <li>The main function of peroxisome is:</li> <li>(1) Catabolism of very long chain fatty ac</li> <li>(2) Glyoxylate cycle in seeds</li> <li>(3) Phosphorespiration in leaves</li> <li>(4) Glycolysis in Trypansomes</li> </ul>	rids						
44.	. In Bryophytes, heterothalic condition is:							
	(1) When male sex organs are not formed	1						
	(2) When male and female sex organs are	found in the same individual						
	(3) When male and female sex organs are	(3) When male and female sex organs are found in separate individuals						
	(4) When two different forms of thallus of	occur						
45.	. Which of the following statements are not	t correct?						
	(1) Funaria hygrometrica is a common mos	ss on Indian hills						
	(2) The adult plant body of Anthoceros is	a sporophyte						
	(3) Selaginella bears spores of two types	A. A						
	(4) Apogamy is a type of reproduction if from the gametophyte without fusion	n some ferns in which sporophyte develops of gametes						
46.	In which of the following animals sex is d	etermined by hormones?						
	(1) Hippocampus (	2) Alligator						
7.	(3) Bonellia (4	4) Cobra						
47.	. Which of the following types of inheritance	ce is <i>not</i> found in ciliate protozoa?						
	(1) Chloroplast inheritance (	2) Mendalian inheritance						
	(3) Cortical inheritance (4)	4) Cytoplasmic inheritance						
48.	The cytoplasmic factors responsible for m	ale sterility in maize plants, are located in :						
		2) Mitochondria						
	(3) Chloroplast	4) Cytosol						
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49.	Mitochondrial DNA is <i>not</i> associated	with v	which of the following?
	(1) Regulation of apoptosis	(2)	Generation of reactive oxygen species
	(3) Energy production	(4)	Regulation of cellular transport
50.	Which of the following is a chaperone	?	
	(1) Nucleoplasmin	(2)	Chromatosome
	(3) Histone $H_1$ and $H_2$	(4)	Histone $H_3$ and $H_4$
51.	Unexplained substantial variation in to closely related species is called:	the ha	ploid nuclear DNA content even between
	(1) Kinetic complexity	(2)	Haploidy
	(3) Aneuploidy	(4)	C-value paradox
52.	Which of the following disease is <i>not</i> s	spreac	by housefly?
	(1) Amoebic dysentry	(2)	Cholera
	(3) Typhoid	(4)	Plague
53.	Coelomic cavity of Balanoglossus is m	nade u	p of how many parts?
	(1) One	(2)	Two
	(3) Four	(4)	Five
54.	Which of the following pairs are corre	ectly n	natched?
	(A) Trochophore – Balanoglossus		
	(B) Bipinnaria–Asterias		
	(C) Holothuria – Auricularia		
	(D) Fasciola – Cercaria		
	The <i>correct</i> answer is:		
	(1) A and B only	(2)	B and D only
	(3) C and D only	(4)	B, C and D only
55.	The early seed fern Ekinsia evolved in	<b>:</b>	
	(1) Late Devonian	(2)	Early Devonian
	(3) Carboniferous	(4)	Triassic

56.	Coralloid roots are found in:	manifest the second of the second of the	23
	(1) Lycopodium	(2) Pinus	
1.	(3) Cycas	(4) Dryopteris	
57.	Which of the following is <i>not</i> correctly	ily matched ?	100
	(1) Marigold – Capitulum	(2) Mimosa – Corymb	
	(3) Brassica – Spike	(4) Anthurium – Spadix	
58.	Synandrous condition is found in the	e family:	
	(1) Cucurbitaceae	(2) Ranunculaceae	36
	(3) Leguminosae	(4) Liliaceae	
59.	Which of the following statements are	re not correct?	
	(A) Spike inflorescence is found in Ac		
	(B) Fruit of family ranunculaceae is e	etaerio.	
	(C) The inflorescence which appear li	ike a single bisexual flower is cyathium.	
	(D) Almost all plants have latex in far		
	The <i>correct</i> answer is:	DO TO A CONTRACT OF THE PROPERTY OF THE PROPER	
	(1) A and D	(2) B and C	
	(3) A only	(4) C only	
60.	In the secondary steles of Boerhaavia:		
	(1) Xylem surrounds phloem	(2) Phloem surrounds xylem	
	(3) Both are parallel	(4) Both are alternate	
61.	In which of the following plants secon		
	(1) Yucca	(2) Dracaena	,
	(3) Oryza	(4) Triticum	
62.	Which of the following is <i>not</i> a part of	f periderm of a plant?	
	(1) Phellogen	(2) Phelloderm	0.
	(3) Phellem	(4) Phloem	

63.	Path of pollen tubes in the pistil is guid	ed by	
	(1) Enzymes of the pollen apparatus	(2)	Stigmatic fluid
	(3) Tissues of the style	(4)	Secration of ovule
64.	Which of the following type of the frui	t, stra	wberry is?
	(1) Drupe		Berry Manual Control of the Control
	(3) Achene	(4)	Follicle
65.	In which of the following animals, block	od flo	ws in both the directions (reverse also)?
00.	(1) Petromyzon	(2)	Fish
	(3) Herdmania	(4)	Branchistoma
66.	Respiration of the cephalochordates of	curs	through which of the following?
	(1) Lungs	(2)	Gills
	(3) Fins	(4)	General body surface
67.	Which of the following pairs are correct	ctly m	natched?
	(A) Alytes – midwife toad		
	(B) Petromyzon – male is parasite on fo	emale	
	(C) Bony fish – cycloid scale		
	(D) Ichthyophis – apoda		
	The answer is:		
	(1) A, B, C and D	(2)	B, C and D only
	(3) A and B only	(4)	A and D only
68.	Which of the following is <i>not</i> a flight in	nuscl	e?
	(1) Coraco-brachialis brevis	(2)	Coraco-brachialis langus
	(3) Gastronemius	(4)	Pectoralis major
69.	Non-renal and pronephric head kidne	ys ar	e found in:
	(1) Rana	(2)	Hemidactylus
	(3) Labeo	(4)	Alligator

70.	. The optimum	pH for action of p	ancreatic ar	nylase is:	ru Tikley's Yandi			
	(1) 3.7	(2) 5.4		6.2	(4) 7.1			
71.	For the digesti	on of fatty acids,	which of the	following are	e required ?			
	(1) Alpha-lipa			Colipase on				
	(3) Alpha-lipa	se + Colipase	(4)	'Alpha-lipase	+ Colipase + bile salts			
72.	Which of the fo	ollowing statemen	nts are <i>not</i> tr	rue ?	e e e e e e e e e e e e e e e e e e e			
	(A) Autonomic	(A) Autonomic nervous system controls smooth muscles.						
	(B) Sympathetic nervous system is voluntarily controlled via fore-brain.							
	(C) The action potential a neuron is terminated by efflux of potassium.							
					peripheral nerves.			
	The answer is:							
	(1) Bonly		(2)	B and C only				
	(3) C and D or	ıly .	(4)	A, C and D o				
73.	Which of the following are <i>not</i> matched correctly?							
	(A) Hypoxia – deficiency of $O_2$ in the tissues							
	(B) Tidal volume in normal man – 0.5 liters							
	(C) Proximal convoluted kidney tubule – reabsorption							
	(D) Stomach – cholecystokinin secretion							
	The answer is:							
	(1) A and B on	ly	(2)	A and C only	,			
	(3) Bonly			D only	The state of			
74.	Which of the following statements are <i>not</i> correct?							
	(A) Testosterone acts by a second messenger system.							
	(B) Triiodothyr	<ul><li>(B) Triiodothyronine binds to intracellular receptors.</li><li>(C) Epinephrine is not a neurotransmitter.</li></ul>						
		ormone enters the		and alters its a				
	The answer is:	Thore eners the	target cen a	ind aners its g	ene expression.			
	(1) A and C on	y	(2)	A and D only				
	(3) B and C onl	y		C and D only				
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75.	The enzyme that fixes atmospheric ca	arbon dioxide in C4 plants is:
	(1) Hydrogenase	(2) PEP carboxylase
	(3) RuBP Oxygenase	(4) Hydrolase
76.	Which of the following statements a xylem of plant?	are incorrect about movement of water through
	(1) Root pressure plays important ro	ole
	(2) Transpiration pull has no role	
	(3) Capillary action has no role	
	(4) Hydrogen ion/AT Pase pump at	t the xylem element membrane plays a role
77.	Most of the plant cytokinins are synt	thesized in:
	(1) Flowers	(2) Roots
	(3) Leaves	(4) Stem
78.	Phytochrome plays a key role in :	
	(1) Photomorphogenesis	(2) Water transport
	(3) Electrolyte balancing	(4) Stomatal movement
79.	Most of the CO <sub>2</sub> generated on the ea	arth is absorbed by :
	(1) Green plants	(2) Green plants and Oceans
	(3) Lime stones	(4) All of these
80.	Which one of the following is <i>not</i> a contract that the following is <i>not</i> and the following is an analysis of the following is an analysis of the following	characteristic of an ecosystem?
	(1) It is self regulated	
	(2) It is leaky in relation to flow of	matter and energy
	(3) It has relations with the surroun	nding ecosystems
	(4) It does not change with time	
81.	Green house effect is related to which	ch of the following cycle?
	(1) Carbon	(2) Nitrogen
	(3) Oxygen	(4) Sulphur

82	. Which of the following is <i>not</i> a gras	sland?
	(1) Prairie	(2) Pampa
	(3) Steppe	(4) Tundra
83.	Which of the following statements a	bout human evolution is <i>not</i> correct?
	(1) The first species of genus <i>Homo</i>	was Homo habilis
	(2) Fossil of Australopitheus anamen.	sis was found in Kenya
	(3) Homo erectus was the first to mor	ve out of Africa
	(4) Sivapithecus was ancestor of mar	
84.	A bacterium that can cause tumors is	n plants and transfer its genes to them is:
	(1) Bacillus thuriengensis	(2) Rhizobium
	(3) Nitrobacterium	(4) Agrobacterium
85.	Which of the following vectors conta	in DNA sequences from lambda phage?
	(1) Plasmid Ti	(2) Cosmid
	(3) RNA phase	(4) Plasmid Ri
86.	Michaelis-Menten rate equation is ab	out:
	(1) Enzyme – substrate complex form	nation
	(2) Rate of Krebs cycle	
1	(3) Rate of oxidative phosphorylatio	n - Training to the state of th
	(4) Rate of reaction of an enzyme	and the second of the second o
87.	The rate of regulatory enzymes is not	t modulated by which the following:
	(1) Feed-back inhibition	the state of the s
	(2) Reversible covalent modification	the second of the management of the second o
	(3) Irreversible covalent modification	n and activation of enzymes
	(4) Coupling factors	

88.	The parts of genome which keep on changing their positions are known as:			
	(1) Exons	(2) Introns		
	(3) Transposable elements	(4) Repressors		
89.	Which of the following are correctly mate (A) Balanoglossus – radial cleavage (B) Chick – discoidal cleavage (C) Cockroach – superficial cleavage (D) Ascaris – spiral cleavage The answer is: (1) A and B only (3) A, B and D only	(2) C and D only (4) A, B, C and D		
90.	Coeloblastula is blastula of: (1) Insect (2) Frog	(3) Bird (4) Lizard		
	(3) Endoblast	(4) Periblast		
92.	Which of the following extra-embryon (1) Amnion (3) Allantois	ic membrane serves as urinary bladder?  (2) Chorion  (4) Yolk sac		
93.	<ul> <li>Which of the following are correctly m</li> <li>(A) Americas – Patato, Corn</li> <li>(B) China Center – Soyabean</li> <li>(C) Near East – Chick pea, Barley</li> <li>(D) India Center – Rice, Mango</li> <li>The <i>correct</i> answer is:</li> <li>(1) A and B only</li> </ul>	atched for their centers of origin?  (2) A, B and C only		
	(3) A. B. C and D	(4) B and D only		

94.	4. The family and generic name of flax-seed	plant is:
	(1) Linaceae, Linum (	2) Camelliacea, Camellia
	(2) 3.6.1	4) Euphorbiaceae, Hevea
95.	5. Which of the following combination is no	t correct?
	(1) C: 1 P 10	2) Gram, Arhar, Pea
	(0) D: 7:11	4) Coriander, Ginger, Cannabis
96.	<ul> <li>Which one of the following combinations</li> <li>(1) Catla, Labeo – Major freshwater carps</li> <li>(2) Silver carp, Grass carp – Major exotic</li> <li>(3) Clarias batrachus, Heteropneustus – Air</li> <li>(4) Bombay Duck, Hilsa – Marine food fis</li> </ul>	carps breathing carnivores
97.		
	(1) Spodoptera (2	2) Trogoderma
	(3) Rhizopertha (4	
98.	. Which of the following statement is wrong	?
	(1) Pyrilla perpusilla is a bug	
	(2) Adults of red pumpkin beetles attack	vegetables
		Oratorius is derived from its unpleasant
	(4) Tribolium castanneum is known as lesse	r grain borer.
99.	. Hadda beetles usually prefer to feed on :	
	(1) Brinjal (2	Brinjal and Potato
	(3) Citrus fruits (4)	
100.	. Which of the following statement is false?	
	(1) Sweat sorghum is used to obtain ethan-	ol.
	(2) Quinine is obtained from the bark of R	
	(3) Sunflower is a source of edible oil.	
	(4) Morphine is obtained from opium plan	t.

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#### SECTION - C

The product of the characteristic roots of the matrix:

$$\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$$
 is:

(1) 3

- (2) 18
- (3) 0

(4) 45

If the roots of equation  $x^3 - 12x^2 + 39x - 28 = 0$  are in A. P., then one of the root is:

(1) 4

- (2) 3
- (3) -4
- (4) 6

**103.** The radius of curvature of the hyperbola  $r^2 = a^2 - b^2 + \frac{a^2b^2}{r^2}$  is:

- (1)  $\frac{a^2b}{p^3}$  (2)  $\frac{a^2b^2}{p^3}$  (3)  $\frac{ab^2}{p^3}$

**104.**  $\int_{0}^{1} \frac{x^3}{\sqrt{1-x^2}} dx$  is equal to :

- (1)  $\frac{3}{2}$
- (2) 0
- (3)  $-\frac{3}{2}$  (4)  $\frac{2}{3}$

The Co-ordinates of the centre of conic  $x^2 + 12xy - 4y^2 - 6x + 4y + 9 = 0$  are:

(1)  $\left(\frac{1}{2},0\right)$ 

(2)  $\left(-\frac{1}{2},0\right)$ 

(3)  $\left(0,\frac{1}{2}\right)$ 

 $(4) \left(\frac{1}{2}, \frac{1}{2}\right)$ 

If  $x = \cos \theta + i \sin \theta$ , then  $x^n + \frac{1}{x^n}$  is equal to:

(1)  $2\cos n\theta$ 

(2)  $2i\cos n\theta$ 

(3)  $\frac{\cos n\theta}{2}$ 

(4)  $\cos 2n\theta$ 

- 107. The least positive integer (mod II) to which 282 is congruent:
  - (1) 4

- (2) 7
- (3) 5

- (4) 2
- **108.** The integrating factor of differential equation  $2\cos(y^2) dx xy \sin(y^2) dy = 0$  is:
  - (1)  $\frac{1}{x^3}$

(2)  $x^2$ 

(3)  $x^3$ 

- (4)  $\frac{1}{x^2}$
- **109.** Particular integral for the differential equation  $(D^2 6D + 9)y = e^{3x}$  is:
  - $(1) \frac{e^{3x}}{2}$

(2)  $x^2 e^{3x}$ 

 $(3) \ \frac{e^{3x}}{x^2}$ 

- (4)  $\frac{x^2}{2}e^{3x}$
- **110.** The value of  $\lambda$  so that the following vectors are coplanar  $\vec{a} = 2\hat{i} 7\hat{j} + \lambda \hat{k}$ ,  $\vec{b} = \hat{i} + 2\hat{j} \hat{k}$  and  $\vec{c} = 3\hat{i} 5\hat{j} + 2\hat{k}$  is:
  - (1) -3

(2) 3

(3)  $\frac{1}{3}$ 

 $(4) -\frac{1}{3}$ 

- 111.  $\lim_{x\to\infty} x \tan \frac{1}{x}$  is :
  - (1) 1

(2) -1

(3) 0

- (4) 2
- **112.** If  $z = \tan^{-1} \left( \frac{x}{y} \right)$ , then  $\frac{\partial z}{\partial x}$  is:
  - (1) 0

 $(2) \quad \frac{x}{x^2 + y^2}$ 

(3)  $\frac{y}{x^2 + y^2}$ 

(4)  $\frac{1}{x^2 + y^2}$ 

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**113.** The partial differential equation 
$$x \frac{\partial^2 z}{\partial x^2} + 2 \frac{\partial^2 z}{\partial y \partial x} + y \frac{\partial^2 z}{\partial y^2} + \frac{\partial z}{\partial x} = 0$$
 is parabolic if:

(1)  $xy \neq 1$ 

(2) xy < 1

(3) xy > 1

- (4) xy = 1
- **114.** The particular integral of the differential equation  $\frac{\partial^3 z}{\partial x^3} 3 \frac{\partial^3 z}{\partial x^2 \partial y} + 4 \frac{\partial^3 z}{\partial y^3} = e^{x+2y}$  is:
  - $(1) \quad \frac{e^x}{72}$

 $(2) \quad \frac{e^{x+2y}}{27}$ 

- (3)  $\frac{e^{x+2y}}{72}$
- (4)  $\frac{e^y}{27}$
- 115. Any wrench may be resolved into two wrenches, whose axes intersect at right angles in how many ways?
  - (1) One way

- (2) Three ways
- (3) Infinite number of ways
- (4) None of these
- **116.**  $\lim_{x \to \infty} \left( \frac{2}{1}, \frac{3}{2}, \frac{4}{3}, \dots, \frac{n}{n-1} \right)^{\frac{1}{n}}$  is equal to:
  - (1) 1

(2) -1

(3) 0

- (4)  $\frac{1}{2}$
- **117.** The series  $1^2 + 2^2 + 3^2 + \dots + n^2 + \dots$  diverges to :
  - $(1) -\infty$

(2) +∞

(3) 0

(4) 1

- **118.** The value of  $H_{2n+1}(0)$  is:
  - (1) 1

(2) -1

(3)  $\frac{1}{n}$ 

(4) 0

**119.** The inverse Laplace Transform of  $\frac{1}{s^{7/2}}$  is:

(1)  $\sqrt{\frac{t}{\pi}}$ 

 $(2) \quad \frac{8}{15} \sqrt{\frac{t}{\pi}}$ 

 $(3) \quad \frac{8t^2}{15} \sqrt{\frac{t}{\pi}}$ 

(4) 0

120. The operator | | means:

(1) Logical OR

(2) Logical AND

(3) Logical NOT

(4) None of these

**121.** Let (R, d) be the usual metric space. Then derived set of:

$$A = \left\{ \frac{1}{n} : n \in \mathbb{N} \right\} \text{ is :}$$

(1) A

 $(2) \{0\}$ 

(3) ¢

(4) {1}

122. Let (X, d) be a metric space and A be any subset of X. Then A is open if and only if:

 $(1) \quad A = -A^{\circ}$ 

(2)  $A = \frac{1}{A}$ 

 $(3) \quad A = A$ 

(4) None of these

**123.** If  $G = \{1, w, w^2\}$  is the group of cube roots of unity, then order of  $w^2$  under the binary operation multiplication is:

(1) 2

(2) 4

(3) 1

(4) 3

- 124. A division ring has how many zero divisors?
  - (1) 1

(2) 3

(3) 2

- (4) None of these
- **125.** "The rate of change of momentum is directly proportional to the impressed force and takes place in the direction of the force" is:
  - (1) Newton's first law of motion
  - (2) Newton's second law of motion
  - (3) Newton's third law of motion
  - (4) None of these
- 126. Time of flight of a projectile is given by:
  - $(1) \frac{2u \sin \alpha}{g}$

(2)  $\frac{u \sin \alpha}{g}$ 

 $(3) \frac{u \sin \alpha}{2g}$ 

(4) None of these

- **127.**  $T\left(\frac{1}{2}\right)$  is equal to :
  - (1) e

(2) n

(3)  $\sqrt{\pi}$ 

- (4) √e
- **128.** The fixed point of the Mobius transformation  $w = \frac{3z-4}{z-1}$  is:
  - (1) z = 1

(2) z = -1

(3) z = -2

- (4) z = 2
- **129.** The set of vectors  $\{(1,0),(0,1)\}$  in  $\mathbb{R}^2$  is:
  - (1) Linearly dependent

(2) Linearly independent

(3) Not defined

(4) None of these

**130.** If  $T:V \to W$  is a linear transformation, then T is one-one iff N(T) is:

(1) {1}

(2) ¢

(3) 0

(4) None of these

131. For the table:

	metal Police	A Long of the	Paralle Santa	1 10 21 10 31	SHETCH PATE	
x	0	1	2	3	4	5
f(x)	0	3	8	15	24	25

 $\Delta^3 f(x)$  is:

(1) 3

(2) 0

(3) 2

(4) 7

132. For the data:

75 <b>x</b> (300)	<b>-</b> 1	1	2	3
f(x)	-21	15	12	3

 $\Delta^2 f(x)$  are:

(1) -7 and -3

(2) 7 and 3

(3) 7 and -3

(4) -7 and 3

133. Runge-Kutta method is a:

- (1) Single step method
- (2) Multiple step method
- (3) Method for solving cubic equation
- (4) None of these

**134.** The force acting on a system of n particles is conservative only if:

(1)  $\nabla \bullet F^{\rightarrow} = 0$ 

(2)  $\nabla \times F^{\rightarrow} = 0$ 

(3)  $\nabla \cdot \nabla \cdot F \rightarrow 0$ 

(4)  $\nabla \bullet \nabla \times F \rightarrow = 0$ 

135. In Lagrangian's Equation Qi represents:

- (1) Generalized force having dimensions of force explicitly
- (2) Quantized force having dimensions of force
- (3) Generalized force may or may not have dimensions of force
- (4) Work done by generalized force

**136.** The Hamiltonian, H = T + V gives total energy:

- (1) when Cartesian and generalized coordinates do not depend on time explicitly
- (2) when only generalized coordinates do depend on time explicitly
- (3) when only Cartesian coordinates do not depend on time explicitly
- (4) when Cartesian and generalized coordinates depend on time explicitly

**137.** Any field,  $A^{\rightarrow}$  is said to solenoid field if:

(1) 
$$A^{\rightarrow} = \nabla \times V^{\rightarrow}$$
 and  $\nabla \cdot A^{\rightarrow} = 0$ 

(2) 
$$A^{\rightarrow} = \nabla \times V^{\rightarrow}$$
 and  $\nabla \cdot A^{\rightarrow} = 0$ 

(3) 
$$A^{\rightarrow} = \nabla \times V^{\rightarrow}$$
 and  $\nabla \times A^{\rightarrow} = 0$ 

(4) 
$$A^{\rightarrow} = \nabla \cdot V^{\rightarrow}$$
 and  $\nabla \times A^{\rightarrow} = 0$ 

**138.** The total charge enclosed by a given surface through which 15000 lines of force is incoming and that of outgoing lines of force is 25000:

(1)  $13.275 \times 10^{-8}C$ 

(2)  $8.85 \times 10^{-12} C$ 

(3)  $8.85 \times 10^{-8}$  C

(4)  $8.85 \times 10^{-8} C/s$ 

**139.** Name of program which translates a high level language into machine language:

(1) compiler

(2) assembler

(3) register

- (4) converter
- **140.** The area enclosed by a cycle represents net work done as well as net heat of interaction is:

(1) P-V diagram

(2) Carnot cycle

(3) T-S diagram

- (4) Triple point diagram
- **141.** A real gas shows neither heating nor cooling in Joule Thomson effect if the initial temperature is:
  - (1) less then inversion temperature
  - (2) greater then inversion temperature
  - (3) equal to inversion temperature
  - (4) equal to 273K.
- **142.** If  $p_1$  and  $p_2$  be the probability of two independent events, then the probability of two events to take place simultaneously is:

(1)  $p_1 + p_2$ 

(2)  $p_1 \times p_2$ 

(3)  $p_1/p_2$ 

(4)  $p_1 - p_2$ 

- 143. The two constraints used in determining the most probable macro-state are:
  - (1)  $\Sigma n_i = n$  and  $\Sigma n_i u_i = u$
- (2)  $\Sigma n_i = n$  and  $\Sigma n_i v_i = v$
- (3)  $\Sigma n_i = n$  and  $\Sigma n_i v_i = v/n$
- (4)  $\Sigma n_i = n$  and  $\Sigma n_i u_i = u/n$
- 144. The essential condition for Fermi Dirac statistics is:
  - (1) the particles are distinguishable
  - (2) the particles are indistinguishable
  - (3) there is no limit on the no. of particles present in a given energy state
  - (4) not more than one particle can be present in a given energy state
- 145. Boltzmann limit is given by
  - (1)  $(n_i/g_i) \ll 1$  and satisfied by all gases at ordinary temperature
  - (2)  $(g_i/n_i) \ll 1$  and satisfied by all gases at absolute temperature
  - (3)  $(n_i/g_i) >> 1$  and satisfied by all gases at ordinary temperature
  - (4)  $(n_i \times g_i) \ll 1$  and satisfied by all gases at 0K
- **146.** The ratio of rms value to the average value of alternating current is called Form Factor (FF) and given by:
  - (1) 1.21, peak of wave is flat if FF less than 1.21
  - (2) 1.11, peak of wave is sharp if FF greater than 1.11
  - (3) 1.11, peak of wave is flat if FF greater than 1.11
  - (4) 2.11, peak of wave is flat if FF greater than 2.11

147. The quality factor of a series resonant circuit is given by:

- (1)  $\frac{wL}{R}$  and depends on R only
- (2)  $\frac{wC}{R}$  and depends on R only
- (3)  $\frac{wR}{L}$  and depends on R only
- (4)  $\frac{wL}{R}$  and depends on L only

**148.** For a given transistor configuration if  $l_c = 10.505$ mA,  $l_b = 100$ µA and  $l_{CBO} = 5$ µA, then value of  $\alpha_{dc}$  and  $\beta_{dc}$  are :

(1) 100 and 0.95

(2) 0.99 and 100

(3) 105 and 1.05

(4) 101 and 99.0

**149.** Calculate the apparent length of a meter road, when it is carried in a rocket moving with a speed of  $2.9 \times 10^8$  m/s take  $c = 3.0 \times 10^8$  m/s

(1) 0.254 m

(2) 0.52 m

(3) 0.359 m

(4) 1.0 m

**150.** The dirichlet conditions for an expandable function, f(x) are :

- (1) non-periodic, single valued, finite and continuous
- (2) periodic, single valued, infinite and continuous
- (3) periodic, single valued, finite and continuous
- (4) periodic, single valued, infinite and in continuous

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151.	The necessary condition for achromatic combination is:						
	(1) Two lenses should be of same materials						
	(2) Two lenses should be of different materials						
	(3) Two lenses should be of same focal length						
	(4) Two lenses should be of same radius of curvature						
	No. 1 to the second of the sec						
152.	For Newton's ring due to transmitted light, the central maximum (n=0) is:						
	(1) dark with zero diameter (2) bright with zero diameter						
	(3) may be bright or dark (4) None of above						
A	the compact of the co						
153.	The Young's double slit experiment is performed with blue and green light						
	of wavelengths 4360 Å and 5460 Å respectively. If X is the distance of 4th maxima from the central maxima, then:						
	(1) $X_{\text{blue}} = X_{\text{green}}$						
	(2) Xblue > Xgreen						
	(3) X <sub>blue</sub> < X <sub>green</sub>						
	(4) $X_{\text{blue}} / X_{\text{green}} = \lambda_{\text{green}} / \lambda_{\text{blue}}$						
	The state of the s						
154.	The angular half width of the principal maxima of a plane diffraction grating is:						
	(1) very narrow and sharp (2) very broad and dim						
	(3) very narrow and dim (4) very broad and sharp						
55.	A polarimeter suitable for color blind persons is:						
	(1) bi-quartz polarimeter (2) half shade polarimeter						
	(3) saccharimeter (4) None of above						

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156. The cubic lattice most densely packed is:

- (1) BCC with packing factor 0.680
- (2) SC with packing factor 0.524
- (3) HCP with packing factor 0.740
- (4) FCC with packing factor 0.740

157. X-Ray diffraction method used for structure determination of single crystal is:

- (1) Power crystal method
- (2) Rotating crystal method

(3) Laue method

(4) None of above

**158.** Relation between volume of unit cell, UT [in direct lattice(DL)] and reciprocal lattice(RL) is:

- (1) (Volume of UT)<sub>RL</sub> =  $4\Pi^2$ /(Volume of UT)<sub>DL</sub>
- (2) (Volume of UT)<sub>DL</sub> =  $4\Pi^2$ /(Volume of UT)<sub>RL</sub>
- (3) (Volume of UT)<sub>RL</sub> =  $8\Pi^3$ /(Volume of UT)<sub>DL</sub>
- (4) (Volume of UT)<sub>DL</sub> =  $8\Pi^3$ /(Volume of UT)<sub>RL</sub>

**159.** Phonons are defined as:

- (1) optical energy given to unit cell
- (2) Lattice vibrations quantized energy
- (3) Lattice vibrations continuous energy
- (4) continuous heat energy given to lattice

160.	The energy of gamma photon having a wavelength 1.5 $\overset{\circ}{A}$ (take h= $6.634 \times 10^{-34} Js$ )			
	(1) $8.275 \times 10^3 eV$	(2) $13.24 \times 10^{-4} eV$		
	(3) $10.24 \times 10^{-3} eV$	(4) $1.6 \times 10^{-19} eV$		

161. The ratio of kinetic energy of proton to that of  $\alpha$ -particle, when a proton and an  $\alpha$ -particle have equal de-Broglie wavelengths is:

(1) 1:2

(2) 2:1

(4)  $1.6 \times 10^{-19} eV$ 

(3) 1:1

(4) 4:1

162. In Schrodinger's equation, eigen values means:

(1) value of energy

(2) value of position

(3) value of frequency

(4) none of above

163. Zero-point energy of an oscillator is given by:

(1) hv

(2) zero

(3) infinite

(4)  $\left(\frac{1}{2}\right)hv$ 

164. The factors that control the allowed values of energy of a particle in a potential well are:

- (1) width and depth of potential well
- (2) time and energy of potential well
- (3) depth and energy of potential well
- (4) time and width of potential well

- **165.** In Moseley's law which leads to correct sequence of putting the elements in periodic chart, frequency of X-ray spectral line depends on :
  - (1) Z

(2)  $(Z)^2$ 

(3)  $(Z)^{1/2}$ 

 $(4) (Z)^3$ 

(Z= Atomic No. of Element)

- 166. The order of dead time and recovery time in a G.M. counter is :
  - (1) 100µs

(2) 10µs

(3)  $10^3 \mu s$ 

(4)  $10^{-3} \mu s$ 

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# (DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

## CPG-EE-2017 (Forensic Science)-(SET-B)

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Time : 1½ Hours	Total Questions : 166	Max. Marks : 100
Roll No. (in figures)	(in words)	
Candidate's Name — Father's Name	———— Date of Mother's Name	
Date of Exam :		
(Signature of the Candidate)	(Signa	ature of the Invigilator)

## CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

- 1. All questions of Section-"A" are compulsory. Students are required to attempt either Section "B" or Section "C". Students of Medical Group are required to attempt Section "B". Students of Non-Medical Group are required to attempt Section "C". All questions carry equal marks i.e. one mark each.
- 2. The candidates must return the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means/misbehaviour will be registered against him/her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
- The candidate must not do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself.
- 4. In case there is any discrepancy in any question(s) in the Question Booklet, the same may be brought to the notice of the Controller of Examinations in writing within two hours after the test is over. No such complaint(s) will be entertained thereafter.
- 5. Use only blue or black ball point pen of good quality in the OMR Answer-Sheet.
- 6. There will be negative marking. Each correct answer will be awarded one full mark and each incorrect answer will be negatively marked for which the candidate will get ¼ discredit. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. Before answering the questions, the candidates should ensure that they have been supplied correct & complete question booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after the start of examination.

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#### SECTION - A

1.	IUPAC name	of $[Cr(CO)_5 \{P(C_6H_5)_3\}]$ is:

- (1) Triphenylphosphine pentacarbonyl chromium (0)
- (2) Pentacarbonyl triphenylphosphine chromium (0)
- (3) Pentacarbonyl triphenylphosphine chromate (III)
- (4) Triphenylphosphine pentacarbonyl chromate (III)
- 2. Which one of the following ions is colourless?
  - (1)  $U^{3+}$
- (2)  $Cm^{4+}$
- (3)  $Th^{4+}$
- (4)  $Pu^{4+}$
- 3. Solubility of iodine in liquid  $SO_2$  is increased on addition of KI. This is attributed to the formation of:
  - (1) KI3
- (2)  $I_2.SO_2$  (3)  $KI.4SO_2$  (4)  $SOI_2$

4. 
$$PbI_2 + KNH_2 \xrightarrow{liq.NH_3} \rightarrow$$

Products of the Reaction are:

- (1)  $PbNH_2 \downarrow + I_2 + KI$
- (2)  $PbNH \downarrow + HI + KI$

(3)  $PbNH_2 \downarrow + KI_3$ 

- (4) None of the above
- **5.** Which gives red colour with Fehling solution?
  - (1) Glucose

(2) Cellulose

(3) Benzaldehyde

- (4) Cane sugar
- 6. Compound A undergoes formation of cynohydrin which on hydrolysis gives lactic acid. Therefore, compound A is:
  - (1) formaldehyde

(2) acetaldehyde

(3) acetone

- (4) benzaldehyde
- 7. Which of the following polymer is thermosetting polymer?
  - (1) Nylon-6

(2) Nylon-6,6

(3) Bakelite

(4) None of these

	(1) Amyl nitrite		(2) Sodium r	nitrite	
	(3) Nitrite thiosul	phate	(4) All of the	above	
9.	Enthalpies of combustion of methane, graphite and hydrogen are 890.2 kJ, 393.4 kJ and 285.7 kJ respectively. Enthalpy of formation of methane is:				
	(1) -211.1 kJ mol	[-1	(2) -890.2 k	J mol <sup>-1</sup>	
	(3) -74.6 kJ mol-	1	(4) 85.7 kJ m	ol-1	
10.	• Containers A, B and C of equal volume contain oxygen, neon and methane respectively at the same temperature and pressure. The correct order of their masse is:				
	(1) A < B < C	(2) B < C < A	(3) $C < A < B$	(4) C < B < A	
11.	The difference beta (1) R	ween $\Delta H$ and $\Delta U$ at (2) $p\Delta V$	constant volume (3) VΔp	is equal to: (4) 3/2R	
12.	The enthalpies of	formation of gaseou	as $N_2O$ and $NO$ a	at 298K are 82 and 90 kJ mol <sup>-1</sup>	
	The enthalpies of formation of gaseous $N_2O$ and $NO$ at 298K are 82 and 90 kJ mol The enthalpy of the reaction $N_2O(g) + \frac{1}{2}O_2 \rightarrow 2NO(g)$ is:				
		(2) 98 kJ	(3) -74 kJ	(4) 8 kJ	
13.		change during Car			
	(1) equal to w		(3) maximum	(4) equal to q	
14.	<ul> <li>A process in which the system, after undergoing various processes, returns to it initial state is called a/an:</li> </ul>			rious processes, returns to its	
	(1) reversible prod	ess	(2) irreversible	e process	
	(3) cyclic process		(4) Hess law	Associated and St.	
15.	The diameter of molecule $B$ is half that of molecule $A$ , the ratio of mean free partial $(\lambda_A/\lambda_B)$ will be:			A, the ratio of mean free path	
	(1) 1/2	(2) 1/4	(3) 4	(4) 2	
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**8.** Which of the following is useful in treatment of cyanide poisoning?

16.	The SI units of the Vander Waals b term	are:
	(1) $m^3 mol$ (2) $m^2 / mol$	(3) $m^3 / mol$ (4) $m^2 mol$
17.	The law which relates the solubility of a (1) Raoults law (3) Henry's law	gas to its pressure is called : (2) The distribution law (4) Ostwald's law
18.	By adding a non-volatile solute to a solv (1) will increase (3) will not change	ent, the boiling point of the solvent:  (2) will decrease  (4) may increase or decrease
19.	If 2.303RT/F = 0.059 and the activities of $Zn   Zn^{2+} (a_1)   Cu^{2+} (a_2)   Cu \text{ is :}$	f the solids are constant, then e.m.f. of the cell
	(1) $E = E^{\circ} - 0.059 \log (a_2 / a_1)$	(2) $E = E^{\circ} + 0.059 \log (a_2 / a_1)$
	(3) $E = E^{\circ} - \frac{0.059}{2} \log (a_2 / a_1)$	(4) $E = E^{\circ} + \frac{0.059}{2} \log (a_2 / a_1)$
20.	The hybridization of Xe in XeO <sub>2</sub> F <sub>2</sub> is:	
	(1) $sp^3d$ (2) $sp^3d^2$	(3) $sp^3d^3$ (4) $dsp^3$
21.	$O_2^{2-}$ is isoelectronic with:	
	(1) H <sub>2</sub> (2) N <sub>2</sub>	(3) F <sub>2</sub> (4) S
22.	Which one of the following species is pa	ramagnetic ?
	(1) $O_2^-$ (2) $CN^-$	(3) CO (4) F <sub>2</sub>
23.	In NaCl type structure, the coordination	numbers of cation and anion are:
	(1) 6 and 4 (2) 6 and 6	(3) 4 and 4 (4) 8 and 4
24.	Which one of the following complex car	exhibit coordination isomers?
it i	(1) $[Co(NH_3)_6][Cr(CN)_6]$	(2) $[Cr(NH_3)_6]Cl_3$
	(3) $[Co(en)_2 Cl_2]^+$	(4) $[Cr(en)_2 Cl_2]^+$

25.	Cr(CO) <sub>x</sub> has EAN	of Cr	= 36, hence x =	± : 0 3				
	(1) 2	(2)	4	(3)	6	(4)	5	7.0
26.	A substance which	h can	act both as an a	intise	ptic and disinfe	ectan	t is:	
14	(1) Aspirin		, 1.55 vs					08
	(3) Analgin			(4)	Sodium pento	thal	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
27.	Out of the followi	ng wh	nich does not ex	khibit	IR spectra ?			
	(1) · O <sub>2</sub>	(2)	CO <sub>2</sub>	(3)	SO <sub>2</sub>	(4)	HBr	
28.	Hyperconjugation	invol	ves overlap of	the fo	ollowing orbital	s:		
	(1) σ-σ				p-p		$\pi - \pi$	
29.	The correct order amongst the follow	of re	activity toward	ds ele ene (1	ectrophilic sub II) and nitroben	stitut zene	ion of the compou (III) is :	nc
					I > II > III			
30.	Vitamin B <sub>12</sub> contain	ins :					"种"。"	
	(1) cobalt	(2)	magnesium	(3)	iron	(4)	nickel	
31.	The root mean squ'd' is:	are ve	elocity of an ide	eal ga	as at constant p	ressu	re varies with dens	ity
	(1) $d^2$	(2)	b. d	(3)	$\sqrt{d}$	(4)	$1/\sqrt{d}$	
32.	For the reaction 2C	Cl(g)Cl	(g) the signs o	of $\Delta H$	and ΔS respect	ively	are:	
	(1) +,-				-,-			12
33.	The principal buffe	er pres	sent in human l	olood	is · · ·		- Maria (1986)	
	(1) $H_3PO_4 + NaH_2$	$PO_4$	Eq. 5.800m 17.	(2)	CH <sub>3</sub> COOH + C	CH <sub>3</sub> C	OONa	
	$(3) Na_2HPO_4 + Na_4$	$a_3PO_4$	ione in a science	(4)	$H_2CO_3 + HCO_3$	3	orson Light :	1
34.	If a neutral solution	n has p	$oK_{w} = 13.36 \text{ at}$	50°C	then pH of the	solu	tion is:	
	(1) 6.68	(2)			7.63		d3.5	
					The state of the s	, ,	19 19 19	

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### SECTION - B

35.	Coeloblastula is blastula of:			
	(1) Insect (2) Frog	(3)	Bird	(4) Lizard
36.	Blastodise of chick is united with the ye	olk m	ass in chick by:	
	(1) Epiblast	(2)	Mesoblast	Total Activities
	(3) Endoblast	(4)	Periblast	
37.	Which of the following extra-embryoni	ic me	mbrane serves a	s urinary bladder?
	(1) Amnion	(2)	Chorion	
	(3) Allantois	(4)	Yolk sac	
38.	Which of the following are correctly m	atche	ed for their cente	ers of origin?
benz	(A) Americas – Patato, Corn			
	(B) China Center – Soyabean			
	(C) Near East – Chick pea, Barley			
	(D) India Center – Rice, Mango			and the state of the same
	The <i>correct</i> answer is:			
	(1) A and B only	(2)		dy
Tanga	(3) A, B, C and D	(4)	B and D only	
39.	The family and generic name of flax-se	eed p	lant is :	
	(1) Linaceae, Linum	(2)	Camelliacea, C	Camellia
	(3) Malvaceae, Chorchorus	(4)	Euphorbiaceae	e, Hevea
40.	Which of the following combination is	not	correct?	
	(1) Cinchona, Rauwolfia, Withania	(2)	Gram, Arhar,	Pea
	(3) Rice, Wheat, Maize	(4)	Coriander, Gir	nger, Cannabis
41.	Which one of the following combination		re not correctly	matched?
	(1) Catla, Labeo – Major freshwater ca			
	(2) Silver carp, Grass carp – Major ex			
	(3) Clarias batrachus, Heteropneustus –			ores
	(4) Bombay Duck, Hilsa – Marine foo	a fish	ies	

42.	Which of the following is a crop p	pest?			
	(1) Spodoptera	(2) Trogoderma			
	(3) Rhizopertha	(4) Sitophilus			
43.	Which of the following statement	is wrong?			
	(1) Pyrilla perpusilla is a bug				
	(2) Adults of red pumpkin beetle	es attack vegetables			
		epocorisa Oratorius is derived from its unpleasa			
	(4) Tribolium castanneum is known	n as lesser grain borer.			
44.	Hadda beetles usually prefer to fe	ed on:			
	(1) Brinjal	(2) Brinjal and Potato			
	(3) Citrus fruits	(4) Sugarcane			
45.	The pigments found in polysiphor	nia (algae) are:			
	(1) Chlorophyll only	(2) Phycocyanin only			
	(3) Phycocyanin and chlorophyll				
46.	Life cycle which contain a domina	nt multicellular diploid stage, are called:			
	(1) Gametic type	(2) Zygotic type			
	(3) Sporic type	(4) Gametophytic type			
47.	Which of the following statements	are correct?			
	(A) Puccinia graminis is known as stem-rust of wheat				
	(B) D-glutamic acid and D-lysin are found in bacterial cell wall				
	(C) 80s ribosomes are found in bac				
	(D) E. Coli. is found in cluster form				
	The correct answer is: (1) A and B (2) B and C				
		(3) C and D (4) B, C and D			
48.	Which of the following cells are inv	volved in fight against cancer?			
	(1) B Cells	(2) Natural killer cells			
	(3) Memory cells	(4) Plasma cells			
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49.	Which of the following cancers are associated asso	ated with Human Papilloma virus 2
	(1) I	(2) Cervical
	(2)	(4) Liver
50.	The true skeleton of a cell is formed by:	
	(1) A 11 (1)	2) Microtubules
	(2) 7	4) Actin filaments and microtubules
51.		of its mitochondrial DNA are identical, it is
	(1) Homoplasmy	2) Heteroplasmy
	(3) Apospory	4) None of the above
52.	Oxydative phosphorylation enzyme s mitochondria?	ystem is found in which part of the
	(1) Cytosol (	2) Outer membrane of mitochondria
	(3) Inner membrane of mitochondria (	4) Mitochondrial fluid
53.	The main function of peroxisome is: (1) Catabolism of very long chain fatty ac (2) Glyoxylate cycle in seeds (3) Phosphorespiration in leaves (4) Glycolysis in Trypansomes	ids
54.	In Bryophytes, heterothalic condition is: (1) When male sex organs are not formed (2) When male and female sex organs are (3) When male and female sex organs are (4) When two different forms of thallus or	found in the same individual found in separate individuals
55.	Which of the following statements are not	correct?
	(1) Funaria hygrometrica is a common most	s on Indian hills
	(2) The adult plant body of <i>Anthoceros</i> is a	sporophyte
	(3) Selaginella bears spores of two types	
	(4) Apogamy is a type of reproduction in from the gametophyte without fusion	some ferns in which sporophyte develops of gametes

56.	In which of the following animals sex is	is determined by hormones?
	(1) Hippocampus	(2) Alligator
	(3) Bonellia	(4) Cobra
57.	Which of the following types of inherita	[전기에 대한 시간 그리아 [2] [2] 이 시간
	(1) Chloroplast inheritance	(2) Mendalian inheritance
	(3) Cortical inheritance *	(4) Cytoplasmic inheritance
58.	The cytoplasmic factors responsible for	r male sterility in maize plants, are located in:
	(1) Nucleus	(2) Mitochondria
	(3) Chloroplast	(4) Cytosol
59.	Mitochondrial DNA is not associated v	with which of the following?
	(1) Regulation of apoptosis	(2) Generation of reactive oxygen species
	(3) Energy production	(4) Regulation of cellular transport
60.	Which of the following is a chaperone	?
	(1) Nucleoplasmin	(2) Chromatosome
	(3) Histone $H_1$ and $H_2$	(4) Histone $H_3$ and $H_4$
61.	Unexplained substantial variation in the closely related species is called:	the haploid nuclear DNA content even between
	(1) Kinetic complexity	(2) Haploidy
	(3) Aneuploidy	(4) C-value paradox
62.	Which of the following disease is <i>not</i> s	spread by housefly ?
	(1) Amoebic dysentry	(2) Cholera
	(3) Typhoid	(4) Plague
63.	Coelomic cavity of Balanoglossus is ma	nade up of how many parts?
	(1) One	(2) Two
	(3) Four	(4) Five

64.	Which of the following pairs are co	correctly matched ?			
	(A) Trochophore – Balanoglossus	of the second state of the second second			
	(B) Bipinnaria–Asterias	Market Commence			
	(C) Holothuria – Auricularia				
	(D) Fasciola – Cercaria	engang pengangan di kenggang pengangan di kenggang beranggan pengangan di kenggan beranggan beranggan berangga Penganggan penganggan penganggan penganggan beranggan beranggan beranggan beranggan beranggan beranggan berang			
	The <i>correct</i> answer is:				
	(1) A and B only	(2) B and D only	SALES THE PERSON		
	(3) C and D only	(4) B, C and D only			
65.	The early seed fern Ekinsia evolved	d in:			
	(1) Late Devonian	(2) Early Devonian			
	(3) Carboniferous	(4) Triassic			
66.	Coralloid roots are found in:				
	(1) Lycopodium	(2) Pinus			
	(3) Cycas	(4) Dryopteris			
67.	Which of the following is <i>not</i> corre	ectly matched ?	The Charles		
	(1) Marigold – Capitulum	(2) Mimosa – Corymb	(140) CALINA		
No Year	(3) Brassica – Spike	(4) Anthurium – Spadix			
68.	Synandrous condition is found in the	the family:			
	(1) Cucurbitaceae	(2) Ranunculaceae			
	(3) Leguminosae	(4) Liliaceae			
69.	Which of the following statements	are not correct?			
	(A) Spike inflorescence is found in	Acalypha.			
	(B) Fruit of family ranunculaceae is etaerio.				
	(C) The inflorescence which appear like a single bisexual flower is cyathium.				
	(D) Almost all plants have latex in				
	The <i>correct</i> answer is:				
	(1) A and D (2) B and C	(3) A only (4) C only			

70.	In the secondary steles of Boerhaavia:		"\$" Why I was a supplied to the
	(1) Xylem surrounds phloem	(2)	Phloem surrounds xylem
	(3) Both are parallel	(4)	Both are alternate
71.	In which of the following plants second	ary s	growth occurs?
	(1) Yucca (2) Dracaena	All D	Oryza (4) Triticum
72.	Which of the following is <i>not</i> a part of p	perid	erm of a plant ?
	(1) Phellogen	(2)	Phelloderm
	(3) Phellem	(4)	Phloem
73.	Path of pollen tubes in the pistil is guid	ed by	y:
	(1) Enzymes of the pollen apparatus	(2)	Stigmatic fluid
	(3) Tissues of the style	(4)	Secration of ovule
74.	Which of the following type of the fruit	, stra	wberry is?
	(1) Drupe (2) Berry	(3)	Achene (4) Follicle
75.	In which of the following animals, bloo	d flo	ws in both the directions (reverse also)?
	(1) Petromyzon	(2)	Fish
	(3) Herdmania	(4)	Branchistoma
76.	Respiration of the cephalochordates occ	curs	through which of the following?
	(1) Lungs	(2)	Gills
	(3) Fins	(4)	General body surface
77.	Which of the following pairs are correct	tly m	natched?
	(A) Alytes – midwife toad		
	(B) Petromyzon – male is parasite on fe	male	
	(C) Bony fish – cycloid scale		
	(D) Ichthyophis – apoda		The second secon
	The answer is:		
	(1) A, B, C and D	(2)	B, C and D only
	(1) A, b, C and b	(2)	b, c and b only

78.	Which of the following is <i>not</i> a flight muscle?			
	(1) Coraco-brachialis brevis	(2)	Coraco-brachialis langus	
	(3) Gastronemius	(4)	Pectoralis major	
79.	Non-renal and pronephric head kidney	s are	found in :	
	(1) Rana	(2)	Hemidactylus	
	(3) Labeo	(4)	Alligator	
80.	The optimum pH for action of pancreat	ic an	nvlase is :	
	(1) 3.7 (2) 5.4		6.2 (4) 7.1	
81.	For the digestion of fatty acids, which o	f the	following are required?	
	(1) Alpha-lipase only	(2)	Colipase only	
	(3) Alpha-lipase + Colipase	(4)	Alpha-lipase + Colipase + bile salts	
82.	Which of the following statements are r	ot ti	rue?	
	(A) Autonomic nervous system control			
	(B) Sympathetic nervous system is vol	unta	rily controlled via fore-brain.	
	(C) The action potential a neuron is term	niņa	ted by efflux of potassium.	
	(D) Schwan cell is responsible for myel	in se	cretion on the peripheral nerves.	
	The answer is:			
	(1) B only	(2)	B and C only	
	(3) C and D only	(4)	A, C and D only	
83.	Which of the following are not matched	cor	ectly?	
	(A) Hypoxia – deficiency of $O_2$ in the ti	ssue	S	
	(B) Tidal volume in normal man – 0.5 li	ters		
	(C) Proximal convoluted kidney tubule	- re	absorption	
	(D) Stomach – cholecystokinin secretion	ı	The second of th	
	The answer is:			
	(1) A and B only	(2)	A and C only	
	(3) Bonly	(4)	Donly	

84.	Which of the following statements are	not correct?			
	(A) Testosterone acts by a second mes	senger system.			
	(B) Triiodothyronine binds to intracel	lular receptors.			
	(C) Epinephrine is not a neurotransmi	tter.			
	(D) A steroid hormone enters the target	et cell and alters its gene expression.			
	The answer is:	The first of the second section (i)			
	(1) A and C only	(2) A and D only			
	(3) B and C only	(4) C and D only			
85.	The enzyme that fixes atmospheric car	bon dioxide in C4 plants is:			
	(1) Hydrogenase	(2) PEP carboxylase			
	(3) RuBP Oxygenase	(4) Hydrolase			
86.	Which of the following statements are <i>incorrect</i> about movement of water throug xylem of plant?				
	(1) Root pressure plays important role	e de la companya de			
	(2) Transpiration pull has no role	THE PROPERTY OF THE PROPERTY O			
The .	(3) Capillary action has no role	The Common of Street, and the			
	(4) Hydrogen ion/AT Pase pump at t	he xylem element membrane plays a role			
87.	Most of the plant cytokinins are synthe	esized in:			
	(1) Flowers	(2) Roots			
	(3) Leaves	(4) Stem			
88.	Phytochrome plays a key role in:				
	(1) Photomorphogenesis	(2) Water transport			
	(3) Electrolyte balancing	(4) Stomatal movement			
89.	Most of the CO <sub>2</sub> generated on the earl	th is absorbed by :			
	(1) Green plants	(2) Green plants and Oceans			
	(3) Lime stones	(4) All of these			
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90.	Which one of the following is <i>not</i> a cha	racteristic of an ecosystem?
	(1) It is self regulated	and the second process of the second
	(2) It is leaky in relation to flow of ma	tter and energy
	(3) It has relations with the surroundir	ng ecosystems
	(4) It does not change with time	
91.	Green house effect is related to which o	of the following cycle?
	(1) Carbon	(2) Nitrogen
	(3) Oxygen	(4) Sulphur
92.	Which of the following is <i>not</i> a grasslar	
	(1) Prairie	(2) Pampa
	(3) Steppe	(4) Tundra
93.	Which of the following statements about	at human evolution is <i>not</i> correct?
	(1) The first species of genus Homo was	
	(2) Fossil of Australopitheus anamensis	was found in Kenya
	(3) Homo erectus was the first to move of	out of Africa
	(4) Sivapithecus was ancestor of man	
94.	A bacterium that can cause tumors in p	lants and transfer its genes to them is:
	(1) Bacillus thuriengensis	(2) Rhizobium
	(3) Nitrobacterium	(4) Agrobacterium
95.	Which of the following vectors contain	DNA sequences from lambda phage?
	(1) Plasmid Ti	(2) Cosmid
	(3) RNA phase	(4) Plasmid Ri
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96.	Michaelis-Menten rate equation is about :	
	(1) Enzyme – substrate complex formation	
	(2) Rate of Krebs cycle	
	(3) Rate of oxidative phosphorylation	
	(4) Rate of reaction of an enzyme	
97.	. The rate of regulatory enzymes is <i>not</i> modulated by which the following	z:
	(1) Feed-back inhibition	
	(2) Reversible covalent modification	
	(3) Irreversible covalent modification and activation of enzymes	
	(4) Coupling factors	A TEAT
98.	. The parts of genome which keep on changing their positions are known	as:
	(1) Exons (2) Introns	
	(3) Transposable elements (4) Repressors	
99.	. Which of the following are correctly matched?	
	(A) Balanoglossus – radial cleavage	
	(B) Chick – discoidal cleavage	
	(C) Cockroach – superficial cleavage	
	(D) Ascaris – spiral cleavage	
	The answer is:	
	(1) A and B only (2) C and D only	
	(3) A, B and D only (4) A, B, C and D	
00.	. Which of the following statement is false?	
	(1) Sweat sorghum is used to obtain ethanol.	

- - (2) Quinine is obtained from the bark of Rauwolfia.
  - (3) Sunflower is a source of edible oil.
  - (4) Morphine is obtained from opium plant.

#### SECTION - C

101.	The necessary	condition	for achromatic	combination is:
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- (1) Two lenses should be of same materials
- (2) Two lenses should be of different materials
- (3) Two lenses should be of same focal length
- (4) Two lenses should be of same radius of curvature

### 102. For Newton's ring due to transmitted light, the central maximum (n=0) is:

- (1) dark with zero diameter
- (2) bright with zero diameter
- (3) may be bright or dark
- (4) None of above

# 103. The Young's double slit experiment is performed with blue and green light of wavelengths 4360 Å and 5460 Å respectively. If X is the distance of 4th maxima from the central maxima, then:

- (1) X<sub>blue</sub> = X<sub>green</sub>
- (2) Xblue > Xgreen
- (3) Xblue < Xgreen
- (4)  $X_{blue} / X_{green} = \lambda_{green} / \lambda_{blue}$

### 104. The angular half width of the principal maxima of a plane diffraction grating is :

- (1) very narrow and sharp
- (2) very broad and dim
- (3) very narrow and dim
- (4) very broad and sharp

### **105.** A polarimeter suitable for color blind persons is:

(1) bi-quartz polarimeter

(2) half shade polarimeter

(3) saccharimeter

(4) None of above

111

**106.** The cubic lattice most densely packed is:

- (1) BCC with packing factor 0.680
- (2) SC with packing factor 0.524
- (3) HCP with packing factor 0.740
- (4) FCC with packing factor 0.740

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107. X-Ray diffraction method used for structure determination of single crystal is:

- (1) Power crystal method
- (2) Rotating crystal method

(3) Laue method

(4) None of above

**108.** Relation between volume of unit cell, UT [in direct lattice(DL)] and reciprocal lattice(RL) is:

- (1) (Volume of UT)<sub>RL</sub> =  $4\Pi^2$ /(Volume of UT)<sub>DL</sub>
- (2) (Volume of UT)<sub>DL</sub> =  $4\Pi^2$ /(Volume of UT)<sub>RL</sub>
- (3) (Volume of UT)<sub>RL</sub> =  $8\Pi^3$ /(Volume of UT)<sub>DL</sub>
- (4) (Volume of UT)<sub>DL</sub> =  $8\Pi^3$ /(Volume of UT)<sub>RL</sub>

109. Phonons are defined as:

- (1) optical energy given to unit cell
- (2) Lattice vibrations quantized energy
- (3) Lattice vibrations continuous energy
- (4) continuous heat energy given to lattice

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110.	The energy of gamma photon having a	wav	relength 1.5 Å (take h= $6.634 \times 10^{-34}$ Js)
	(1) $8.275 \times 10^3 eV$	(2)	$13.24 \times 10^{-4} eV$
	(3) $10.24 \times 10^{-3} eV$	(4)	$1.6 \times 10^{-19} eV$
111.	The ratio of kinetic energy of pro and an α-particle have equal de-Broglie	oton wav	to that of $\alpha$ -particle, when a proton velengths is :
	(1) 1:2	(2)	2:1
	(3) 1:1	(4)	4:1
112.	In Schrodinger's equation, eigen values	mea	ns:
	(1) value of energy	(2)	value of position
	(3) value of frequency	(4)	none of above
113.	Zero-point energy of an oscillator is give	en by	y:
	(1) hv	(2)	zero
	(3) infinite	(4)	$\left(\frac{1}{2}\right)hv$
114.	The factors that control the allowed value:		of energy of a particle in a potential well
	(1) width and depth of potential well		o beninger over a military bening the second
	(2) time and energy of potential well		
	(3) depth and energy of potential well		a subcerior of the same of the
	(4) time and width of potential well		or converge on that succession in the

- **115.** In Moseley's law which leads to correct sequence of putting the elements in periodic chart, frequency of X- ray spectral line depends on :
  - (1) Z

(2)  $(Z)^2$ 

(3)  $(Z)^{1/2}$ 

 $(4) (Z)^3$ 

(Z= Atomic No. of Element)

116. The product of the characteristic roots of the matrix:

$$\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$$
 is:

(1) 3

- (2) 18
- (3) 0
- (4) 45
- 117. If the roots of equation  $x^3 12x^2 + 39x 28 = 0$  are in A. P., then one of the root is:
  - (1) 4

- (2) 3
- (3) -4
- (4) 6
- **118.** The radius of curvature of the hyperbola  $r^2 = a^2 b^2 + \frac{a^2b^2}{p^2}$  is:
  - $(1) \ \frac{a^2b}{p^3}$

 $(2) \quad \frac{a^2b^2}{p^3}$ 

 $(3) \ \frac{ab^2}{p^3}$ 

 $(4) \ \frac{a^2b^2}{p}$ 

- 119.  $\int_{0}^{1} \frac{x^3}{\sqrt{1-x^2}} dx$  is equal to :
  - (1)  $\frac{3}{2}$

(2) 0

(3)  $-\frac{3}{2}$ 

 $(4) \frac{2}{3}$ 

**120.** The Co-ordinates of the centre of conic  $x^2 + 12xy - 4y^2 - 6x + 4y + 9 = 0$  are :

 $(1) \ \left(\frac{1}{2},0\right)$ 

 $(2) \quad \left(-\frac{1}{2},0\right)$ 

 $(3) \left(0,\frac{1}{2}\right)$ 

 $(4) \left(\frac{1}{2}, \frac{1}{2}\right)$ 

**121.** If  $x = \cos \theta + i \sin \theta$ , then  $x^n + \frac{1}{x^n}$  is equal to:

(1)  $2\cos n\theta$ 

(2)  $2i\cos n\theta$ 

(3)  $\frac{\cos n\theta}{2}$ 

(4)  $\cos 2n\theta$ 

122. The least positive integer (mod II) to which 282 is congruent:

(1) 4

- (2) 7
- (3) 5
- (4) 2

123. The integrating factor of differential equation  $2\cos(y^2) dx - xy \sin(y^2) dy = 0$  is:

(1)  $\frac{1}{x^3}$ 

(2)  $x^2$ 

(3)  $x^3$ 

(4)  $\frac{1}{r^2}$ 

**124.** Particular integral for the differential equation  $(D^2 - 6D + 9)y = e^{3x}$  is:

 $(1) \frac{e^{3x}}{2}$ 

(2)  $x^2e^{3x}$ 

 $(3) \ \frac{e^{3x}}{x^2}$ 

(4)  $\frac{x^2}{2}e^{3x}$ 

**125.** The value of  $\lambda$  so that the following vectors are coplanar  $\vec{a} = 2\hat{i} - 7\hat{j} + \lambda \hat{k}$ ,  $\vec{b} = \hat{i} + 2\hat{j} - \hat{k}$  and  $\vec{c} = 3\hat{i} - 5\hat{j} + 2\hat{k}$  is:

(1) -3

(2) 3

(3)  $\frac{1}{3}$ 

 $(4) -\frac{1}{3}$ 

126.  $\lim_{x\to\infty} x \tan \frac{1}{x}$  is :

(1) 1

(2) -1

(3) 0

(4) 2

**127.** If  $z = \tan^{-1} \left( \frac{x}{y} \right)$ , then  $\frac{\partial z}{\partial x}$  is:

(1) 0

 $(2) \quad \frac{x}{x^2 + y^2}$ 

(3)  $\frac{y}{x^2 + y^2}$ 

(4)  $\frac{1}{x^2 + y^2}$ 

**128.** The partial differential equation  $x \frac{\partial^2 z}{\partial x^2} + 2 \frac{\partial^2 z}{\partial y \partial x} + y \frac{\partial^2 z}{\partial y^2} + \frac{\partial z}{\partial x} = 0$  is parabolic if:

(1)  $xy \neq 1$ 

(2) xy < 1

(3) xy > 1

(4) xy = 1

**129.** The particular integral of the differential equation  $\frac{\partial^3 z}{\partial x^3} - 3 \frac{\partial^3 z}{\partial x^2 \partial y} + 4 \frac{\partial^3 z}{\partial y^3} = e^{x+2y} \text{ is :}$ 

(1)  $\frac{e^x}{72}$ 

(2)  $\frac{e^{x+2y}}{27}$ 

(3)  $\frac{e^{x+2y}}{72}$ 

(4)  $\frac{e^y}{27}$ 

130. Any wrench may be resolved into two wrenches, whose axes intersect at right angles in how many ways?

(1) One way

- (2) Three ways
- (3) Infinite number of ways
- (4) None of these

- $\lim_{x \to \infty} \left( \frac{2}{1} \cdot \frac{3}{2} \cdot \frac{4}{3} \cdot \dots \cdot \frac{n}{n-1} \right)^{\frac{1}{n}}$  is equal to: 131.
  - (1) 1

- (2) -1
- (3) 0
- $(4) \frac{1}{2}$
- The series  $1^2 + 2^2 + 3^2 + \dots + n^2 + \dots$  diverges to: 132.
  - $(1) -\infty$
- (2) +∞
- (3) 0

(4) 1

- The value of  $H_{2n+1}(0)$  is:
  - (1) 1

(2) -1

(3)  $\frac{1}{n}$ 

- (4) 0
- The inverse Laplace Transform of  $\frac{1}{e^{7/2}}$  is:
  - (1)  $\sqrt{\frac{t}{\pi}}$

(2)  $\frac{8}{15}\sqrt{\frac{t}{\pi}}$ 

(3)  $\frac{8t^2}{15}\sqrt{\frac{t}{\pi}}$ 

- The operator | | means:
  - (1) Logical OR

(2) Logical AND

(3) Logical NOT

- (4) None of these
- **136.** Let (R, d) be the usual metric space. Then derived set of:

$$A = \left\{ \frac{1}{n} : n \in \mathbb{N} \right\} \text{ is :}$$

- (1) A
- (2) {0} (3) ¢

certain any order of the contract of the contract of

 $(4){1}$ 

MIN (Legender Science (SELE)) (II)

137. Let (X, d) be a metric space and A be any subset of X. Then A is open if and only if:

 $(1) \quad A = -A^{\circ}$ 

 $(2) \quad A = \frac{1}{A}$ 

(3)  $A = \mathring{A}$ 

(4) None of these

**138.** If  $G = \{1, w, w^2\}$  is the group of cube roots of unity, then order of  $w^2$  under the binary operation multiplication is :

(1) 2

(2) 4

(3) 1

(4) 3

139. A division ring has how many zero divisors?

(1) 1

(2) 3

(3) 2

(4) None of these

140. "The rate of change of momentum is directly proportional to the impressed force and takes place in the direction of the force" is:

- (1) Newton's first law of motion
- (2) Newton's second law of motion
- (3) Newton's third law of motion
- (4) None of these

141. Time of flight of a projectile is given by:

 $(1) \frac{2u \sin \alpha}{g}$ 

 $(2) \quad \frac{u\sin\alpha}{g}$ 

(3)  $\frac{u \sin \alpha}{2g}$ 

(4) None of these

**142.**  $T\left(\frac{1}{2}\right)$  is equal to:

(1) e

(2) π

(3)  $\sqrt{\pi}$ 

(4) √e

**143.** The fixed point of the Mobius transformation  $w = \frac{3z-4}{z-1}$  is:

(1) z = 1

(2) z = -1

(3) z = -2

(4) z = 2

**144.** The set of vectors  $\{(1,0),(0,1)\}$  in  $\mathbb{R}^2$  in:

(1) Linearly dependent

(2) Linearly independent

(3) Not defined

(4) None of these

**145.** If  $T:V\to W$  is a linear transformation, then T is one-one iff N(T) is:

(1) {1}

(2) ¢

(3) 0

(4) None of these

146. For the table:

x	0	1	2	3	4	5
f(x)	0	3	8	15	24	25

 $\Delta^3 f(x)$  is:

- (1) 3
- (2) 0
- (3) 2
- (4) 7

147. For the data:

x	-1	1	2	3
f(x)	-21	15	12	2

 $\Delta^2 f(x)$  are:

- (1) -7 and -3
- (2) 7 and 3
- (3) 7 and -3
- (4) -7 and 3

148. Runge-Kutta method is a:

- (1) Single step method
- (2) Multiple step method
- (3) Method for solving cubic equation
- (4) None of these

The force acting on a system of *n* particles is conservative only if : 149.

- (1)  $\nabla \cdot F \rightarrow 0$  (2)  $\nabla \times F \rightarrow 0$
- (3)  $\nabla \cdot \nabla \cdot F \rightarrow = 0$

 $(4) \quad \nabla \bullet \nabla \times F^{\to} = 0$ 

In Lagrangian's Equation Qi represents:

- (1) Generalized force having dimensions of force explicitly
- (2) Quantized force having dimensions of force
- (3) Generalized force may or may not have dimensions of force
- (4) Work done by generalized force

**151.** The Hamiltonian, H = T + V gives total energy:

- (1) when Cartesian and generalized coordinates do not depend on time explicitly
- (2) when only generalized coordinates do depend on time explicitly
- (3) when only Cartesian coordinates do not depend on time explicitly
- (4) when Cartesian and generalized coordinates depend on time explicitly

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**152.** Any field,  $A^{\rightarrow}$  is said to solenoid field if:

- (1)  $A^{\rightarrow} = \nabla \times V^{\rightarrow}$  and  $\nabla \cdot A^{\rightarrow} = 0$
- (2)  $A^{\rightarrow} = \nabla \times V^{\rightarrow}$  and  $\nabla \cdot A^{\rightarrow} = 0$
- (3)  $A^{\rightarrow} = \nabla \times V^{\rightarrow}$  and  $\nabla \times A^{\rightarrow} = 0$
- (4)  $A^{\rightarrow} = \nabla \cdot V^{\rightarrow}$  and  $\nabla \times A^{\rightarrow} = 0$

**153.** The total charge enclosed by a given surface through which 15000 lines of force is incoming and that of outgoing lines of force is 25000:

(1)  $13.275 \times 10^{-8}C$ 

(2)  $8.85 \times 10^{-12} C$ 

(3)  $8.85 \times 10^{-8}$  C

(4)  $8.85 \times 10^{-8} C/s$ 

**154.** Name of program which translates a high level language into machine language:

(1) compiler

(2) assembler

(3) register

(4) converter

**155.** The area enclosed by a cycle represents net work done as well as net heat of interaction is:

(1) P-V diagram

(2) Carnot cycle

(3) T-S diagram

(4) Triple point diagram

**156.** A real gas shows neither heating nor cooling in Joule - Thomson effect if the initial temperature is :

- (1) less then inversion temperature
- (2) greater then inversion temperature
- (3) equal to inversion temperature
- (4) equal to 273K.

If  $p_1$  and  $p_2$  be the probability of two independent events, then the probability of two events to take place simultaneously is:

(1)  $p_1 + p_2$ 

(2)  $p_1 \times p_2$ 

(3)  $p_1/p_2$ 

(4)  $p_1 - p_2$ 

The two constraints used in determining the most probable macro-state 158. are:

- (1)  $\Sigma n_i = n$  and  $\Sigma n_i u_i = u$
- (2)  $\Sigma n_i = n$  and  $\Sigma n_i v_i = v$
- (3)  $\Sigma n_i = n$  and  $\Sigma n_i v_i = v/n$  (4)  $\Sigma n_i = n$  and  $\Sigma n_i u_i = u/n$

159. The essential condition for Fermi - Dirac statistics is:

- (1) the particles are distinguishable
- (2) the particles are indistinguishable
- (3) there is no limit on the no. of particles present in a given energy state
- (4) not more than one particle can be present in a given energy state

160. Boltzmann limit is given by

- (1)  $(n_i/g_i) \ll 1$  and satisfied by all gases at ordinary temperature
- (2)  $(g_i/n_i) << 1$  and satisfied by all gases at absolute temperature
- (3)  $(n_i/g_i) >> 1$  and satisfied by all gases at ordinary temperature
- (4)  $(n_i \times g_i) \ll 1$  and satisfied by all gases at 0K

- **161.** The ratio of rms value to the average value of alternating current is called Form Factor (FF) and given by :
  - (1) 1.21, peak of wave is flat if FF less than 1.21
  - (2) 1.11, peak of wave is sharp if FF greater than 1.11
  - (3) 1.11, peak of wave is flat if FF greater than 1.11
  - (4) 2.11, peak of wave is flat if FF greater than 2.11
- **162.** The quality factor of a series resonant circuit is given by :
  - (1)  $\frac{wL}{R}$  and depends on R only
  - (2)  $\frac{wC}{R}$  and depends on R only
  - (3)  $\frac{wR}{L}$  and depends on R only
  - (4)  $\frac{wL}{R}$  and depends on L only
- **163.** For a given transistor configuration if  $l_c$  = 10.505mA,  $l_b$  = 100 $\mu$ A and  $l_{CBO}$  = 5 $\mu$ A, then value of  $\alpha_{dc}$  and  $\beta_{dc}$  are :
  - (1) 100 and 0.95

(2) 0.99 and 100

(3) 105 and 1.05

- (4) 101 and 99.0
- **164.** Calculate the apparent length of a meter road, when it is carried in a rocket moving with a speed of  $2.9 \times 10^8$  m/s take  $c = 3.0 \times 10^8$  m/s
  - (1) 0.254 m

(2) 0.52 m

(3) 0.359 m

(4) 1.0 m

**165.** The dirichlet conditions for an expandable function, f(x) are :

- (1) non-periodic, single valued, finite and continuous
- (2) periodic, single valued, infinite and continuous
- (3) periodic, single valued, finite and continuous
- (4) periodic, single valued, infinite and in continuous

166. The order of dead time and recovery time in a G.M. counter is :

(1) 100µs

(2) 10µs

(3)  $10^3 \mu s$ 

(4)  $10^{-3} \mu s$ 

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Total No. of Printed Pages: 29

# (DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

### CPG-EE-2017 (Forensic Science)-(SET-B)

C	yes for faithy &	10179 Sr.No.
Time: 1½ Hours	Total Questions : 166	Max. Marks: 100
Roll No. (in figures)	(in words)	
Candidate's Name		Date of Birth
Father's Name ————————————————————————————————————	Mother's Na	ame
Date of Exam :		
(Signature of the Candidat	te)	(Signature of the Invigilator)

## CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

- 1. All questions of Section-"A" are compulsory. Students are required to attempt either Section "B" or Section "C". Students of Medical Group are required to attempt Section "B". Students of Non-Medical Group are required to attempt Section "C". All questions carry equal marks i.e. one mark each.
- 2. The candidates must return the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means/misbehaviour will be registered against him/her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
- 3. The candidate *must not* do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself.
- 4. In case there is any discrepancy in any question(s) in the Question Booklet, the same may be brought to the notice of the Controller of Examinations in writing within two hours after the test is over. No such complaint(s) will be entertained thereafter.
- 5. Use only blue or black ball point pen of good quality in the OMR Answer-Sheet.
- 6. There will be negative marking. Each correct answer will be awarded one full mark and each incorrect answer will be negatively marked for which the candidate will get ¼ discredit. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. Before answering the questions, the candidates should ensure that they have been supplied correct & complete question booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after the start of examination.

CPG-EE-2017(Forensic Science)-(SET-B)/(C)

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### SECTION - A

1.	Compound A undergoes formation o acid. Therefore, compound A is:	f cyno	hydrin which on hydrolysis gives lactic
	(1) formaldehyde	(2)	acetaldehyde
	(3) acetone	(4)	benzaldehyde
2.	Which of the following polymer is then	moset	ting polymer?
	(1) Nylon-6	(2)	Nylon-6,6
	(3) Bakelite	(4)	None of these
3.	Which of the following is useful in trea	tment	of cyanide poisoning?
	(1) Amyl nitrite	(2)	Sodium nitrite
	(3) Nitrite thiosulphate	(4)	All of the above
4.	Enthalpies of combustion of methane and 285.7 kJ respectively. Enthalpy of the	E-1678 HT-152	hite and hydrogen are 890.2 kJ, 393.4 kJ ion of methane is:
	(1) -211.1 kJ mol <sup>-1</sup>	(2)	-890.2 kJ mol <sup>-1</sup>
	(3) -74.6 kJ mol <sup>-1</sup>	(4)	85.7 kJ mol <sup>-1</sup>
5.	respectively at the same temperature a is:	and pr	e contain oxygen, neon and methane ressure. The correct order of their masses
	(1) $A < B < C$ (2) $B < C < A$	(3)	C < A < B (4) $C < B < A$
6.	A substance which can act both as an a	ntisep	tic and disinfectant is:
	(1) Aspirin	(2)	Phenol
	(3) Analgin	(4)	Sodium pentothal
7.	Out of the following which does not ex	chibit l	IR spectra ?
	(1) $O_2$ (2) $CO_2$	(3)	SO <sub>2</sub> (4) HBr
8.	Hyperconjugation involves overlap of	the fol	llowing orbitals:
	(1) $\sigma - \sigma$ (2) $\sigma - p$	(3)	$p-p$ (4) $\pi-\pi$

						ompo	ounc
(1) II > III > I		(2)	I < II > III				
(3) I > II > III		(4)	III > II > I		region T.a.		.ar
Vitamin B <sub>12</sub> contains:	<b>4</b> (1)						
(1) cobalt (2)	magnesium	(3)	iron	(4)	nickel	DN.	.01
<ul><li>(1) Triphenylphosphir</li><li>(2) Pentacarbonyl triph</li><li>(3) Pentacarbonyl triph</li></ul>	ne pentacarbonyl o henylphosphine c henylphosphine c	chro hro hro	mium (0) mate (III)				1
Which one of the follow	ving ions is colour	rless	s?				
(1) $U^{3+}$ (2)	Cm <sup>4+</sup>	(3)	$Th^{4+}$	(4)	$Pu^{4+}$		
Solubility of iodine in the formation of:	liquid SO <sub>2</sub> is incr	ease	ed on addition o	of KI	. This is att	ibute	ed to
(1) $KI_3$ (2)	$I_2.SO_2$	(3)	KI.4SO <sub>2</sub>	(4)	SOI <sub>2</sub>		
$PbI_2 + KNH_2 $ $liq.NH_3$	<b>→</b>			体			E ?
Products of the Reaction	n are:				M	1)	
$(1) PbNH_2 \downarrow + I_2 + KI$		(2)	$PbNH \downarrow + HI +$	KI			
$(3) PbNH_2 \downarrow + KI_3$		(4)	None of the abo	ve			
Which gives red colour	with Fehling solu	utio	n ?				
(1) Glucose		(2)	Cellulose				
(3) Benzaldehyde		(4)	Cane sugar			(2)	
$O_2^{2-}$ is isoelectronic wit	h:			101	ilis pakal		
(1) H <sub>2</sub> (2)	$N_2$	(3)	$F_2$	(4)	S		
	amongst the following  (1) $II > III > I$ (3) $I > II > III$ Vitamin $B_{12}$ contains:  (1) cobalt (2) $IUPAC$ name of $[Cr(CC)$ (1) Triphenylphosphir  (2) Pentacarbonyl triph (3) Pentacarbonyl triph (4) Triphenylphosphir  Which one of the follow (1) $U^{3+}$ (2)  Solubility of iodine in the formation of:  (1) $KI_3$ (2) $PbI_2 + KNH_2 \xrightarrow{liq.NH_3}$ Products of the Reaction (1) $PbNH_2 \downarrow + I_2 + KI$ (3) $PbNH_2 \downarrow + KI_3$ Which gives red colour (1) Glucose (3) Benzaldehyde $O_2^{2-}$ is isoelectronic with	amongst the following aniline (I), benzer (1) II > III > I  (3) I > II > III  Vitamin $B_{12}$ contains:  (1) cobalt (2) magnesium  IUPAC name of $[Cr(CO)_5[P(C_6H_5)_3]]$ is  (1) Triphenylphosphine pentacarbonyl (2) Pentacarbonyl triphenylphosphine c (3) Pentacarbonyl triphenylphosphine c (4) Triphenylphosphine pentacarbonyl which one of the following ions is colour (1) $U^{3+}$ (2) $Cm^{4+}$ Solubility of iodine in liquid $SO_2$ is increthe formation of:  (1) $KI_3$ (2) $I_2.SO_2$ $PbI_2 + KNH_2 \xrightarrow{liq.NH_3}$ Products of the Reaction are:  (1) $PbNH_2 \downarrow + I_2 + KI$ (3) $PbNH_2 \downarrow + KI_3$ Which gives red colour with Fehling solution (1) Glucose (3) Benzaldehyde $O_2^{2-}$ is isoelectronic with:	amongst the following aniline (I), benzene (II) II > III > I (2) (3) I > III > III (4) (4) (4) Vitamin $B_{12}$ contains: (1) cobalt (2) magnesium (3) IUPAC name of $[Cr(CO)_5[P(C_6H_5)_3]]$ is: (1) Triphenylphosphine pentacarbonyl chromograms (2) Pentacarbonyl triphenylphosphine chromograms (3) Pentacarbonyl triphenylphosphine chromograms (4) Triphenylphosphine pentacarbonyl chromograms (4) Triphenylphosphine pentacarbonyl chromograms (1) $U^{3+}$ (2) $Cm^{4+}$ (3) Solubility of iodine in liquid $SO_2$ is increase the formation of: (1) $KI_3$ (2) $I_2.SO_2$ (3) $PbI_2 + KNH_2 \xrightarrow{liq.NH_3}$ Products of the Reaction are: (1) $PbNH_2 \downarrow + I_2 + KI$ (2) (3) $PbNH_2 \downarrow + KI_3$ (4) Which gives red colour with Fehling solution (1) Glucose (2) (3) Benzaldehyde (4) $O_2^{2-}$ is isoelectronic with:	amongst the following aniline (I), benzene (II) and nitrobenze (II) III > III > I (2) I < II > III (3) I > II > III (4) III > II (4) III > II > I (4) III > II > I (4) III > II > I (4) III > I (4) III > I (4) III > I (5) II > I (7) II > I (7) II > I (8) II > I (9) II > I (1) II > II > I (1) II > II > II > I (1) II > II > II > II	amongst the following aniline (I), benzene (II) and nitrobenzene (I) $\Pi>\Pi>\Pi>I$ (2) $I<\Pi>III$ (3) $I>II>III$ (4) $III>III$ (4) $III>III>II$ Vitamin $B_{12}$ contains: (1) cobalt (2) magnesium (3) iron (4) $III$ (4) $III>III>II$ (4) $III>III>II$ (4) $III>III>II$ (4) $III>III>II$ (4) $III>III>II$ (5) $III>III$ (7) $III>III$ (8) $III>III$ (9) $III>III>II$ (1) $III>III$ (1) $III>III$ (1) $III>III$ (2) $III>III$ (3) $III>III$ (4) $III>III>II$ (4) $III>III>II$ (4) $III>III>III>III$ (7) $III>III>III$ (8) $III>III>III>III$ (9) $IIII>III>III>IIII$ (1) $III>IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII$	amongst the following aniline (II), benzene (III) and nitrobenzene (III) is: (1) III > III > II	(1) $\Pi>\Pi>\Pi$ (2) $\Pi>\Pi$ (3) $\Pi>\Pi$ (4) $\Pi>\Pi>\Pi$ Vitamin $B_{12}$ contains: (1) cobalt (2) magnesium (3) iron (4) nickel $\Pi$ IUPAC name of $\Pi$ (2) $\Pi$ (3) $\Pi$ (4) $\Pi$ (4) $\Pi$ (4) $\Pi$ (4) $\Pi$ (5) $\Pi$ (7) $\Pi$ (7) $\Pi$ (8) $\Pi$ (9)

17.	which one of the	following species is	parama	ignetic :		
	(1) $O_2^-$	(2) CN <sup>-</sup>	(3)	со	(4) F <sub>2</sub>	
18.	In NaCl type stru	cture, the coordinati	ion num	bers of cation	and anion are:	
	(1) 6 and 4	(2) 6 and 6	(3)	4 and 4	(4) 8 and 4	
19.	Which one of the	following complex	can exhi	ibit coordinat	ion isomers?	
	(1) $[Co(NH_3)_6][$	$Cr(CN)_6$	(2)	$[Cr(NH_3)_6]$	213	
	(3) [Co (en) <sub>2</sub> Cl <sub>2</sub> ]	+	(4)	$[Cr(en)_2 Cl_2]$	+	
20.	Cr(CO) <sub>x</sub> has EAN	N of Cr = 36, hence x	=:		An alto be writered to	
	(1) 2	(2) 4	(3)	6	(4) 5	
21.	The SI units of th	e Vander Waals b te	rm are:			
	(1) m <sup>3</sup> mol	$(2)$ $m^2/mol$	(3)	m <sup>3</sup> / mol	(4) m <sup>2</sup> mol .	
22.	The law which re	lates the solubility of	of a gas t	to its pressure	e is called :	
	(1) Raoults law		(2)	The distribu	tion law	
	(3) Henry's law		(4)	Ostwald's lav	<b>V</b> .	
23.	By adding a non-	volatile solute to a s	solvent,	the boiling po	oint of the solvent :	
	(1) will increase	X-4/-	(2)	will decrease		
	(3) will not chan	ge	(4)	may increase	or decrease	
24.	If $2.303RT/F = 0$ . $Zn   Zn^{2+} (a_1)   C$		es of the	solids are co	nstant, then e.m.f. of	the cell
	(1) $E = E^{\circ} - 0.059$	$\log (a_2/a_1)$	(2)	$E = E^{\circ} + 0.05$	$9\log\left(a_2/a_1\right)$	
	(3) $E = E^{\circ} - \frac{0.059}{2}$	$\frac{\partial}{\partial a_2} \log \left( a_2 / a_1 \right)$	(4)	$E = E^{\circ} + \frac{0.059}{2}$	$\frac{9}{2}\log\left(a_2/a_1\right)$	
25.	The hybridization	n of Xe in XeO <sub>2</sub> F <sub>2</sub> is	<b>:</b>			St. die

(3)  $sp^3d^3$ 

 $(2) sp^3d^2$ 

(1)  $sp^3d$ 

(4)  $dsp^3$ 

26.	The difference betw (1) R	veen ΔH and . (2) $p\Delta V$		ant volume is eq VΔp	(4) 3/2R
27.	The enthalpies of f	ormation of g	gaseous N <sub>2</sub> 0	O and NO at 298	8K are $82$ and $90$ kJ mol <sup>-1</sup> .
	The enthalpy of the	e reaction N <sub>2</sub> 0	$O(g) + \frac{1}{2}O_2$	$\rightarrow$ 2NO(g) is:	top ( ) (c)
	(1) –8 kJ	(2) 98 kJ	(3)	-74 kJ	(4) 8 kJ
28.	The overall energy	change durin	g Carnot cy	vcle is:	Stone (4)
5	(1) equal to w	(2) zero	(3)	maximum	(4) equal to q
29.	A process in which initial state is called	th the system	ı, after und	lergoing various	s processes, returns to its
	(1) reversible proc	ess	(2)	irreversible pro	ocess (C)
	(3) cyclic process		(4)	Hess law	Same and Same
30.	The diameter of m $(\lambda_A/\lambda_B)$ will be:	nolecule <i>B</i> is	half that of	molecule A, th	e ratio of mean free path
	(1) 1/2	(2) 1/4	(3)	4	(4) 2
31.	The root mean squa	are velocity o	f an ideal g	as at constant pr	essure varies with density
	'd' is:				<b>有工作。</b> 在外的工作工作工程是是是现代的。
,	(1) $d^2$	(2) b. d	(3)	$\sqrt{d}$	$(4) 1/\sqrt{d}$
32.	For the reaction 2C	l(g)Cl <sub>2</sub> (g) the	signs of ΔH	I and ΔS respecti	vely are:
	(1) +, -	(2) +,+	(3)	-,-	(4) + (1)
33.	The principal buffe	r present in h	uman blood	l is:	with transity Att.
	(1) $H_3PO_4 + NaH_2$	$PO_4$	(2)	STATE OF STREET STATE OF STREET	CH <sub>3</sub> COONa (1)
	$(3) Na_2HPO_4 + Na$		(4)	$H_2CO_3 + HCO_3$	(3) Nitroutenin
34.	If a neutral solution		nVC me		AC. Which we lot
34.					
	(1) 6.68	(2) 7	(3)	7.63	(4) d3.5

#### SECTION - B

35.	Which one of the following is <i>not</i> a contract of the following is <i>not</i> a contract of the following is <i>not</i> a contract of the following is <i>not</i> and <i>not</i> a contract of the following is <i>not</i> and <i>not</i> and <i>not</i> are the following is an arrow the following is a contact are the following is a contact are the followi	characteristic of an ecosystem?	
	(1) It is self regulated	The state of the s	
	(2) It is leaky in relation to flow of	matter and energy	
	(3) It has relations with the surroun	ding ecosystems	
	(4) It does not change with time	文化,大学的发展的一种的一种。 1	
36.	Green house effect is related to which	h of the following cycle?	
	(1) Carbon	(2) Nitrogen	
	(3) Oxygen	(4) Sulphur	
37.	Which of the following is <i>not</i> a grass	sland?	
G by	(1) Prairie	(2) Pampa	
	(3) Steppe	(4) Tundra	
38.	Which of the following statements a	bout human evolution is <i>not</i> correct?	
	(1) The first species of genus <i>Homo</i>	was Homo habilis	
	(2) Fossil of Australopitheus anamen	sis was found in Kenya	
	(3) Homo erectus was the first to mo	ve out of Africa	
	(4) Sivapithecus was ancestor of man		
39.	A bacterium that can cause tumors i	n plants and transfer its genes to them is :	
	(1) Bacillus thuriengensis	(2) Rhizobium	
	(3) Nitrobacterium	(4) Agrobacterium	
40.	Which of the following vectors cont	ain DNA sequences from lambda phage?	
	(1) Plasmid Ti	(2) Cosmid	
	(3) RNA phase	(4) Plasmid Ri	

53.	Which of the following statement is wrong?						
	(1) Pyrilla perpusilla is a bug	Committee (v)					
	(2) Adults of red pumpkin beetles atta	ack vegetables					
	(3) The name Gandhibug of Lepocor odour	isa Oratorius is derived from its unpleasant					
	(4) Tribolium castanneum is known as le	esser grain borer.					
54.	Hadda beetles usually prefer to feed on						
44	(1) Brinjal	(2) Brinjal and Potato					
	(3) Citrus fruits	(4) Sugarcane					
55.	The pigments found in polysiphonia (algae) are:						
	(1) Chlorophyll only	(2) Phycocyanin only					
	(3) Phycocyanin and chlorophyll	(4) Phycocyanin and phycoerythrine					
56.	Life cycle which contain a dominant mu	ulticellular diploid stage, are called:					
	(1) Gametic type	(2) Zygotic type					
	(3) Sporic type	(4) Gametophytic type					
57.	Which of the following statements are (A) <i>Puccinia graminis</i> is known as stem-(B) D-glutamic acid and D-lysin are for (C) 80s ribosomes are found in bacteria (D) <i>E. Coli.</i> is found in cluster form The correct answer is:	rust of wheat und in bacterial cell wall					
	(1) A and B (2) B and C	(3) C and D (4) B, C and D					
58.	Which of the following cells are involved: (1) B Cells	d in fight against cancer?  (2) Natural killer cells					
	(3) Memory cells	(4) Plasma cells					
59.	Which of the following cancers are asso	ciated with Human Papilloma virus?					
	(1) Lung	(2) Cervical					
	(3) Ovarian	(4) Liver					
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60.	. The true skeleton of a cell is formed by :	
	(1) Actin filaments (2)	Microtubules
	(3) Intermediate filaments (4)	Actin filaments and microtubules
61.	. When in a eukaryotic cell all the copies of i called:	ts mitochondrial DNA are identical, it is
	(1) Homoplasmy (2)	Heteroplasmy
	(3) Apospory (4)	None of the above
62.	2. Oxydative phosphorylation enzyme syst mitochondria?	em is found in which part of the
	(1) Cytosol (2)	Outer membrane of mitochondria
	(3) Inner membrane of mitochondria (4)	Mitochondrial fluid
63.	<ul><li>The main function of peroxisome is:</li><li>(1) Catabolism of very long chain fatty acids</li><li>(2) Glyoxylate cycle in seeds</li><li>(3) Phosphorespiration in leaves</li><li>(4) Glycolysis in Trypansomes</li></ul>	
64.		
	(1) When male sex organs are not formed	
	(2) When male and female sex organs are fo	
	<ul><li>(3) When male and female sex organs are for</li><li>(4) When two different forms of thallus occ</li></ul>	
	(4) When two different forms of thands occ	
65.	5. Which of the following statements are not co	orrect?
	(1) Funaria hygrometrica is a common moss of	
	(2) The adult plant body of <i>Anthoceros</i> is a s	porophyte
	(3) Selaginella bears spores of two types	
	(4) Apogamy is a type of reproduction in a from the gametophyte without fusion of	some ferns in which sporophyte develops f gametes
66.	6. In which of the following animals sex is dete	ermined by hormones?
	(1) Hippocampus (2)	Alligator
	(3) Bonellia (4)	Cobra

67.	<b>67.</b> Which of the following types of inheritance is <i>not</i> found in ciliate protozoa?					
	(1) Chloroplast inheritance					
	(2) Mendalian inheritance	The state of the s				
	(3) Cortical inheritance					
	(4) Cytoplasmic inheritance					
68.	The cytoplasmic factors responsible for	male sterility in maize plants, are located in:				
	(1) Nucleus	(2) Mitochondria				
	(3) Chloroplast	(4) Cytosol				
69.	Mitochondrial DNA is not associated w	rith which of the following?				
	(1) Regulation of apoptosis					
	(2) Generation of reactive oxygen spec	ies ·				
	(3) Energy production					
	(4) Regulation of cellular transport					
70.	Which of the following is a chaperone?					
	(1) Nucleoplasmin	(2) Chromatosome				
	(3) Histone $H_1$ and $H_2$	(4) Histone $H_3$ and $H_4$				
71.	Unexplained substantial variation in th closely related species is called:	e haploid nuclear DNA content even between				
	(1) Kinetic complexity	(2) Haploidy				
	(3) Aneuploidy	(4) C-value paradox				
72.	Which of the following disease is <i>not</i> sp	read by housefly?				
	(1) Amoebic dysentry	(2) Cholera				
	(3) Typhoid	(4) Plague				
73.	Coelomic cavity of Balanoglossus is mad	le up of how many parts?				
	(1) One	(2) Two				
	(3) Four	(4) Five				

			그리고 있다면 하는 사람들이 되었다. 이번 살았다. 이 사람들은 사람들이 되었다면 하는 것이 없는 것이다. 그렇게 되었다면 하는데 없는데 없었다면 하는데 없다면 없다면 없다면 없다면 없다면 없다면 다른데 없다면
74.	Which of the following pairs are corr	ectly match	ned?
	(A) Trochophore – Balanoglossus		
	(B) Bipinnaria-Asterias		
	(C) Holothuria – Auricularia		
	(D) Fasciola – Cercaria		and the second section of
	The <i>correct</i> answer is:		A CONTRACTOR OF THE STATE OF TH
	(1) A and B only	(2) B	and D only
	(3) C and D only	(4) B,	C and D only
75.	The early seed fern Ekinsia evolved in	ı:	
	(1) Late Devonian	(2) Ea	rly Devonian
	(3) Carboniferous	(4) Tri	assic
76.	Coralloid roots are found in:		
	(1) Lycopodium	(2) Pir	nus
	(3) Cycas	(4) Dr	yopteris
77.	Which of the following is <i>not</i> correct	ly matched	?
	(1) Marigold – Capitulum	(2) M	imosa – Corymb
	(3) Brassica – Spike	(4) Ar	thurium – Spadix
78.	Synandrous condition is found in the	e family:	
	(1) Cucurbitaceae	(2) Ra	nunculaceae
	(3) Leguminosae	(4) Lil	iaceae
79.	Which of the following statements a	re not corre	ect?
	(A) Spike inflorescence is found in A		
	(B) Fruit of family ranunculaceae is		
	(C) The inflorescence which appear		
	(D) Almost all plants have latex in far. The <i>correct</i> answer is:	imily euph	ordiaceae.
	(1) A and D	(2) B	and C
	(3) A only	(4) C	
	(U) A OILLY	(1)	

80.	In the secondary steles of Boerhaavia:	Honeir	W. Will He folio pel seletore la	3
	(1) Xylem surrounds phloem	(2)		
	(3) Both are parallel	(4)	Both are alternate	
81.	In which of the following plants secon	ndary	growth occurs?	
	(1) Yucca	(2)	Dracaena	
	(3) Oryza	(4)	Triticum	
82.	Which of the following is <b>not</b> a part of	f perid	lerm of a plant ?	
	(1) Phellogen	(2)	Phelloderm	
	(3) Phellem	(4)	Phloem	
83.	Path of pollen tubes in the pistil is gui	ded by	y: He had to a substitution of the	403
	(1) Enzymes of the pollen apparatus			
	(3) Tissues of the style		Secration of ovule	
84.	Which of the following type of the fru		the state of the same of the s	
	(1) Drupe	(2)	Berry	
	(3) Achene		Follicle	
			- agi	
85.	In which of the following animals, block	od flov	vs in both the directions (reverse also)	?
	(1) Petromyzon		Fish (A)	
	(3) Herdmania	(4)	Branchistoma (3)	
86.	Respiration of the cephalochordates oc	ccurs th	nrough which of the following?	
	(1) Lungs			
	(3) Fins	(4)	General body surface	

Which of the following pairs are corre	ectly matched?
(A) Alytes - midwife toad	The second secon
(B) Petromyzon – male is parasite on	female
(C) Bony fish – cycloid scale	
(D) Ichthyophis – apoda	
The answer is:	The second secon
(1) A, B, C and D	(2) B, C and D only
(3) A and B only	(4) A and D only
	muselo 2
	(2) Coraco-brachialis langus
(3) Gastronemius	(4) Pectoralis major
Non-renal and pronephric head kidn	eys are found in:
(1) Rana	(2) Hemidactylus
(3) Labeo	(4) Alligator
The optimum pH for action of pancre	eatic amylase is:
	(3) 6.2 (4) 7.1
(1) Alpha-lipase only	(2) Colipase only
(3) Alpha-lipase + Colipase	(4) Alpha-lipase + Colipase + bile salts
Which of the following statements ar	re not true ?
	voluntarily controlled via fore-brain.
	And the second control of the second control
	(0) P 1 C 1
(1) Bonly	(2) B and C only
	(A) Alytes – midwife toad (B) Petromyzon – male is parasite on (C) Bony fish – cycloid scale (D) Ichthyophis – apoda The answer is: (1) A, B, C and D (3) A and B only Which of the following is not a flight (1) Coraco-brachialis brevis (3) Gastronemius Non-renal and pronephric head kidn (1) Rana (3) Labeo The optimum pH for action of pancre (1) 3.7 (2) 5.4 For the digestion of fatty acids, which (1) Alpha-lipase only (3) Alpha-lipase + Colipase Which of the following statements an (A) Autonomic nervous system cont (B) Sympathetic nervous system is a (C) The action potential a neuron is a (D) Schwan cell is responsible for my The answer is:

93.	Which of the following are not match	hed con	rrectly?	w 00 in 1 in 1 in 1				
	(A) Hypoxia – deficiency of $O_2$ in the tissues							
	(B) Tidal volume in normal man – 0.5 liters							
	(C) Proximal convoluted kidney tub			2900K				
	(D) Stomach – cholecystokinin secre		<b>.</b>					
	The answer is:							
	(1) A and B only	(2)	A and C only	in rigidal state of the state o				
	(3) Bonly		D only	mino se female de la comi				
				ALTON TO STATE OF THE STATE OF				
94.	or the rono wing statements at	re not c	correct?	The second second				
	(A) Testosterone acts by a second me	essenge	er system.					
	(B) Triiodothyronine binds to intrac	ellular	receptors.					
	(C) Epinephrine is not a neurotransmitter.							
	(D) A steroid hormone enters the target cell and alters its gene expression.  The answer is:							
		(0)	of Caratha II so					
	(1) A and C only	(2)		1977				
	(3) B and C only	(4)	C and D only	in quality promises				
95.	The enzyme that fixes atmospheric ca	arbon d	lioxide in C4 pla	ints is:				
	(1) Hydrogenase	(2)	PEP carboxyla					
	(3) RuBP Oxygenase	(4)	Hydrolase					
96.	Which of the following statements a	are inco	orrect about mo	vement of water through				
	xylem of plant?							
	(1) Root pressure plays important ro	ole						
	(2) Transpiration pull has no role							
	(3) Capillary action has no role							
	(4) Hydrogen ion/AT Pase pump at	the xyl	em element mer	mbrane plays a role				
97.	Most of the plant cytokinins are syntl	nesized	in:	Liverno Liverno de				
	(1) Flowers		Roots					
	(3) Leaves		Stem	nZ bos				
98.	Phytochrome plays a key role in:			Experience of Experience Ex				
	(1) Photomorphogenesis	(2)	Water transpor					
	(3) Electrolyte balancing	sufficient for	Stomatal mover					
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- 99. Most of the CO<sub>2</sub> generated on the earth is absorbed by :
  - (1) Green plants

(2) Green plants and Oceans

(3) Lime stones

- (4) All of these
- 100. Which of the following statement is false?
  - (1) Sweat sorghum is used to obtain ethanol.
  - (2) Quinine is obtained from the bark of Rauwolfia.
  - (3) Sunflower is a source of edible oil.
  - (4) Morphine is obtained from opium plant.

#### SECTION - C

- **101.** A real gas shows neither heating nor cooling in Joule Thomson effect if the initial temperature is :
  - (1) less then inversion temperature
  - (2) greater then inversion temperature
  - (3) equal to inversion temperature
  - (4) equal to 273K.
- **102.** If  $p_1$  and  $p_2$  be the probability of two independent events, then the probability of two events to take place simultaneously is:
  - (1)  $p_1 + p_2$

(2)  $p_1 \times p_2$ 

(3)  $p_1/p_2$ 

- (4)  $p_1 p_2$
- **103.** The two constraints used in determining the most probable macro-state are:
  - (1)  $\Sigma n_i = n$  and  $\Sigma n_i u_i = u$
- (2)  $\Sigma n_i = n$  and  $\Sigma n_i v_i = v$
- (3)  $\Sigma n_i = n$  and  $\Sigma n_i v_i = v/n$
- (4)  $\Sigma n_i = n$  and  $\Sigma n_i u_i = u/n$

104. The essential condition for Fermi - Dirac statistics is:

- (1) the particles are distinguishable
- (2) the particles are indistinguishable
- (3) there is no limit on the no. of particles present in a given energy state
- (4) not more than one particle can be present in a given energy state

105. Boltzmann limit is given by

- (1)  $(n_i/g_i) \ll 1$  and satisfied by all gases at ordinary temperature
- (2)  $(g_i/n_i) \ll 1$  and satisfied by all gases at absolute temperature
- (3)  $(n_i/g_i) >> 1$  and satisfied by all gases at ordinary temperature
- (4)  $(n_i \times g_i) \ll 1$  and satisfied by all gases at 0K

**106.** The ratio of rms value to the average value of alternating current is called Form Factor (FF) and given by :

- (1) 1.21, peak of wave is flat if FF less than 1.21
- (2) 1.11, peak of wave is sharp if FF greater than 1.11
- (3) 1.11, peak of wave is flat if FF greater than 1.11
- (4) 2.11, peak of wave is flat if FF greater than 2.11

107. The quality factor of a series resonant circuit is given by:

- (1)  $\frac{wL}{R}$  and depends on R only
- (2)  $\frac{wC}{R}$  and depends on R only
- (3)  $\frac{wR}{L}$  and depends on R only and Aria
- (4)  $\frac{wL}{R}$  and depends on L only

			17
108.	<b>18.</b> For a given transistor configuration is then value of $\alpha_{dc}$ and $\beta_{dc}$ are:	$l_c$ = 10.505mA, $l_b$ = 100μA and $l_{CBO}$ =	= 5μΑ,
	(1) 100 and 0.95	(2) 0.99 and 100	
	(3) 105 and 1.05	(4) 101 and 99.0	
109.	<b>19.</b> Calculate the apparent length of a moving with a speed of 2.9 × 10 <sup>8</sup> m/s ta	neter road, when it is carried in a	rocket
	(1) 0.254 m	(2) 0.52 m	
	(3) 0.359 m	(4) 1.0 m	
	the terminal analysis on the second	aper a primate lateral service of the service of the service of	Lt.
110.	0. The dirichlet conditions for an expandal	ble function, $f(x)$ are:	
	(1) non-periodic, single valued, finite ar	nd continuous	197
	(2) periodic, single valued, infinite and	continuous	
	(3) periodic, single valued, finite and co	ntinuous	
	(4) periodic, single valued, infinite and	in continuous	
111.	1. The necessary condition for achromatic	combination is:	
	(1) Two lenses should be of same mater	ials — though the bloom of the m	
	(2) Two lenses should be of different m	aterials	
	(3) Two lenses should be of same focal 1	ength	
	(4) Two lenses should be of same radius		
112.	2. For Newton's ring due to transmitted lig	ht, the central maximum (n=0) is:	

(2) bright with zero diameter

(4) None of above

(1) dark with zero diameter

(3) may be bright or dark

113.	The Young's double slit experiment	is performed with blue and green light
	of wavelengths 4360 Å and 5460 Å maxima from the central maxima, then:	respectively. If X is the distance of 4th
	(1) $X_{\text{blue}} = X_{\text{green}}$	
	(2) X <sub>blue</sub> > X <sub>green</sub>	
	(3) X <sub>blue</sub> < X <sub>green</sub>	
	(4) $X_{blue} / X_{green} = \lambda_{green} / \lambda_{blue}$	
114.	The angular half width of the principal i	maxima of a plane diffraction grating is:
	(1) very narrow and sharp	(2) very broad and dim
	(3) very narrow and dim	(4) very broad and sharp
115.	A polarimeter suitable for color blind pe	ersons is:
	(1) bi-quartz polarimeter	(2) half shade polarimeter
	(3) saccharimeter	(4) None of above
116.	The cubic lattice most densely packed is	
	(1) BCC with packing factor 0.680	(2) SC with packing factor 0.524
	(3) HCP with packing factor 0.740	(4) FCC with packing factor 0.740
117.	X-Ray diffraction method used for struc	ture determination of single crystal is :
	(1) Power crystal method	(2) Rotating crystal method

(4) None of above

(3) Laue method

118. Relation between volume of unit cell, UT [in direct lattice(DL)] and reciprocal lattice(RL) is:

- (1) (Volume of UT)<sub>RL</sub> =  $4\Pi^2$ /(Volume of UT)<sub>DL</sub>
- (2) (Volume of UT)<sub>DL</sub> =  $4\Pi^2$ /(Volume of UT)<sub>RL</sub>
- (3) (Volume of UT)<sub>RL</sub> =  $8\Pi^3$ /(Volume of UT)<sub>DL</sub>
- (4) (Volume of UT)DL =  $8\Pi^3$ /(Volume of UT) RL

119. Phonons are defined as:

- (1) optical energy given to unit cell
- (2) Lattice vibrations quantized energy
- (3) Lattice vibrations continuous energy
- (4) continuous heat energy given to lattice

**120.** The energy of gamma photon having a wavelength 1.5  $\mathring{A}$  (take h=  $6.634 \times 10^{-34}$ Js)

(1)  $8.275 \times 10^3 eV$ 

(2)  $13.24 \times 10^{-4} eV$ 

(3)  $10.24 \times 10^{-3} eV$ .

(4)  $1.6 \times 10^{-19} eV$ 

121. The ratio of kinetic energy of proton to that of  $\alpha$ -particle, when a proton and an  $\alpha$ -particle have equal de-Broglie wavelengths is :

(1) 1:2

(2) 2:1

(3) 1:1

(4) 4:1

Stori less

122.	In	Schrodinger's	equation,	eigen	values	means
------	----	---------------	-----------	-------	--------	-------

(1) value of energy

(2) value of position

(3) value of frequency

(4) none of above

### 123. Zero-point energy of an oscillator is given by:

(1) hv

(2) zero

(3) infinite

(4)  $\left(\frac{1}{2}\right)hv$ 

## **124.** The factors that control the allowed values of energy of a particle in a potential well are:

- (1) width and depth of potential well
- (2) time and energy of potential well
- (3) depth and energy of potential well
- (4) time and width of potential well

(1) Z

 $(2) (Z)^2$ 

(3)  $(Z)^{1/2}$ 

 $(4) (Z)^3$ 

(Z= Atomic No. of Element)

### **126.** The product of the characteristic roots of the matrix :

$$\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$$
 is:

(1) 3

- (2) 18
- (3) 0
- (4) 45

- If the roots of equation  $x^3 12x^2 + 39x 28 = 0$  are in A. P., then one of the root is:
  - (1) 4
- (2) 3
- (3) -4
- (4) 6
- The radius of curvature of the hyperbola  $r^2 = a^2 b^2 + \frac{a^2b^2}{r^2}$  is:
  - $(1) \frac{a^2b}{n^3}$
- (2)  $\frac{a^2b^2}{p^3}$  (3)  $\frac{ab^2}{p^3}$  (4)  $\frac{a^2b^2}{p}$

- **129.**  $\int_{0}^{1} \frac{x^3}{\sqrt{1-x^2}} dx$  is equal to :
  - (1)  $\frac{3}{2}$  (2) 0
- (3)  $-\frac{3}{2}$  (4)  $\frac{2}{3}$
- The Co-ordinates of the centre of conic  $x^2 + 12xy 4y^2 6x + 4y + 9 = 0$  are:
  - (1)  $\left(\frac{1}{2},0\right)$

(2)  $\left(-\frac{1}{2},0\right)$ 

(3)  $\left(0,\frac{1}{2}\right)$ 

- (4)  $\left(\frac{1}{2}, \frac{1}{2}\right)$
- **131.** If  $x = \cos \theta + i \sin \theta$ , then  $x^n + \frac{1}{x^n}$  is equal to:
  - (1)  $2\cos n\theta$

(2)  $2i\cos n\theta$ 

(3)  $\frac{\cos n\theta}{2}$ 

- (4)  $\cos 2n\theta$
- The least positive integer (mod II) to which 282 is congruent: 132.
  - (1) 4

- (3) 5
- (4) 2

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- The integrating factor of differential equation  $2\cos(y^2) dx xy \sin(y^2) dy = 0$  is: 133.
  - (1)  $\frac{1}{r^3}$

(3)  $x^3$ 

(4)  $\frac{1}{x^2}$ 

**144.** The inverse Laplace Transform of  $\frac{1}{s^{7/2}}$  is:

(1)  $\sqrt{\frac{t}{\pi}}$ 

 $(2) \quad \frac{8}{15} \sqrt{\frac{t}{\pi}}$ 

 $(3) \quad \frac{8t^2}{15} \sqrt{\frac{t}{\pi}}$ 

(4) 0

145. The operator | | means:

(1) Logical OR

(2) Logical AND

(3) Logical NOT

(4) None of these

146. Let (R, d) be the usual metric space. Then derived set of:

$$A = \left\{ \frac{1}{n} : n \in \mathbb{N} \right\} \text{ is :}$$

(1) A

(2) {0}

(3) ¢

(4) {1}

147. Let (X, d) be a metric space and A be any subset of X. Then A is open if and only if:

 $(1) \quad A = -A^{\circ}$ 

 $(2) \quad A = \frac{1}{A}$ 

(3) A = A

(4) None of these

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**148.** If  $G = \{1, w, w^2\}$  is the group of cube roots of unity, then order of  $w^2$  under the binary operation multiplication is:

(1) 2

(2) 4

(3) 1

(4) 3

149.	A div	ision	rino	has	how	many	zero	divisors	2
		TOTOIL.		Lice	TIONA	rittity	LCIU	CIVISO13	

(1) 1

(2) 3

(3) 2

(4) None of these

"The rate of change of momentum is directly proportional to the impressed force and 150. takes place in the direction of the force" is:

- (1) Newton's first law of motion
- (2) Newton's second law of motion
- (3) Newton's third law of motion
- (4) None of these

151. Time of flight of a projectile is given by:

(4) None of these

**152.**  $T\left(\frac{1}{2}\right)$  is equal to:

(3)  $\sqrt{\pi}$ 

The fixed point of the Mobius transformation  $w = \frac{3z-4}{z-1}$  is:

(1) z = 1

- (2) z = -1
- (3) z = -2 to refer to z = 2 to z = 2 to z = 2

**154.** The set of vectors  $\{(1,0),(0,1)\}$  in  $\mathbb{R}^2$  is:

(1) Linearly dependent

(2) Linearly independent

peration rauth with the

(3) Not defined

(4) None of these

**155.** If  $T:V \to W$  is a linear transformation, then T is one-one iff N(T) is:

(1) {1}

(2) ¢

(3) 0

(4) None of these

156. For the table:

			Fare eller			
x	0	1	2	3	4	5
f(x)	0	3	8	15	24	25

 $\Delta^3 f(x)$  is:

(1) 3

(2) 0

(3) 2

(4) 7

157. For the data:

x	-1	1	2	3
f(x)	-21	15	12	3

 $\Delta^2 f(x)$  are:

(1) -7 and -3

(2) 7 and 3

(3) 7 and -3

(4) -7 and 3

**158.** Runge-Kutta method is a:

- (1) Single step method
- (2) Multiple step method
- (3) Method for solving cubic equation
- (4) None of these

**159.** The force acting on a system of n particles is conservative only if:

(1) 
$$\nabla \bullet F^{\rightarrow} = 0$$

(2) 
$$\nabla \times F^{\rightarrow} = 0$$

(3) 
$$\nabla \cdot \nabla \cdot F \rightarrow = 0$$

(4) 
$$\nabla \bullet \nabla \times F \rightarrow = 0$$

160. In Lagrangian's Equation Q<sub>j</sub> represents:

- (1) Generalized force having dimensions of force explicitly
- (2) Quantized force having dimensions of force
- (3) Generalized force may or may not have dimensions of force
- (4) Work done by generalized force

**161.** The Hamiltonian, H = T + V gives total energy:

- (1) when Cartesian and generalized coordinates do not depend on time explicitly
- (2) when only generalized coordinates do depend on time explicitly
- (3) when only Cartesian coordinates do not depend on time explicitly
- (4) when Cartesian and generalized coordinates depend on time explicitly

**162.** Any field,  $A^{\rightarrow}$  is said to solenoid field if:

(1) 
$$A^{\rightarrow} = \nabla \times V^{\rightarrow}$$
 and  $\nabla \cdot A^{\rightarrow} = 0$ 

(2) 
$$A^{\rightarrow} = \nabla \times V^{\rightarrow}$$
 and  $\nabla \cdot A^{\rightarrow} = 0$ 

(3) 
$$A^{\rightarrow} = \nabla \times V^{\rightarrow}$$
 and  $\nabla \times A^{\rightarrow} = 0$ 

(4) 
$$A^{\rightarrow} = \nabla \cdot V^{\rightarrow}$$
 and  $\nabla \times A^{\rightarrow} = 0$ 

**163.** The total charge enclosed by a given surface through which 15000 lines of force is incoming and that of outgoing lines of force is 25000 :

(1) 
$$13.275 \times 10^{-8}C$$

(2) 
$$8.85 \times 10^{-12} C$$

(3) 
$$8.85 \times 10^{-8}$$
 C

(4) 
$$8.85 \times 10^{-8} C/s$$

164.	Name of program which language:	translates a high level language int	o machine
	(1) compiler	(2) assembler	
	(3) register	(4) converter	
165.	The area enclosed by a cycl of interaction is:	e represents net work done as well	as net hea
	(1) P - V diagram	(2) Carnot cycle	
	(3) T - S diagram	(4) Triple point diagram	

**166.** The order of dead time and recovery time in a G.M. counter is:

(1) 100µs

(2) 10µs

(3)  $10^3 \mu s$ 

(4)  $10^{-3} \mu s$ 

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# (DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

### CPG-EE-2017 (Forensic Science)-(SET-B)

D w	allo jurpology 10184  Sr. No.	
Time : 1½ Hours Roll No. (in figures)	Total Questions : 166 Max. Marks  (in words)	: 100
Candidate's Name — — — Father's Name — — — — — — — — — — — — — — — — — — —	Date of Birth Mother's Name	
(Signature of the Candidate)	(Signature of the Invigilator)	)

# CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

- 1. All questions of Section-"A" are compulsory. Students are required to attempt either Section "B" or Section "C". Students of Medical Group are required to attempt Section "B". Students of Non-Medical Group are required to attempt Section "C". All questions carry equal marks i.e. one mark each.
- 2. The candidates must return the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means/misbehaviour will be registered against him/her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
- 3. The candidate *must not* do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself.
- 4. In case there is any discrepancy in any question(s) in the Question Booklet, the same may be brought to the notice of the Controller of Examinations in writing within two hours after the test is over. No such complaint(s) will be entertained thereafter.
- 5. Use only blue or black ball point pen of good quality in the OMR Answer-Sheet.
- 6. There will be negative marking. Each correct answer will be awarded one full mark and each incorrect answer will be negatively marked for which the candidate will get ¼ discredit. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. Before answering the questions, the candidates should ensure that they have been supplied correct & complete question booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after the start of examination.

CPG-EE-2017(Forensic Science)-(SET-B)/(D)

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### SECTION - A

1.	A substance which	h can	act both as an a	antise	ptic and disin	fectant	is:	
	(1) Aspirin			(2)	Phenol			
	(3) Analgin			(4)	Sodium pent	othal		
2.	Out of the following	ing wh	nich does <i>not</i> e	xhibit	IR spectra ?			
	(1) O <sub>2</sub>	(2)	CO <sub>2</sub>	(3)	SO <sub>2</sub>	(4)	HBr	
3.	Hyperconjugation	n invo	lves overlap of	the fo	ollowing orbit	als:		
	(1) σ-σ	(2)	$\sigma - p$	(3)	p-p	(4)	$\pi - \pi$	
4.	The correct order amongst the follow	r of rewing a	eactivity towar aniline (I), benz	ds ele zene (1	ectrophilic su II) and nitrobe	bstituti enzene	on of the co	mpound
	(1) II > III > I			(2)	I < II > III			
	(3) I > II > III			(4)	I < II < III			
5.	Vitamin B <sub>12</sub> conta	ins:						
	(1) cobalt	(2)	magnesium	(3)	iron	(4)	nickel	
6.	The difference bet (1) R		$\Delta H$ and $\Delta U$ at $p\Delta V$		ant volume is VΔp		o: 3/2R	
7.	The enthalpies of	forma	tion of gaseou	s N <sub>2</sub> (	and NO at 2	98K ar	re 82 and 90 l	kJ mol <sup>-1</sup> .
	The enthalpy of th			The state of				
	(1) -8 kJ	(2)	98 kJ	(3)	-74 kJ	(4)	8 kJ	
8.	The overall energy	y chan	ge during Carr	not cy	cle is :			
	(1) equal to w	(2)	zero	(3)	maximum	(4)	equal to q	
9.	A process in whi initial state is calle	da/a	e system, after n:	und	ergoing vario	us pro	cesses, retur	ns to its
	(1) reversible prod	cess			irreversible p	rocess		
	(3) cyclic process			(4)	Hess law			

10.	The diameter of molecule $B$ is half that $(\lambda_A/\lambda_B)$ will be :	at of molecule A, the ratio of mean free path
	(1) 1/2 (2) 1/4	(3) 4 (4) 2
11.	The SI units of the Vander Waals b term	are:
	(1) $m^3 \text{ mol}$ (2) $m^2/\text{mol}$	(3) $m^3 / mol$ (4) $m^2 mol$
12.	The law which relates the solubility of a	gas to its pressure is called:
	(1) Raoults law	(2) The distribution law
	(3) Henry's law	(4) Ostwald's law
13.	By adding a non-volatile solute to a solu	vent, the boiling point of the solvent:
	(1) will increase	(2) will decrease
*	(3) will not change	(4) may increase or decrease
14.	If 2.303RT/F = 0.059 and the activities of $Zn \mid Zn^{2+}$ (a <sub>1</sub> ) $\mid Cu^{2+}$ (a <sub>2</sub> ) $\mid Cu$ is :	of the solids are constant, then e.m.f. of the cel
	(1) $E = E^{\circ} - 0.059 \log (a_2 / a_1)$	(2) $E = E^{\circ} + 0.059 \log (a_2 / a_1)$
	(3) $E = E^{\circ} - \frac{0.059}{2} \log (a_2 / a_1)$	(4) $E = E^{\circ} + \frac{0.059}{2} \log (a_2 / a_1)$
15.	The hybridization of Xe in XeO <sub>2</sub> F <sub>2</sub> is:	
	(1) $sp^3d$ (2) $sp^3d^2$	(3) $sp^3d^3$ (4) $dsp^3$
16.	Compound A undergoes formation of acid. Therefore, compound A is:	cynohydrin which on hydrolysis gives lactic
	(1) formaldehyde	(2) acetaldehyde
	(3) acetone	(4) benzaldehyde
17.	Which of the following polymer is there	mosetting polymer?
	(1) Nylon-6	(2) Nylon-6,6
	(3) Bakelite	(4) None of these

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18.	Which of the following is useful in trea	atme	en	nt of cyanide po	isonii	ng?
	(1) Amyl nitrite	(2	2)	Sodium nitrit	e	
	(3) Nitrite thiosulphate	(4	1)	All of the above	ve	In am 1 sub sur
19.	Enthalpies of combustion of methane and 285.7 kJ respectively. Enthalpy of			To be a live of the second of the same of the second of th		are 890.2 kJ, 393.4 kJ
	(1) -211.1 kJ mol <sup>-1</sup>	(2	2)	-890.2 kJ mo	ol-1	
	(3) -74.6 kJ mol <sup>-1</sup>	(4	1)	85.7 kJ mol <sup>-1</sup>		
20.	Containers A, B and C of equal respectively at the same temperature is:					
	(1) $A < B < C$ (2) $B < C < A$	(3	3)	C < A < B	(4)	C < B < A
21.	IUPAC name of $[Cr(CO)_5 \{P(C_6H_5)_3\}]$ is	s:				
	(1) Triphenylphosphine pentacarbony	yl ch	rc	omium (0)		
	(2) Pentacarbonyl triphenylphosphine	e chr	0:	mium (0)		
	(3) Pentacarbonyl triphenylphosphine	e chr	0:	mate (III)		
	(4) Triphenylphosphine pentacarbony	yl ch	rc	omate (III)		
22.	Which one of the following ions is colo	ourle	200	. ?		
in in	(1) $U^{3+}$ (2) $Cm^{4+}$			$Th^{4+}$	(4)	$Pu^{4+}$
23.	Solubility of iodine in liquid $SO_2$ is in the formation of:	ncrea	se	ed on addition	of KI	. This is attributed to
	(1) $KI_3$ (2) $I_2.SO_2$	(3)	)	KI.4SO <sub>2</sub>	(4)	SOI <sub>2</sub>
24.	$PbI_2 + KNH_2 \xrightarrow{liq.NH_3} \rightarrow$					
	Products of the Reaction are:					
	$(1) PbNH_2 \downarrow + I_2 + KI$	(2)	)	PbNH ↓+ HI	+ KI	
	(3) $PbNH_2 \downarrow + KI_3$	(4)	)	None of the ab	ove	

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25.	Which gives red col (1) Glucose (3) Benzaldehyde	lour with Fehling sol	ution ? (2) Cellulose (4) Cane sugar	to remark transports of
26.	$O_2^{2-}$ is isoelectronic	with:		
	(1) H <sub>2</sub>	(2) N <sub>2</sub>	(3) F <sub>2</sub>	(4) S
27.	Which one of the fo	llowing species is pa	ramagnetic ?	A Primit But To
	(1) O <sub>2</sub>	(2) CN <sup>-</sup>	(3) CO	(4) F <sub>2</sub>
28.	In NaCl type structu	ure, the coordination	numbers of cation a	nd anion are :
	(1) 6 and 4	(2) 6 and 6	(3) 4 and 4	(4) 8 and 4
29.	Which one of the fo	ollowing complex car	exhibit coordination	n isomers?
	(1) $[Co(NH_3)_6][Co(NH_3)_6]$	$r(CN)_6$	(2) $[Cr(NH_3)_6]Cl_3$	
	(3) $[Co(en)_2 Cl_2]^+$		(4) $[Cr(en)_2 Cl_2]^+$	
30.	$Cr(CO)_{\chi}$ has EAN of	of $Cr = 36$ , hence $x = :$	e golfer annet ek	n en en el al light de la company
	(1) 2	(2) 4	(3) 6	(4) 5
31.	The root mean squa'd' is:	are velocity of an ide	eal gas at constant pr	essure varies with density
	(1) $d^2$	(2) b. d	(3) $\sqrt{d}$	$(4) 1/\sqrt{d}$
32.	For the reaction 2C	$l(g)Cl_2(g)$ the signs of	f ΔH and ΔS respecti	vely are:
	(1) +,-	(2) +,+	(3) -,-	(4) -,+
33.	The principal buffe	r present in human b	plood is	
	(1) $H_3PO_4 + NaH_2$	$PO_4$	(2) $CH_3COOH + C$	CH <sub>3</sub> COONa
	(3) $Na_2HPO_4 + Na_4$	$_3PO_4$	(4) $H_2CO_3 + HCO_3$	
34.	If a neutral solution	h has $pK_w = 13.36$ at	50°C, then pH of the	solution is:
	(1) 6.68	(2) 7	(3) 7.63	(4) d3.5

### SECTION - B

The	e optimum pH fo	r act	ion of panc	reatic an	nylase is:		
(1)	3.7	(2)	5.4	(3)	6.2	(4)	7.1
For	the digestion of	fatty	acids, whi	ch of the	followin	g are requi	red?
(1)	Alpha-lipase on	ly		(2)	Colipase	only	
(3)	Alpha-lipase + 0	Colip	pase	(4)	Alpha-li	pase + Coli	ipase + bile salts
(A) (B) (C) (D) The	Autonomic nervices Sympathetic nervices The action potent Schwan cell is received answer is: B only	yous rvou ntial	system con as system is a neuron is	volunta volunta termina nyelin sec (2)	ooth mus rily contr ted by eff cretion or B and C	olled via for flux of potanthe the peripherion	ssium.
(3)	C and D only			(4)	A, Cano	Donly	
Wh	ich of the follow	ing a	re <i>not</i> mate	ched corr	ectly?		
(A)	Hypoxia – defic	iency	$y$ of $O_2$ in the	he tissue	S		
(B)	Tidal volume in	nori	mal man – (	0.5 liters			
(C)	Proximal convo	luted	kidney tul	oule – rea	absorptio	n	
(D)	Stomach - chole	cysto	okinin secre	etion			
The	e answer is:						
(1)	A and B only			(2)	A and C	only	
(3)	Bonly			(4)	D only		
(A) (B) (C) (D) The (1)	Testosterone act Triiodothyronin Epinephrine is r A steroid hormo answer is: A and C only	s by e bir ot a	a second mads to intrac neurotrans	essenger cellular r mitter. rget cell (2)	esystem. eceptors. and alter A and D	s its gene e	xpression.
	(1) For (1) (3) Wh (A) (B) (C) (D) The (1) (3) Wh (A) (B) (C) (D) The (1) (3) Wh (A) (B) (C) (D) The (1) (1) (3) Wh (A) (B) (C) (D) The (1) (1) (1) (1) (2) (1) (3)	(1) 3.7  For the digestion of (1) Alpha-lipase on (3) Alpha-lipase + 6  Which of the follow (A) Autonomic nervices (B) Sympathetic nervices (C) The action potent (D) Schwan cell is reaction to the answer is:  (1) B only (3) C and D only  Which of the follow (A) Hypoxia – defices (B) Tidal volume in (C) Proximal convolution (D) Stomach – choles	(1) 3.7 (2) For the digestion of fatty (1) Alpha-lipase only (3) Alpha-lipase + Colip Which of the following s (A) Autonomic nervous (B) Sympathetic nervous (C) The action potential (D) Schwan cell is respons The answer is: (1) B only (3) C and D only Which of the following a (A) Hypoxia – deficiency (B) Tidal volume in norm (C) Proximal convoluted (D) Stomach – cholecyste The answer is: (1) A and B only (3) B only Which of the following s (A) Testosterone acts by (B) Triiodothyronine bin (C) Epinephrine is not a (D) A steroid hormone expenses The answer is: (1) A and C only	(1) 3.7 (2) 5.4  For the digestion of fatty acids, which of the following statements at (A) Autonomic nervous system con (B) Sympathetic nervous system is (C) The action potential a neuron is (D) Schwan cell is responsible for more than the answer is:  (1) B only  (3) C and D only  Which of the following are <i>not</i> mate (A) Hypoxia – deficiency of $O_2$ in the (B) Tidal volume in normal man – (C) Proximal convoluted kidney tule (D) Stomach – cholecystokinin secretary than the answer is:  (1) A and B only  (3) B only  Which of the following statements at (A) Testosterone acts by a second more (B) Triiodothyronine binds to intract (C) Epinephrine is not a neurotrans (D) A steroid hormone enters the tat The answer is:  (1) A and C only	(1) 3.7 (2) 5.4 (3)  For the digestion of fatty acids, which of the (1) Alpha-lipase only (2) (3) Alpha-lipase + Colipase (4)  Which of the following statements are not tre (A) Autonomic nervous system controls small (C) The action potential a neuron is terminal (D) Schwan cell is responsible for myelin second (D) Schwan cell is	(1) 3.7 (2) 5.4 (3) 6.2  For the digestion of fatty acids, which of the followin (1) Alpha-lipase only (2) Colipase (3) Alpha-lipase + Colipase (4) Alpha-li Which of the following statements are <i>not</i> true?  (A) Autonomic nervous system controls smooth mus (B) Sympathetic nervous system is voluntarily controly (C) The action potential a neuron is terminated by efform the answer is:  (B) Soly (2) B and C (3) C and D only (4) A, C and C (4) Alypoxia – deficiency of O2 in the tissues  (B) Tidal volume in normal man – 0.5 liters  (C) Proximal convoluted kidney tubule – reabsorption (D) Stomach – cholecystokinin secretion  The answer is:  (C) A and B only (2) A and C (3) B only (4) D only  Which of the following statements are <i>not</i> correct?  (A) Testosterone acts by a second messenger system.  (B) Triiodothyronine binds to intracellular receptors.  (C) Epinephrine is not a neurotransmitter.  (D) A steroid hormone enters the target cell and alterative and C only (2) A and C (2) A and C (3) A and C only (2) A and C (3) A and C (4) A and C only (2) A and C (3) A and C (4) A and C (5) A and C (6) A and C (7) A and C (7) A and C (8) A and C (8) A and C (9) A an	For the digestion of fatty acids, which of the following are requir.  (1) Alpha-lipase only (2) Colipase only (3) Alpha-lipase + Colipase (4) Alpha-lipase + Colipase Which of the following statements are <i>not</i> true? (A) Autonomic nervous system controls smooth muscles. (B) Sympathetic nervous system is voluntarily controlled via for (C) The action potential a neuron is terminated by efflux of pota (D) Schwan cell is responsible for myelin secretion on the periph The answer is: (1) B only (2) B and C only (3) C and D only (4) A, C and D only Which of the following are <i>not</i> matched correctly? (A) Hypoxia – deficiency of O <sub>2</sub> in the tissues (B) Tidal volume in normal man – 0.5 liters (C) Proximal convoluted kidney tubule – reabsorption (D) Stomach – cholecystokinin secretion The answer is: (1) A and B only (2) A and C only (3) B only (4) D only Which of the following statements are <i>not</i> correct? (A) Testosterone acts by a second messenger system. (B) Triiodothyronine binds to intracellular receptors. (C) Epinephrine is not a neurotransmitter. (D) A steroid hormone enters the target cell and alters its gene enters and C only (2) A and D only

40.	The enzyme that fixes atmospheric can	rbon dioxide in C4 plants is :
	(1) Hydrogenase	(2) PEP carboxylase
	(3) RuBP Oxygenase	(4) Hydrolase
41.	Which of the following statements as xylem of plant?	re incorrect about movement of water through
	(1) Root pressure plays important rol	e .
	(2) Transpiration pull has no role	
	(3) Capillary action has no role	
	(4) Hydrogen ion/AT Pase pump at t	the xylem element membrane plays a role
42.	Most of the plant cytokinins are synth	esized in:
	(1) Flowers	(2) Roots
	(3) Leaves	(4) Stem
43.	Phytochrome plays a key role in:	
	(1) Photomorphogenesis	(2) Water transport
	(3) Electrolyte balancing	(4) Stomatal movement
44.	Most of the CO <sub>2</sub> generated on the ear	th is absorbed by :
	(1) Green plants	(2) Green plants and Oceans
	(3) Lime stones	(4) All of these
45.	Which one of the following is <b>not</b> a ch	naracteristic of an ecosystem?
	(1) It is self regulated	
	(2) It is leaky in relation to flow of ma	atter and energy
	(3) It has relations with the surround	ing ecosystems
	(4) It does not change with time	du, the seasons to the content of th
46.	Green house effect is related to which	of the following cycle?
	(1) Carbon	(2) Nitrogen
	(3) Oyygen	(4) Sulphur

47.	Which of the following is <i>not</i> a grasslar	nd?	
	(1) Prairie	(2)	Pampa
	(3) Steppe	(4)	Tundra
48.	Which of the following statements about	ut hu	uman evolution is <i>not</i> correct?
	(1) The first species of genus Homo wa	s Ho	mo habilis
	(2) Fossil of Australopitheus anamensis v	was f	ound in Kenya
	(3) Homo erectus was the first to move	out c	of Africa
	(4) Sivapithecus was ancestor of man		
49.	A bacterium that can cause tumors in p	lants	s and transfer its genes to them is:
	(1) Bacillus thuriengensis	(2)	Rhizobium
	(3) Nitrobacterium	(4)	Agrobacterium
50.	Which of the following vectors contain	DN	A sequences from lambda phage?
	(1) Plasmid Ti	(2)	Cosmid
	(3) RNA phase	(4)	Plasmid Ri
51.	Michaelis-Menten rate equation is abou	ıt:	and the second second second
	(1) Enzyme – substrate complex forma	tion	
	(2) Rate of Krebs cycle		
	(3) Rate of oxidative phosphorylation		
	(4) Rate of reaction of an enzyme		
52.	The rate of regulatory enzymes is <b>not</b> n	nodu	lated by which the following:
	(1) Feed-back inhibition		
	(2) Reversible covalent modification		
	(3) Irreversible covalent modification a	and a	activation of enzymes
	(4) Coupling factors		
	i i		

55.	The parts of genome which keep on ch	nanging their positions are known as:	
	(1) Exons	(2) Introns	
	(3) Transposable elements	(4) Repressors	
54.	Which of the following are correctly m		.0.
	(A) Balanoglossus – radial cleavage		
	(B) Chick – discoidal cleavage		
	(C) Cockroach – superficial cleavage	and the second of the second of the second	-
	(D) Ascaris – spiral cleavage		
	The answer is:	so with the property of the field.	
		Property of the City of the Ci	
	(1) A and B only	(2) C and D only	
	(3) A, B and D only	(4) A, B, C and D	
55.	Coeloblastula is blastula of:		
	(1) Insect (2) Frog	(3) Bird (4) Lizard	
56.	Blastodise of chick is united with the yo	rolk mass in chick by:	
	(1) Epiblast	(2) Mesoblast	
	(3) Endoblast	(4) Periblast	
57.	Which of the following extra-embryoni	nic membrane serves as urinary bladder?	
	(1) Amnion	(2) Chorion	
	(3) Allantois	(4) Yolk sac	
58.	Which of the following are correctly ma	natched for their centers of origin?	.46
	(A) Americas – Patato, Corn	The second secon	
	(B) China Center – Soyabean	e the contract of the contract	
	(C) Near East – Chick pea, Barley		.86
	(D) India Center – Rice, Mango		3 2.00
	The <i>correct</i> answer is:	to the second of	
	(1) A and B only	(2) A, B and C only	
	(3) A, B, C, and D	(4) B and D only	
7 - 3		(1) Dand Donly	

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59.	The family and generic name of flax-	seed plant is:	
	(1) Linaceae, Linum	(2) Camelliacea, Camellia	
	(3) Malvaceae, Chorchorus	(4) Euphorbiaceae, Hevea	
60.	Which of the following combination		
	(1) Cinchona, Rauwolfia, Withania	(2) Gram, Arhar, Pea	
	(3) Rice, Wheat, Maize	(4) Coriander, Ginger, Cannabis	
61.	Which one of the following combinate (1) Catla, Labeo – Major freshwater (2) Silver carp, Grass carp – Major ex	carps	
	(3) Clarias batrachus, Heteropneustus -		
	(4) Bombay Duck, Hilsa – Marine fo	ood fishes	
62.	Which of the following is a crop pest	1?	
	(1) Spodoptera	(2) Trogoderma	
	(3) Rhizopertha	(4) Sitophilus	
63.	Which of the following statement is w	wrong?	
	(1) Pyrilla perpusilla is a bug		
	(2) Adults of red pumpkin beetles at	ttack vegetables	
	(3) The name Gandhibug of Lepot odour	corisa Oratorius is derived from its unpleasan	t
	(4) Tribolium castanneum is known as	s lesser grain borer	
64.	Hadda beetles usually prefer to feed	on:	
	(1) Brinjal	(2) Brinjal and Potato	
	(3) Citrus fruits	(4) Sugarcane	
65.	The pigments found in polysiphonia	(algae) are :	
	(1) Chlorophyll only	(2) Phycocyanin only	
	(3) Phycocyanin and chlorophyll	(4) Phycocyanin and phycoerythrine	

66.	Life cycle which contain a dominant m	ulticellular diploid stage, are called :						
	(1) Gametic type	(2) Zygotic type						
	(3) Sporic type	(4) Gametophytic type						
67.	Which of the following statements are	correct?						
	(A) Puccinia graminis is known as stem-	rust of wheat						
	(B) D-glutamic acid and D-lysin are for	and in bacterial cell wall						
	(C) 80s ribosomes are found in bacteria	(C) 80s ribosomes are found in bacteria						
	(D) E. Coli. is found in cluster form							
	The correct answer is:							
	(1) A and B (2) B and C	(3) C and D (4) B, C and D						
68.	Which of the following cells are involved	ed in fight against cancer?						
	(1) B Cells	(2) Natural killer cells						
	(3) Memory cells	(4) Plasma cells						
69.	Which of the following cancers are asso	ciated with Human Papilloma virus?						
	(1) Lung	(2) Cervical						
	(3) Ovarian	(4) Liver						
70.	The true skeleton of a cell is formed by							
	(1) Actin filaments	(2) Microtubules						
	(3) Intermediate filaments	(4) Actin filaments and microtubules						
71.	When in a eukaryotic cell all the copie called:	s of its mitochondrial DNA are identical, it is						
	(1) Homoplasmy	(2) Heteroplasmy						
	(3) Apospory	(4) None of the above						
72.	Oxydative phosphorylation enzyme mitochondria?	system is found in which part of the						
	(1) Cytosol	(2) Outer membrane of mitochondria						
	(3) Inner membrane of mitochondria	(4) Mitochondrial fluid						

73.	(1) (2) (3)	e main function of peroxisome is: Catabolism of very long chain fatty Glyoxylate cycle in seeds Phosphorespiration in leaves Glycolysis in Trypansomes	acid			
74.	In I	Bryophytes, heterothalic condition is				
		When male sex organs are not form				
	(2)	When male and female sex organs a	re fo	ound in the same individual		
	(3)	When male and female sex organs a	re fo	ound in separate individuals		
		When two different forms of thallus				
75.	Wh	nich of the following statements are n	ot co	orrect?		
		Funaria hygrometrica is a common m				
	(2)	The adult plant body of Anthoceros	is a s	sporophyte		
	(3)	Selaginella bears spores of two types				
	(4)	Apogamy is a type of reproduction from the gametophyte without fusion		some ferns in which sporophyte develops f gametes		
76.	In	In which of the following animals sex is determined by hormones?				
	(1)	Hippocampus	(2)	Alligator		
	(3)	Bonellia	(4)	Cobra		
77.	Wł	Which of the following types of inheritance is <i>not</i> found in ciliate protozoa?				
	(1)	Chloroplast inheritance	(2)	Mendalian inheritance		
	(3)	Cortical inheritance	(4)	Cytoplasmic inheritance		
78.	78. The cytoplasmic factors responsible for male sterility in maize plants, are le			e sterility in maize plants, are located in :		
	(1)	Nucleus	(2)	Mitochondria		
	(3)	Chloroplast	(4)	Cytosol		
79.	Mitochondrial DNA is <i>not</i> associated with which of the following?					
	(1)	Regulation of apoptosis	(2)	Generation of reactive oxygen species		
	(3)	Energy production	(4)	Regulation of cellular transport		
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80.	Which of the following is a chaper	one?	i wa galakini Na
	(1) Nucleoplasmin	(2) Chromatosome	Myave (1) 1 M
3.5	(3) Histone $H_1$ and $H_2$	(4) Histone $H_3$ and $H_4$	A 718 (F) 1
81.	Unexplained substantial variation closely related species is called:	in the haploid nuclear DNA conte	nt even betweer
	(1) Kinetic complexity	(2) Haploidy	
	(3) Aneuploidy	(4) C-value paradox	The state of the s
82.	Which of the following disease is n	ot spread by housefly?	
10 M	(1) Amoebic dysentry	(2) Cholera	T ABY
	(3) Typhoid	(4) Plague	(1 = 6)
83.	Coelomic cavity of Balanoglossus is	s made up of how many parts?	
	(1) One	(2) Two	erT
	(3) Four	(4) Five	
84.	Which of the following pairs are co	rrectly matched?	7 A 48
	<ul><li>(A) Trochophore – Balanoglossus</li><li>(B) Bipinnaria–Asterias</li><li>(C) Holothuria – Auricularia</li></ul>	Constant and the second of the	
	(D) Fasciola – Cercaria The <i>correct</i> answer is:	a comment de transfero	er erwale 19
	(1) A and B only	(2) B and D only	
	(3) C and D only	(4) B, C and D only	
85.	The early seed fern Ekinsia evolved	in:	La captur Sk
	(1) Late Devonian	(2) Early Devonian	
	(3) Carboniferous	(4) Triassic	
86.	Coralloid roots are found in:	in particular and a significant	, o day of.
	(1) Lycopodium	(2) Pinus	
	(3) Cycas	(4) Dryopteris	
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87.	Which of the following is <i>not</i> correctly	matched?	.08		
	(1) Marigold – Capitulum	(2) Mimosa – Corymb			
	(3) Brassica – Spike	(4) Anthurium – Spadix			
88.	Synandrous condition is found in the family:				
	(1) Cucurbitaceae	(2) Ranunculaceae			
	(3) Leguminosae	(4) Liliaceae			
89.	Which of the following statements are	not correct?			
	(A) Spike inflorescence is found in Aca	lypha.	14.55		
	(B) Fruit of family ranunculaceae is eta				
	(C) The inflorescence which appear lik	The second of th			
	(D) Almost all plants have latex in fam	ily euphorbiaceae.	4		
	The <i>correct</i> answer is:				
	(1) A and D	(2) B and C			
	(3) A only	(4) C only			
90.	In the secondary steles of Boerhaavia:				
	(1) Xylem surrounds phloem	(2) Phloem surrounds xylem			
	(3) Both are parallel	(4) Both are alternate			
91.	In which of the following plants secondary growth occurs?				
	(1) Yucca	(2) Dracaena			
	(3) Oryza	(4) Triticum			
92.	Which of the following is <b>not</b> a part of periderm of a plant?				
	(1) Phellogen	(2) Phelloderm			
	(3) Phellem	(4) Phloem			
93.	Path of pollen tubes in the pistil is guid				
	(1) Enzymes of the pollen apparatus	(2) Stigmatic fluid	AUD .		
,	(3) Tissues of the style	(4) Secration of ovule			

94.	Which of the following type of the fruit, strawberry is?					
	(1) Drupe	(2) Berry				
	(3) Achene	(4) Follicle				
95.	In which of the following animals	, blood flows in both the directions (reverse also)				
	(1) Petromyzon	(2) Fish				
	(3) Herdmania	(4) Branchistoma				
96.	Respiration of the cephalochordates occurs through which of the following?					
	(1) Lungs	(2) Gills				
	(3) Fins	(4) General body surface				
97.	Which of the following pairs are correctly matched?  (A) Alytes – midwife toad  (B) Polymorphism is a few discountry of the second of the following pairs are correctly matched?					
	<ul><li>(B) Petromyzon – male is parasite (</li><li>(C) Bony fish – cycloid scale</li></ul>	on female				
	(D) Ichthyophis – apoda					
	The answer is:					
	(1) A, B, C and D	(2) B, C and D only				
	(3) A and B only	(4) A and D only				
98.	Which of the following is <i>not</i> a flight muscle?					
	(1) Coraco-brachialis brevis	(2) Coraco-brachialis langus				
	(3) Gastronemius	(4) Pectoralis major				
99.	Non-renal and pronephric head kidneys are found in:					
	(1) Rana	(2) Hemidactylus				
	(3) Labeo	(4) Alligator				
00.	Which of the following statement is <i>false</i> ?					
	(1) Sweat sorghum is used to obtain ethanol.					
	(2) Quinine is obtained from the bark of Rauwolfia.					
	(3) Sunflower is a source of edible oil.					

(4) Morphine is obtained from opium plant.

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## SECTION - C

101. For the table:

x	0	1	2	3	4	5
f(x)	0	3	8	15	24	25

 $\Delta^3 f(x)$  is:

(1) 3

(2) 0

(3) 2

(4) 7

102. For the data:

x	-1	1	2	3
f(x)	-21	15	12	3

 $\Delta^2 f(x)$  are:

(1) -7 and -3

(2) 7 and 3

(3) 7 and -3

(4) -7 and 3

103. Runge-Kutta method is a:

- (1) Single step method
- (2) Multiple step method
- (3) Method for solving cubic equation
- (4) None of these

**104.** The force acting on a system of n particles is conservative only if:

(1)  $\nabla \bullet F^{\rightarrow} = 0$ 

(2)  $\nabla \times F \rightarrow = 0$ 

(3)  $\nabla \cdot \nabla \cdot F^{\rightarrow} = 0$ 

(4)  $\nabla \bullet \nabla \times F \rightarrow = 0$ 

- 105. In Lagrangian's Equation Q represents:
  - (1) Generalized force having dimensions of force explicitly
  - (2) Quantized force having dimensions of force
  - (3) Generalized force may or may not have dimensions of force
  - (4) Work done by generalized force
- **106.** The Hamiltonian, H = T + V gives total energy:
  - (1) when Cartesian and generalized coordinates do not depend on time explicitly
  - (2) when only generalized coordinates do depend on time explicitly
  - (3) when only Cartesian coordinates do not depend on time explicitly
  - (4) when Cartesian and generalized coordinates depend on time explicitly
- **107.** Any field,  $A^{\rightarrow}$  is said to solenoid field if:

(1) 
$$A^{\rightarrow} = \nabla \times V^{\rightarrow}$$
 and  $\nabla \cdot A^{\rightarrow} = 0$ 

(2) 
$$A^{\rightarrow} = \nabla \times V^{\rightarrow}$$
 and  $\nabla \cdot A^{\rightarrow} = 0$ 

(3) 
$$A \rightarrow = \nabla \times V \rightarrow \text{ and } \nabla \times A \rightarrow = 0$$

(4) 
$$A^{\rightarrow} = \nabla \cdot V^{\rightarrow}$$
 and  $\nabla \times A^{\rightarrow} = 0$ 

- **108.** The total charge enclosed by a given surface through which 15000 lines of force is incoming and that of outgoing lines of force is 25000:
  - (1)  $13.275 \times 10^{-8}C$

(2) 
$$8.85 \times 10^{-12} C$$

(3)  $8.85 \times 10^{-8}$  C

(4)  $8.85 \times 10^{-8} C/s$ 

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		$^{1}$
109.	Name of program which language:	translates a high level language into machine
7 14	(1) compiler	(2) assembler
	(3) register	(4) converter
110.	The area enclosed by a cyclof interaction is:	le represents net work done as well as net heat
	(1) P - V diagram	(2) Carnot cycle
	(3) T - S diagram	(4) triple point diagram
111.	A real gas shows neither heating temperature is:	ng nor cooling in Joule - Thomson effect if the initial
	(1) less then inversion tempera	ture the property of the penns
	(2) greater then inversion temp	perature
j.	(3) equal to inversion temperat	ure
	(4) equal to 273K.	
112.	If $p_1$ and $p_2$ be the probability of events to take place simultaneous	of two independent events, then the probability of two usly is:
	(1) $p_1 + p_2$	$(2)  p_1 \times p_2$
	(3) $p_1/p_2$	(4) $p_1 - p_2$
113.	The two constraints used are:	in determining the most probable macro-state
	(1) $\Sigma n_i = n$ and $\Sigma n_i u_i = u$	(2) $\Sigma n_i = n$ and $\Sigma n_i v_i = v$
	(3) $\Sigma n_i = n$ and $\Sigma n_i v_i = v/n$	(4) $\Sigma n_i = n$ and $\Sigma n_i u_i = u/n$

- 114. The essential condition for Fermi Dirac statistics is:
  - (1) the particles are distinguishable
  - (2) the particles are indistinguishable
  - (3) there is no limit on the no. of particles present in a given energy state
  - (4) not more than one particle can be present in a given energy state
- 115. Boltzmann limit is given by
  - (1)  $(n_i/g_i) \ll 1$  and satisfied by all gases at ordinary temperature
  - (2)  $(g_i/n_i) << 1$  and satisfied by all gases at absolute temperature
  - (3)  $(n_i/g_i) >> 1$  and satisfied by all gases at ordinary temperature
  - (4)  $(n_i \times g_i) \ll 1$  and satisfied by all gases at 0K
- **116.** The ratio of rms value to the average value of alternating current is called Form Factor (FF) and given by :
  - (1) 1.21, peak of wave is flat if FF less than 1.21
  - (2) 1.11, peak of wave is sharp if FF greater than 1.11
  - (3) 1.11, peak of wave is flat if FF greater than 1.11
  - (4) 2.11, peak of wave is flat if FF greater than 2.11
- 117. The quality factor of a series resonant circuit is given by:
  - (1)  $\frac{wL}{R}$  and depends on R only
  - (2)  $\frac{wC}{R}$  and depends on R only
  - (3)  $\frac{wR}{L}$  and depends on R only
  - (4)  $\frac{wL}{R}$  and depends on L only

•		
118.	For a given transistor configuration then value of $\alpha_{dc}$ and $\beta_{dc}$ are :	uration if $l_c$ = 10.505mA, $l_b$ = 100 $\mu$ A and $l_{CBO}$ = 5 $\mu$ A,
	(1) 100 and 0.95	(2) 0.99 and 100
	(3) 105 and 1.05	(4) 101 and 99.0
119.	Calculate the apparent lengt moving with a speed of 2.9 × 10	th of a meter road, when it is carried in a rocket $0^8$ m/s take $c = 3.0 \times 10^8$ m/s
	(1) 0.254 m	(2) 0.52 m
	(3) 0.359 m	(4) 1.0 m
	mining a perfect of the	
120.	The dirichlet conditions for an	expandable function, $f(x)$ are :
	(1) non-periodic, single valued	d, finite and continuous
	(2) periodic, single valued, inf	inite and continuous
	(3) periodic, single valued, fin	ite and continuous
	(4) periodic, single valued, inf	inite and in continuous
121.	The necessary condition for ach	nromatic combination is :
	(1) Two lenses should be of sa	me materials
	(2) Two lenses should be of di	fferent materials
	(3) Two lenses should be of sa	me focal length
	(4) Two lenses should be of sa	me radius of curvature
122.	For Newton's ring due to trans	mitted light, the central maximum (n=0) is :
	(1) dark with zero diameter	(2) bright with zero diameter
	(3) may be bright or dark	(4) None of above

- 123. The Young's double slit experiment is performed with blue and green light of wavelengths 4360 Å and 5460 Å respectively. If X is the distance of 4th maxima from the central maxima, then
  - (1)  $X_{blue} = X_{green}$
  - (2) Xblue > Xgreen
  - (3) Xblue < Xgreen
  - (4)  $X_{blue} / X_{green} = \lambda_{green} / \lambda_{blue}$
- 124. The angular half width of the principal maxima of a plane diffraction grating is :
  - (1) very narrow and sharp
- (2) very broad and dim

- (3) very narrow and dim
- (4) very broad and sharp
- 125. A polarimeter suitable for color blind persons is:
  - (1) bi-quartz polarimeter

(2) half shade polarimeter

(3) saccharimeter

- (4) None of above
- **126.** The cubic lattice most densely packed is:
  - (1) BCC with packing factor 0.680
- (2) SC with packing factor 0.524
- (3) HCP with packing factor 0.740
- (4) FCC with packing factor 0.740
- 127. X-Ray diffraction method used for structure determination of single crystal is:
  - (1) Power crystal method
- (2) Rotating crystal method

(3) Laue method

(4) None of above

**128.** Relation between volume of unit cell, UT [in direct lattice(DL)] and reciprocal lattice(RL) is:

- (1) (Volume of UT)<sub>RL</sub> =  $4\Pi^2$ /(Volume of UT)<sub>DL</sub>
- (2) (Volume of UT)<sub>DL</sub> =  $4\Pi^2$ /(Volume of UT)<sub>RL</sub>
- (3) (Volume of UT)<sub>RL</sub> =  $8\Pi^3$ /(Volume of UT)<sub>DL</sub>
- (4) (Volume of UT)<sub>DL</sub> =  $8\Pi^3$ /(Volume of UT)<sub>RL</sub>

**129.** Phonons are defined as:

- (1) optical energy given to unit cell
- (2) Lattice vibrations quantized energy
- (3) Lattice vibrations continuous energy
- (4) continuous heat energy given to lattice

**130.** The energy of gamma photon having a wavelength 1.5  $\mathring{A}$  (take h=  $6.634 \times 10^{-34} Js$ )

(1)  $8.275 \times 10^3 eV$ 

(2)  $13.24 \times 10^{-4} eV$ 

(3)  $10.24 \times 10^{-3} eV$ 

(4)  $1.6 \times 10^{-19} eV$ 

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131. The ratio of kinetic energy of proton to that of  $\alpha$ -particle, when a proton and an  $\alpha$ -particle have equal de-Broglie wavelengths is :

(1) 1:2

(2) 2:1

(3) 1:1

(4) 4:1

132. In Schrodinger's equation, eigen values means:

(1) value of energy

(2) value of position

(3) value of frequency

(4) none of above

133. Zero-point energy of an oscillator is given by:

(1) hv

(2) zero

(3) infinite

(4)  $\left(\frac{1}{2}\right)hv$ 

134. The factors that control the allowed values of energy of a particle in a potential well are:

- (1) width and depth of potential well
- (2) time and energy of potential well
- (3) depth and energy of potential well
- (4) time and width of potential well

**135.** In Moseley's law which leads to correct sequence of putting the elements in periodic chart, frequency of X- ray spectral line depends on :

(1) Z

 $(2) (Z)^2$ 

(3)  $(Z)^{1/2}$ 

 $(4) (Z)^3$ 

(Z= Atomic No. of Element)

136. The product of the characteristic roots of the matrix:

$$\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$$
 is:

(1) 3

- (2) 18
- (3) 0
- (4) 45

- 137. If the roots of equation  $x^3 12x^2 + 39x 28 = 0$  are in A. P., then one of the root is:
  - (1) 4

- (2) 3
- (3) -4
- (4) 6
- The radius of curvature of the hyperbola  $r^2 = a^2 b^2 + \frac{a^2b^2}{r^2}$  is: 138.
  - (1)  $\frac{a^2b}{m^3}$
- (2)  $\frac{a^2b^2}{p^3}$  (3)  $\frac{ab^2}{p^3}$
- (4)  $\frac{a^2b^2}{n}$

- **139.**  $\int_{0}^{1} \frac{x^3}{\sqrt{1-x^2}} dx$  is equal to :
  - (1)  $\frac{3}{2}$
- (2) 0
- (3)  $-\frac{3}{2}$  (4)  $\frac{2}{3}$
- **140.** The Co-ordinates of the centre of conic  $x^2 + 12xy 4y^2 6x + 4y + 9 = 0$  are:
  - (1)  $\left(\frac{1}{2},0\right)$

(2)  $\left(-\frac{1}{2},0\right)$ 

(3)  $\left(0,\frac{1}{2}\right)$ 

- (4)  $\left(\frac{1}{2}, \frac{1}{2}\right)$
- **141.** If  $x = \cos \theta + i \sin \theta$ , then  $x^n + \frac{1}{x^n}$  is equal to:
  - (1)  $2\cos n\theta$

(2)  $2i\cos n\theta$ 

(3)  $\frac{\cos n\theta}{2}$ 

- (4)  $\cos 2n\theta$
- The least positive integer (mod II) to which 282 is congruent:
  - (1) 4

- (2) 7
- (3) 5
- (4) 2
- The integrating factor of differential equation  $2\cos(y^2) dx xy \sin(y^2) dy = 0$  is:
  - (1)  $\frac{1}{x^3}$

(2)  $x^2$ 

(3)  $x^3$ 

(4)  $\frac{1}{x^2}$ 

**144.** Particular integral for the differential equation  $(D^2 - 6D + 9)y = e^{3x}$  is:

 $(1) \ \frac{e^{3x}}{2}$ 

(2)  $x^2e^{3x}$ 

 $(3) \ \frac{e^{3x}}{x^2}$ 

(4)  $\frac{x^2}{2}e^{3x}$ 

**145.** The value of  $\lambda$  so that the following vectors are coplanar  $\vec{a} = 2\hat{i} - 7\hat{j} + \lambda \hat{k}$ ,  $\vec{b} = \hat{i} + 2\hat{j} - \hat{k}$  and  $\vec{c} = 3\hat{i} - 5\hat{j} + 2\hat{k}$  is:

(1) -3

(2) 3

(3)  $\frac{1}{3}$ 

 $(4) -\frac{1}{3}$ 

146.  $\lim_{x\to\infty} x \tan \frac{1}{x}$  is :

(1) 1

(2) -1

(3) 0

(4) 2

**147.** If  $z = \tan^{-1} \left( \frac{x}{y} \right)$ , then  $\frac{\partial z}{\partial x}$  is:

(1) 0

 $(2) \quad \frac{x}{x^2 + y^2}$ 

(3)  $\frac{y}{x^2 + y^2}$ 

(4)  $\frac{1}{x^2 + y^2}$ 

**148.** The partial differential equation  $x \frac{\partial^2 z}{\partial x^2} + 2 \frac{\partial^2 z}{\partial y \partial x} + y \frac{\partial^2 z}{\partial y^2} + \frac{\partial z}{\partial x} = 0$  is parabolic if:

(1)  $xy \neq 1$ 

(2) xy < 1

(3) xy > 1

(4) xy = 1

**149.** The particular integral of the differential equation  $\frac{\partial^3 z}{\partial x^3} - 3 \frac{\partial^3 z}{\partial x^2 \partial y} + 4 \frac{\partial^3 z}{\partial y^3} = e^{x+2y} \text{ is :}$ 

 $(1) \quad \frac{e^x}{72}$ 

 $(2) \quad \frac{e^{x+2y}}{27}$ 

 $(3) \quad \frac{e^{x+2y}}{72}$ 

(4)  $\frac{e^y}{27}$ 

**150.** Any wrench may be resolved into two wrenches, whose axes intersect at right angles in how many ways?

(1) One way

- (2) Three ways
- (3) Infinite number of ways
- (4) None of these

**151.**  $\lim_{x \to \infty} \left( \frac{2}{1}, \frac{3}{2}, \frac{4}{3}, \dots, \frac{n}{n-1} \right)^{\frac{1}{n}}$  is equal to:

(1) 1

(2) -1

(3) 0

(4)  $\frac{1}{2}$ 

**152.** The series  $1^2 + 2^2 + 3^2 + \dots + n^2 + \dots$  diverges to :

 $(1) -\infty$ 

(2) + ∞

(3) 0

(4) 1

**153.** The value of  $H_{2n+1}(0)$  is:

(1) 1

(2) -1

 $(3) \ \frac{1}{n}$ 

(4) 0

**154.** The inverse Laplace Transform of  $\frac{1}{s^{7/2}}$  is:

(1)  $\sqrt{\frac{t}{\pi}}$ 

 $(2) \quad \frac{8}{15} \sqrt{\frac{t}{\pi}}$ 

Participation of the participa

(3)  $\frac{8t^2}{15}\sqrt{\frac{t}{\pi}}$ 

(4) 0

155. The operator | | means:

(1) Logical OR

(2) Logical AND

(3) Logical NOT

(4) None of these

156. Let (R, d) be the usual metric space. Then derived set of:

$$A = \left\{ \frac{1}{n} : n \in \mathbb{N} \right\} \text{ is :}$$

(1) A

(2) {0}

(3) ¢

(4) {1}

157. Let (X, d) be a metric space and A be any subset of X. Then A is open if and only if:

 $(1) \quad A = -A^{\circ}$ 

(2)  $A = \frac{1}{A}$ 

 $(3) \quad A = A$ 

(4) None of these

**158.** If  $G = \{1, w, w^2\}$  is the group of cube roots of unity, then order of  $w^2$  under the binary operation multiplication is :

(1) 2

(2) 4

(3) 1

(4) 3

159. A division ring has how many zero divisiors?

(1) 1

(2) 3

(3) 2

(4) None of these

- **160.** "The rate of change of momentum is directly proportional to the impressed force and takes place in the direction of the force" is:
  - (1) Newton's first law of motion
  - (2) Newton's second law of motion
  - (3) Newton's third law of motion
  - (4) None of these
- 161. Time of flight of a projectile is given by:
  - $(1) \frac{2u \sin \alpha}{g}$

 $(2) \quad \frac{u\sin\alpha}{g}$ 

 $(3) \frac{u\sin\alpha}{2g}$ 

(4) None of these

- **162.**  $T\left(\frac{1}{2}\right)$  is equal to:
  - (1) e

(2) n

(3)  $\sqrt{\pi}$ 

- (4) √e
- **163.** The fixed point of the Mobius transformation  $w = \frac{3z-4}{z-1}$  is:
  - (1) z = 1

(2) z = -1

(3) z = -2

- (4) z = 2
- **164.** The set of vectors  $\{(1,0),(0,1)\}$  in  $\mathbb{R}^2$  is:
  - (1) Linearly dependent

(2) Linearly independent

(3) Not defined

(4) None of these

**165.** If  $T:V \to W$  is a linear transformation, then T is one-one iff N(T) is :

(1) {1}

(2) ¢

(3) 0

(4) None of these

166. The order of dead time and recovery time in a G.M. counter is :

(1) 100µs

(2) 10µs

(3)  $10^3 \mu s$ 

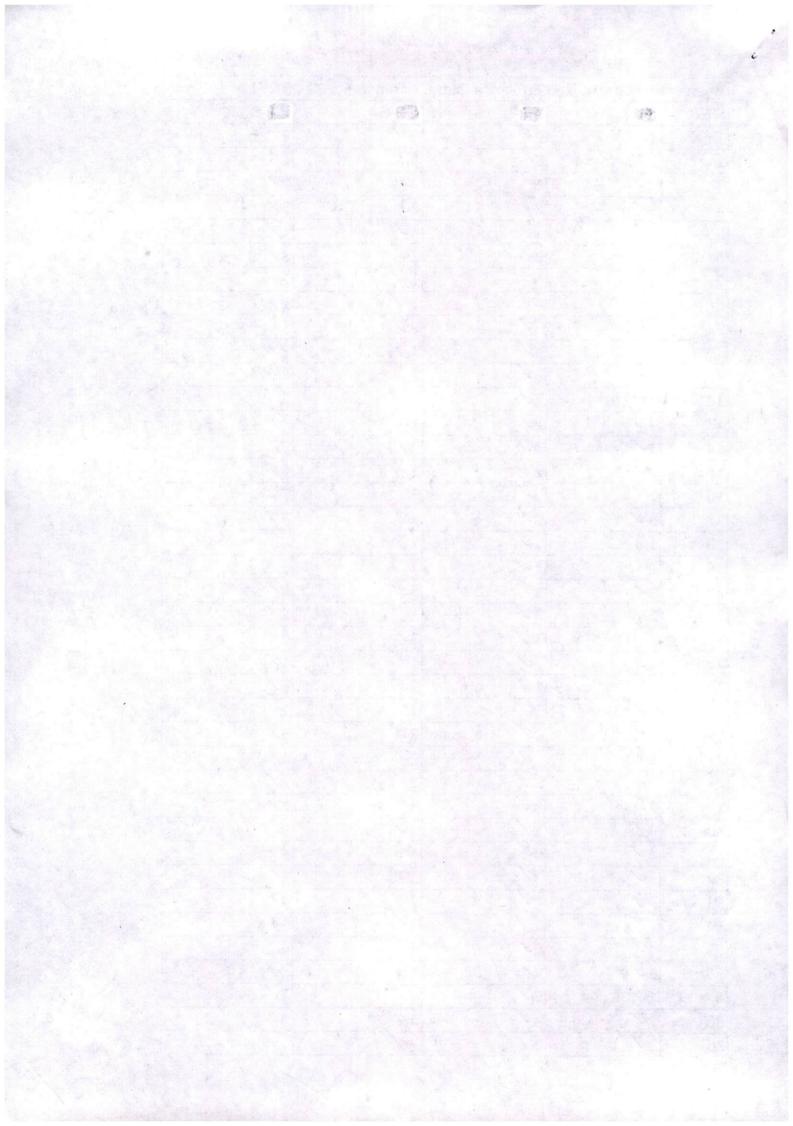
(4)  $10^{-3} \mu s$ 

. The same of the es divoners in . the second to the end temperature to a desired to the

S.No	Α	В	·C	D
1	3.	2/	2 -	2/
2	2/	3	3.4	1/
3	2 -	1-	4.	2/
4	3 🗸	21	3./	3/
5	2 🗸	1/	4.1	1/
6	3 -	2/	2	3/
7	3 ~	3/	1.	2/
8	1	4	2~	2/
9	3	3/	3./	3/
10	1/	4/	1/	2/
11	3 /	3./	2.	3/
12	1 -	21	3 🗸	3/
13	2 🗸	2./	1	1/
14	1/	3./	2./	3/
15	3 -	2/	1./	1/
16	2 1	3/	3.	2/
17	3/	3/	1_	3/
18	1/	1	2./	4/
19	2~	31	1	3/
20	1/	1/	3./	4/
21	2 🗸	3 🗸	3 🗸	2/
22	1/	11	3.	3/
23	2 🗸	2/	1	1/
24	3 🗸	1./	3 🗸	2/
25	1 ^	3 🗸	1/	1/
26	2 1	2/	3 🗸	3/
27	3 🗸	1/	2	1/
28	4-	2/	2 🗸	2/
29	3/	3 🗸	3 🗸	1/
30	4	1/	2 .	3/
31	4/	4/	4 🗸	4/
32	3 🗸	3	3 .	3/
33	4 🗸	4	4	4/
34	1	1/	1	1/
35	4~	2/	4./	4/
36	2	4/	1/	4/
37	1 🗸	3/	4/	1/
38	2	3/	4/	4
39	2	1/	4/	1/



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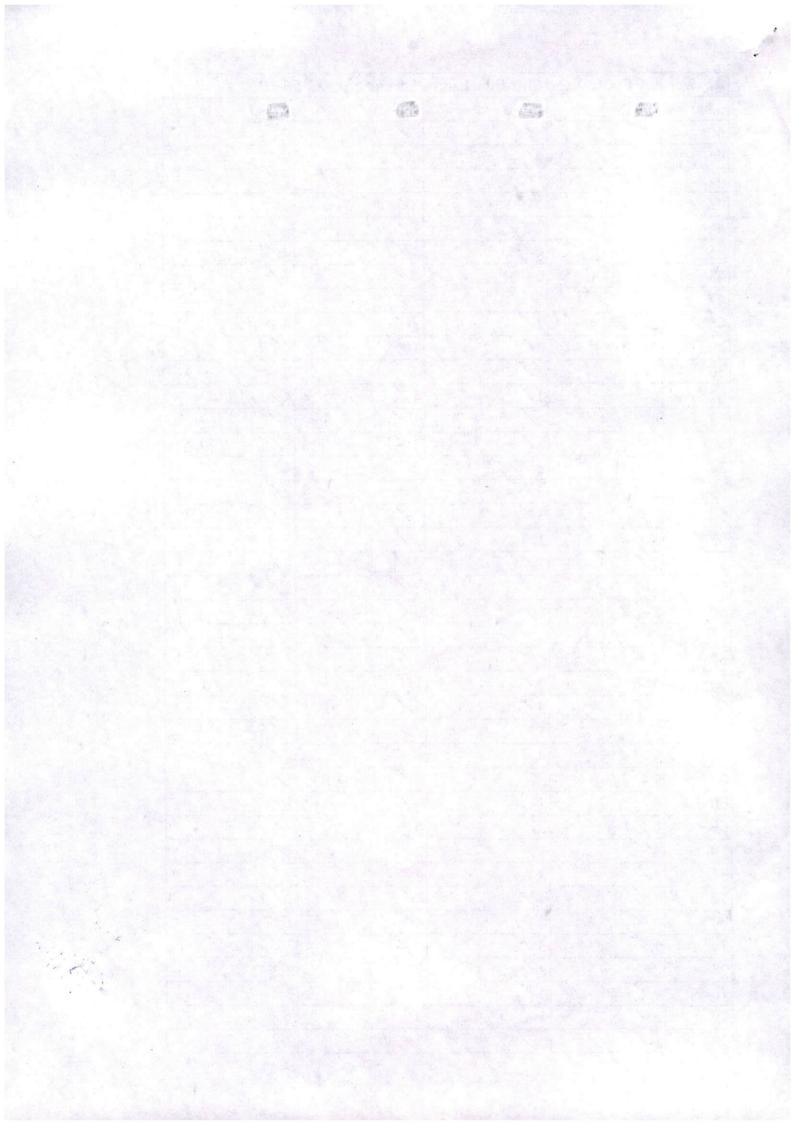


S.No	A	В	С	D
40	3	4/	2/	2/
41	1/	4	4/	2/
42	3/	1/	4,	2/
43	1.⁄	4/	34	1/
44	3/	2/	4/	4/
45	2~	4/	2%	4/
46	3/	2/	4/	1/
47	1/	1/	3/	4/
48	2 🗸	2/	3.2	4/
49	4./	2/	1_	4/
50	1.	3/	4/	2/
51	4./	1/	4./	4/
52	4./	3/	11/	4/
53	4	1/	4-/	3/
54	4./	3/	2/	4/
55	1/	2/	4./	2/
56	3/	3/	2/	4/
57	3/	1/	1/	3/
58	1/	2/	2/	3/
59	3 ✓	4/	2:/	1/
60	1	1/	3/	4/
51	2	4/	1/	4/
62	4 /	4/	3/	1/
63	4/	4/	1/	4/
64	3 🗸	4/	3/	2/
65	3 1	1/	2/	4./
66	4 /	3 /	3/	2/
67	1 🗸	3/	1/	1/
58	3 🗸	1/	2/	2/
69	3 🗸	3/	4/	2/
70	4 🗸	1/	1/	3/
71	4/	2/	4:/	1/
72	1 🗸	4/	4./	3
73	4 🗸	4/	46	1/
74	1 /	3 /	4./	3/
75	2/	3/	1/	2/
76	2 🗸	4/	3/	3/
77	2~	1/	3	1/,
78	1	3 /	1/	2/

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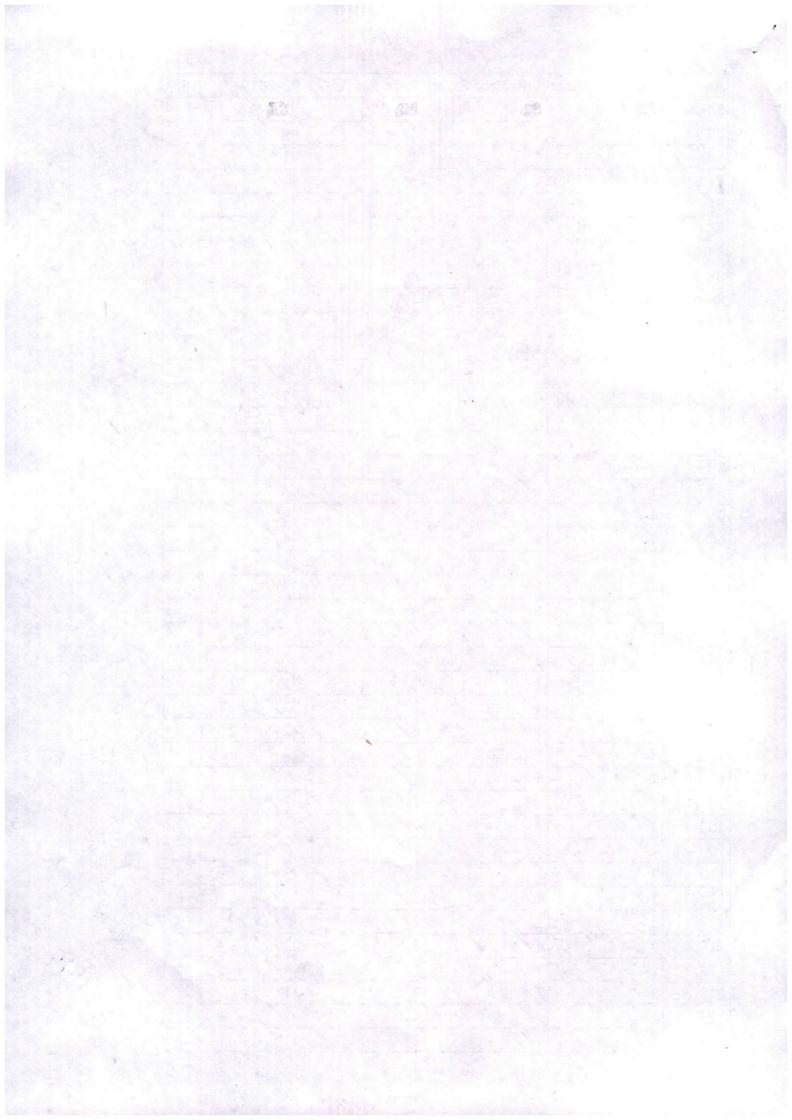




S.No	A	В	С	D
79	41	3/	3/	4/
80	4	4/	1/	1/
81	1./	4/	2/	4/
82	4	1/	4/	4/
83	4/	4/	4/	4/
84	4	1/	3/	4/
85	2 🗸	2/	3 /	1/
86	4	2/	4/	3/
87	4~	2/	1/	3/
88	3~	1/	3.	1/
89	4 🗸	4/	3/	3/
90	2.^	4/	4/	1/
91	4./	1/	4/	2/
92	3/	4/	1/	4/
93	3 🗸	4/	4/	4/
94	1_	4/	1/	3/
95	4./	2/	2:/	3/
96	4.^	4/	26	4/
97	1./	4/	2/	1/
98	4./	3/	1/	3/
99	2 🗸	4/	4/	3.
100	2~	2/	2/	2/
101	3/	2/	3/	2/
102	1/	2/	2/	1/
103	2.	3/	1/	1/
104	4/	1/	4/	2/
105	3./	2/	1/	3/
106	1~	4/	2/	1/
107	2 🗸	2/	1/	1/
108	3 🗸	3/	2/	3/
109	4	2/	1/	1/
110	2/	1/	3/	3 /
111	1/	4/	2/	3/
112	3 🗸	1/	2/	2/
113	4./	4/	3/	1/
114	2	1/	1/	4/
115	3~	2/	2/	1/
116	1	3/	4/	2/
117	2 -/	1/	2 /	1/

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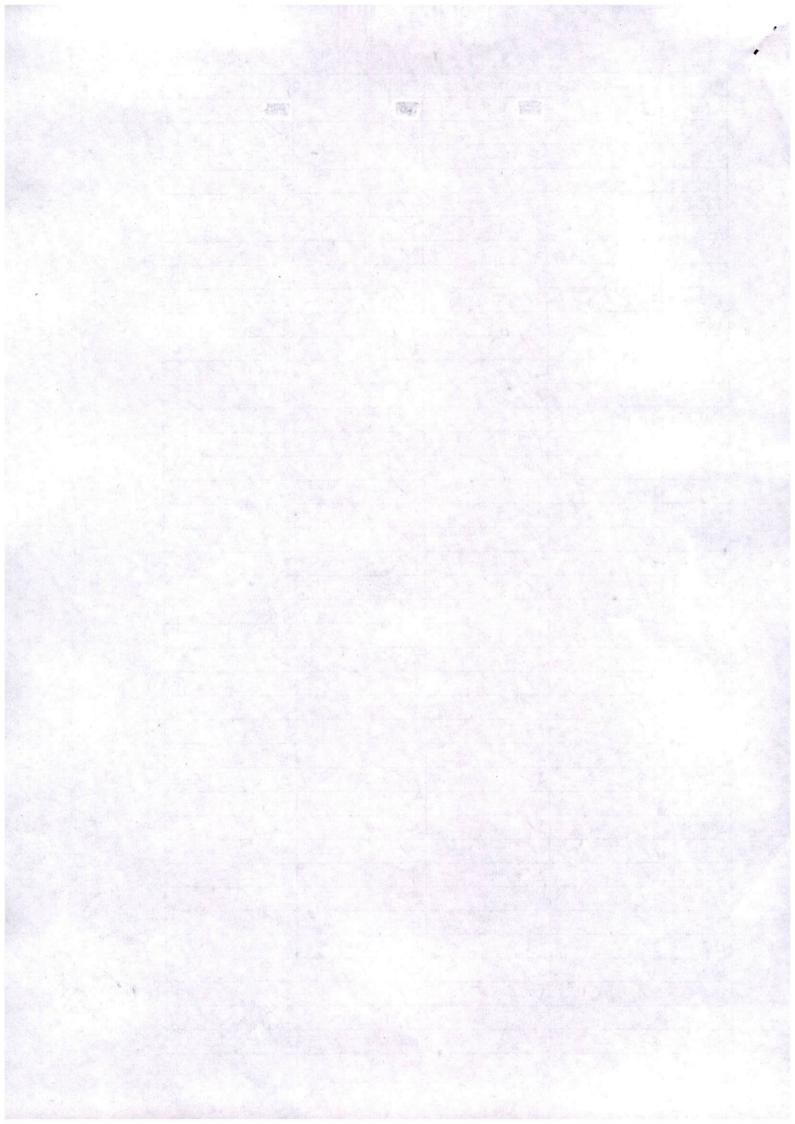
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S.No	A	В	C	D
118	4/	2/	3 /	2/
119	3 /	4/	2/	1/
120	1/	3/	1/	3/
121	2/	1/	4/	2/
122	3/	2/	1/	2/
123	4/	3 /	4/	3/
124	4/	4/	1/	1/
125	2/	2/	2/	2/
126	1/	1/	3/	4/
127	3/	3/	1/	2/
128	4/	4/	2/	3 /
129	2/	2/	4/	2/
130	4/	3/	3 /	1/
131	2/	1/	1/	4/
132	1/	2/	2/	1/
133	1/	4/	3/	4/
134	2/	3/	4/	1/
L35	3/	1/	24	2/
136	1/	2/	1/	3/
L37	1/	3/	3/	1/
.38	3 /	4/	4/	2/
.39	1/	4/	2/	4/
.40	3/	2/	3/	3/
.41	3/	1/	1/	1/
.42	2/	3/	2/	2/
.43	1/	4/	4/	3/
144	4/	2/	3/	4/
L45	1/	4/	1/	2/
46	2/	2/	2/	1/
.47	1/	1/	3/	3/
48	2/	1/	4/	4/
.49	1/	2/	4/	2/
.50	3/	3/	2/	3/
51	2/	1/	1/	1/
.52	2/	1/	3/	2/
53	3/	3/	4/	4/
54	1/	1/	2/	3 /
.55	2/	3 /	4/	1/
156	4/	3 /	2/	2/

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Answe	Answer Key Centralized Entrance Exam. Forensic Sc. 22-06-2017					
S.No	A	В	C	D		
157	2/	2	1/	3/		
158	3/	1/	1	4/		
159	2	4/	2/	4/		
160	1/	1/	3/	2/		
161	4/	2/	1/	1/		
162	1/	1/	1/	3 /		
163	4/	2/	3/	4 /		
164	1/	1/	1/	2 /		
165	2/	3/	3/,	4/,		
166	1/	1/	1/	1/		

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