Total No. of Printed Pages: 21

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

### UG-4Yr.-EE-June, 2025

SET-Y

## SUBJECT: Bachelor of Public Health Sciences

Time : 1¼ Hours Roll No. (in figures)	Max. Marks : <b>100</b> (in words)	10061 Total Questions : 130
Name		
Father's Name		
Date of Examination		
(Signature of the Candidate)		(Signature of the Invigilator)

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

- All questions of Section-A are compulsory. Students are required to attempt either Section-B or 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 unfairmeans / mis-behaviour 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. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- 4. Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University Website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case, will be considered.
- 5. 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. Answers *must not* be ticked in the question booklet.
- 6. There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. Use only Black or Blue Ball Point Pen of good quality in the OMR Answer-Sheet.
- 8. Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.

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### SECTION - A

1.	Which hormone is known as the 'stress	s hormone'?	
	(1) Adrenaline	(2) Thyroxine	
	(3) Insulin	(4) Cortisol	
2.	What is the function of alveoli in the lu	ungs?	
	(1) Exchange gases	(2) Store oxygen	
	(3) Filter blood	(4) Produce mucus	
3.	Which disease is caused by a deficiency	cy of Vitamin B1?	
	(1) Pellagra	(2) Rickets	
	(3) Beriberi	(4) Scurvy	
4.	Which organ stores bile ?		
	(1) Liver	(2) Pancreas	
	(3) Gallbladder	(4) Stomach	
5.	What does HIV attack in the human boo	######################################	
	(1) Red blood cells	(2) Nerves	
	(3) Platelets	(4) Immune cells	
6.	Which part of the brain controls breathing	ng and heart rate? vd behave suppose and	
	(1) Cerebrum of oil is mumicate (2)	(2) Cerebellum	
	(3) Medulla oblongata	(4) Pons	
7.	What is the main cause of rickets in childre	ren?up relate a el parwollet est lo doutW	
	(1) Lack of Vitamin D		
	(3) Lack of iron		
3.	Which hormone regulates the sleen, wake a	cycle? les lando an ao earch indyoud adT	
	(1) Insulin	(2) Melatonin	
	(3) Cortisol	(4) Estrogen	
		(.) Zurogon	

9.	What is the largest internal organ in the l	numan body ?
	(1) Brain	(2) Heart
	(3) Liver	(4) Kidney
10.	Which blood group is known as the univ	ersal recipient?
	(1) A	(2) B
	(3) O	(4) AB
11.	The work done by a force is zero when t	he displacement is ?
	(1) In the same direction as force	(2) Perpendicular to the force
	(3) Opposite to the force	(4) None of these
12.	A car moves with uniform acceleration.	Its velocity-time graph is:
	(1) Horizontal	(2) Parabolic
	(3) Linear	(4) Exponential
13.	A train is moving with a uniform accellst, 2nd and 3rd seconds is:	leration. The ratio of distances covered in th
	(1) 1:1:1	(2) 1:2:3
	(3) 1:4:9	(4) 1:3:5
14.	The pressure exerted by a fluid in a cont	ainer is ?
	(1) Same at all points	(2) Maximum at the top
	(3) Zero at the bottom	(4) Varies linearly with depth
15.	Which of the following is a scalar quant	ity?
	(1) Displacement	(2) Velocity
	(3) Speed	(4) Force
16.	The buoyant force on an object submerg	ged in a fluid is equal to?
	(1) Weight of the object	(2) Weight of fluid displaced
	(3) Volume of object	(4) Mass of object

17.	What is the energy conversion in a hydr	roelectric power plant?
	(1) Electrical to Mechanical	(2) Mechanical to Electrical
	(3) Chemical to Electrical	(4) Thermal to Mechanical
18.	The concept of inertia is associated with	which law of motion?
	(1) First Law	(2) Second Law
	(3) Third Law	(4) Law of Gravitation
19.	A car accelerates from rest and covers 1	00 m in 5 s. What is its acceleration?
	(1) $5 \text{ m/s}^2$	(2) $8 \text{ m/s}^2$
	(3) $10 \text{ m/s}^2$	(4) $20 \text{ m/s}^2$
20.	Which lens is used to correct myopia (ne	earsightedness)?
	(1) Convex lens	(2) Concave lens
	(3) Cylindrical lens	(4) None of these
21.	angle of minimum deviation is 60°.  (1) $\frac{\sqrt{3}}{2}$	naterial of an equilateral prism for which the (2) $\sqrt{3}$ (4) $\frac{1}{\sqrt{2}}$
	$(3)$ $\frac{1}{2}$	$(4)  \overline{\sqrt{2}}$
22.	Total internal reflection occurs when ligh	nt travels from?
	(1) Dense to rarer medium beyond critic	
	(2) Rarer to denser medium beyond criti	L. H SHA MHARREST FEET
	<ul><li>(3) Dense to denser medium beyond crit</li><li>(4) None of these</li></ul>	ical angle
	(4) None of these	
23.	The human eye focuses light on the?	
	(1) Cornea	(2) Retina
	(3) Iris	(4) Lens
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24.	Chromatic aberration in lenses due to ?	
	(1) Dispersion of light	(2) Reflection of light
	(3) Refraction of light	(4) Diffraction of light
25.	The image formed by a plane mirror is?	
	(1) Real and inverted	(2) Real and erect
	(3) Virtual and inverted	(4) Virtual and erect
26.	Which of the following has the smallest	wavelength?
	(1) Radio waves	(2) Microwaves
	(3) Ultraviolet rays	(4) Infrared rays
27.	The unit of refractive index is ?	
	(1) Meter	(2) Hertz
	(3) Candela	(4) Dimensionless (no unit)
28.	A convex lens is dipped in a liquid windex of the lens. Then what is its focal	hose refractive index is equal to the refractive length?
	(1) Focal Length will become zero	
	(2) Focal Length will become infinite	
	(3) Focal length will reduce, but not bed	come zero
	(4) Remains unchanged	The second of th
29.	If a glass prism is dipped in water, what	
	(1) Increases	(2) Decreases
	(3) Does not change	(4) No effect

36.	The temperature at which vapor pressure	equals atmospheric pressure is ?
	(1) Boiling point	(2) Melting point
	(3) Freezing point	(4) Critical point
37.	lies in ?	mum energy in the electromagnetic spectrum
	(1) Radio waves	(2) Gamma rays
	(3) Visible light	(4) Infrared
38.	Which of the following does the wave th	neory of light not explain?
	(1) Diffraction	(2) Photocurrent
	(3) Polarization	(4) Interference
39.	In nuclear reactions, there is a conservat	ion of:
	(1) Energy only	(2) Mass only
	(3) Mass, energy and momentum	(4) Momentum only
40.	What happens when the radio wave read	ches the ionizing medium?
	(1) Will bend towards normal	(2) Will bend away from the normal
	(3) Will follow a straight path	(4) None of these
41.	Which element has the highest electrone	egativity ?
	(1) Oxygen	(2) Nitrogen
	(3) Chlorine	(4) Fluorine
42.	The bond formed by the sharing of elec	etron pairs between atoms is called?
	(1) Ionic bond	(2) Metallic bond
	(3) Covalent bond	(4) Hydrogen bond

30.	Two plane mirrors A and B are placed An object is kept in between them 15 d is an image not formed in mirror A.	I parallel to each other and spaced 20 cm apart.  cm from A. Out of the following at which point
	(1) 15 cm	(2) 25 cm
	(3) 45 cm	(4) 55 cm
31.		1.38 m from the ground stands before a mirror nimum length of the mirror so that he can view
	(1) 0.8 m	(2) 0.75 m
	(3) 0.69 m	(4) none of these
32.	Which scientist proposed the dual natur	e of matter ?
	(1) de Broglie	(2) Einstein
	(3) Newton	(4) Planck
33.	The electrochemical cell converts?  (1) Electrical energy into chemical energy	rgy
	(2) Mechanical energy into electrical en	nergy
	(3) Chemical energy into electrical energy	rgy
	(4) Electrical energy into mechanical en	nergy
34.	The entropy of a perfectly crystalline su	bstance at absolute zero is ?
	(1) Maximum	(2) Zero
	(3) Infinite	(4) Undefined
35.	In the photoelectric effect, the emission	of electrons depends on ?
	(1) Frequency of incident light	(2) Intensity of incident light
	(3) Both frequency and intensity	(4) None of the above

43.	. Which of the following is paramag	netic ?
	(1) $N_2$	(2) O <sub>2</sub>
	(3) C0 <sub>2</sub>	(4) CH <sub>4</sub>
44.	What type of hybridization is prese	nt in methane (CH <sub>4</sub> ) ?
	(1) sp	(2) Sp2
	(3) Sp3	(4) dsp2
45.	The atomic radius generally	across a period from left to right.
	(1) Increase	(2) Decreases
	(3) Remains same	(4) Varies irregularly
46.	The color of transition metal comple	
	(1) Nuclear reactions	(2) Atomic mass
	(3) Ionization energy	(4) d-d electronic transitions
47.	Which of the following is a property	of f-block elements?
	(1) High ionization energy	(2) Exhibiting variable oxidation states
	(3) Low melting points	(4) None of these
48.	Which bond is strongest?	
	(1) Single bond	(2) Double bond
	(3) Triple bond	(4) Hydrogen bond
49.	The ionic bond is formed by ?	
	(1) Transfer of electrons	(2) Sharing of electrons
	(3) Attraction of dipoles	(4) Hydrogen bonding

50.	The shape of BF <sub>3</sub> molecule is ?	
	(1) Tetrahedral	(2) Linear
	(3) Trigonal planar	(4) Octahedral
51.	Which of the following is an aromatic hy	drocarbon?
	(1) Ethane	(2) Benzene
	(3) Ethene	(4) Propane
<b>52</b> .	Which compound contains a carbonyl gr	oup?
	(1) Alcohol	(2) Alkane
	(3) Amine	(4) Aldehyde
53.	Which reagent is commonly used to test	for unsaturation in hydrocarbons?
	(1) Tollen's reagent	(2) Fehling's solution
	(3) KMn0 <sub>4</sub>	(4) Bromine water
54.	The IUPAC name of CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -OH	is?
	(1) Methanol	(2) Ethanol
	(3) Propanol	(4) Butanol
<b>55.</b>	Which of the following contains nitroge	n ?
	(1) Alcohol	(2) Amine
	(3) Ketone	(4) Ether
56.	Polymerization is a process of?	
	(1) Breaking down molecules	
	(2) Formation of large molecules from	small ones
	(3) Crystallization	
	(4) Distillation	

57	The empirical formula of glucose is?	
	(1) $C_6H_{12}O_6$	(2) $C_6H_{10}O_5$
	(3) CH <sub>2</sub> O	(4) $C_3H_6O_3$
58		mpounds is responsible for the sweet smell of
	(1) Alcohols	(2) Esters (4)
	(3) Aldehydes	(4) Ketones
59.	What type of bond is found in benzene	?
	(1) Single bonds only	
	(2) Alternating single and double bond	ds (resonance)
	(3) Triple bonds	66. The potential difference between these lec
	(4) Ionic bonds	
-	Will Cal Call (	
60.	Which of the following organic compo	(3) Resistance
	(1) R-O-R'	(2) R-COOH
	(3) R-NH <sub>2</sub>	(4) R-CHO di pode moderni and
61.	The first law of thermodynamics deals	with? Homogonous double (1)
	(1) Conservation of mass	(2) Conservation of energy
	(3) Entropy	(4) Enthalpy
60	In alcohoration, the cathoda is sub-	\$6. For the following reaction at 300 K
62.	In electrochemistry, the cathode is when	
	(1) Oxidation occurs	(2) Reduction occurs
74.	(3) Both oxidation and reduction occur	(4) No reaction occurs
63.	The unit of rate constant for a first-orde	r reaction is ?
	(1) S <sup>-1</sup>	(2) mol L <sup>-1</sup> s <sup>-1</sup>
	(3) L mol <sup>-1</sup> s <sup>-1</sup>	(4) Unitless

What does the term "activation energy" mean?

- (1) Energy released during a reaction
- (2) Minimum energy required for a reaction to occur Which of the following organic compound is
- (3) Total energy in reactants
- (4) Energy lost as heat

The entropy of an isolated system always?

(1) Decreases

(2) Increases or remains constant

(3) Remains constant

(4) Fluctuates randomly

The potential difference between the electrodes of a galvanic cell is called? 66.

(1) EMF

(2) Current

(3) Resistance

(4) Voltage drop

In which reaction does the catalyst remain unchanged?

- (1) Homogeneous catalyst reaction (2) Heterogeneous catalyst reaction
- (3) Both A and B
- (4) None of these

For the following reaction at 300 K 68.

$$A_2(g) + 3B_2(g) \rightarrow 2AB_3(g)$$

the enthalpy change is + 15 kJ, then the internal energy change is:

- (1) 19988.4 J
- (2) 200 J

(3) 1999 J

(4) 1.9988 kJ

69. At a given temperature and pressure, the equilibrium constant values for the equilibria are given below:

$$3A_2 + B_2 \rightleftharpoons 2A_3B, K_1$$
  
 $A_3B \rightleftharpoons 3/2A_2 + 1/2B_2, K_2$ 

The relation between K, and K<sub>2</sub> is:

(1)  $K_1^2 = 2K_2$ 

(2)  $K_2 = K_1/2$ 

(3)  $K_1 = 1/sqrt(K_2)$ 

- (4)  $K_2 = 1/sqrt(K_1)$
- 70. Mass in grams of copper deposited by passing 9.6487 A current through a voltmeter containing copper sulphate solution for 100 seconds is (Given: Molar mass of Cu: 63 g mol<sup>-1</sup>, 1 F = 96487C):
  - (1) 3.15g

(2) 0.315g

(3) 31.5g

(4) 0.0315g

# SECTION – B (MATHEMATICS)

- 71. If the roots of the quadratic equation  $ax^2 + bx + c = 0$  are equal, then the discriminant is:
  - (1) Greater than zero

(2) Less than zero

(3) Zero

- (4) None of these
- 72. The sum of the first n natural numbers is:
  - (1) n(n+1)/2

(2)  $n^2$ 

(3) n(n-1)/2

- (4) n(n+1)
- 73. Find the number of terms if the sum of an AP is 100, the first term is 5, and the last term is 20:
  - (1) 15

(2) 10

- (3) 20
- (4) 25

**74.** If 
$$A = \begin{bmatrix} 2 & 2 \\ 9 & 4 \end{bmatrix}$$
 and  $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ 

Then  $10A^{-1}$  is equal to:

(1) A-4I

(2) 6I - A

(3) A - 6I

(4) 4I - A

**75.** If  $S_n = 3n^2 + 5n$ , then the first term is:

(1) 8

(2) 6

(3) 7

(4) 3

**76.** For equation  $x^2 + px + q = 0$ ,  $\alpha^2 + \beta^2$  equals:

(1)  $p^2 - 2q$ 

(2)  $p^2 + 2q$ 

(3)  $q^2 - 2p$ 

(4)  $q^2 + 2p$ 

**77.** Sum of GP is given by:

(1)  $a(1-r^n)/(1-r)$ 

(2)  $a(r^n-1)/(r-1)$ 

(3) Both A & B

(4) None

78. If A is a 3 x 3 non-singular matrix such that  $AA^{T} = A^{T} A$  and  $B = A^{-1}A^{T}$ , then  $BB^{T}$  equals:

(1) I+B

(2) I

(3)  $B^{-1}$ 

 $(4) (B^{-1})^{T}$ 

**79.** If  $\alpha$  is a root of the equation 2x(2x+1) = 1, then the other root is :

(1)  $3\alpha^3 + 4\alpha$ 

(2)  $\alpha^2$ 

(3)  $-2\alpha (\alpha+1)$ 

(4) none of these

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80.	A value of b for which the equations	$sx^2 + bx - 1 = 0 \text{ and } x$	$x^2 + x + 1$	o = 0 have or	ne root in
	common is:				

 $(1) - \sqrt{2}$ 

(2)  $-i - \sqrt{3}$ 

(3) i√5

(4) 2

81. 
$$\sin(2\theta)$$
 is equal to:

- (1)  $2\sin\theta\cos\theta$  (2)  $\sin^2\theta + \cos^2\theta$
- (3)  $\sin\theta + \cos\theta$

(4) None

82. 
$$tan^2\theta + 1$$
 equals:

(1)  $\sec^2\theta$ 

(2)  $\csc^2\theta$ 

(3) 1

(4)  $\sin^2\theta$ 

If  $\sin \theta$  and  $\cos \theta$  are the roots of  $ax^2$  - bx + c = 0, then the relation between a, b and c will be:

(1)  $a^2 + b^2 + 2ac = 0$ 

(2)  $a^2 - b^2 + 2ac = 0$ 

(3)  $a^2 + c^2 + 2ab = 0$ 

 $(4) \ a^2 - b^2 - 2ac = 0$ 

**84.** The value of cos 1° cos 2° cos 3° ... cos 179° is :

- (1)  $1/\sqrt{2}$  and an extract the doing and (2) 0 and extract the state of the contract the contract that the contract the contract that th

(3) 1

the points (11) and (1 et m the 1-1(4). I then I equals

If A lies in the second quadrant and 3 tan A + 4 = 0, then the value of (2 cot A - 5 cos  $A + \sin A$ ) is equal to:

(1) -53/10

(2) 7/10

(3) 37/10

(4) 23/10

86. Number of solutions of the equation  $\tan x + \sec x = 2 \cos x$  lying in the interval  $[0, 2\pi]$ is:

(1) 0

(2) 1

(3) 2

(4) 3

87.	Standard fo	orm of a parab	ola opening rightward:
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$$(1) y^2 = 4ax$$

(2) 
$$x^2 = 4ay$$

(3) 
$$y^2 + 4ax$$

(4) 
$$x^2 + 4ay$$

#### Equation of a line with slope m and passing through $(X_1, Y_1)$ : 88.

$$(1) y = mx + c$$

(2) 
$$y - y_1 = m(x - x_1)$$

(3) 
$$y = m + X$$

91. If the line 
$$2x + y = k$$
 passes through the point which divides the line segment joining the points (11) and (2, 4) in the ratio 3: 2, then k equals

92. For the ellipse 
$$3x^2 + 4y^2 = 12$$
, the length of the latus rectum is:

93	Let E be the ellipse $x^2 / 9 + y^2 / 4 = 1$ and	and C be the circle $x^2 + y$	$v^2 = 9$ . Let P and Q	be the
babu	points (1, 2) and (2, 1), respectively. T	managed & report and	which should inc	
	(1) Q lies inside C but outside E	(2) Q lies outside bo	th C and E	
	(3) Plies inside both Cond E	(A) Division of	¥[ (1)	
	(3) P lies inside both C and E	(4) P lies inside C be	ut outside E	
94.	The locus of the mid-point of the li	ne segment joining th	e focus of the pa	arabola
	$y^2 = 4ax$ to a moving point of the parab	ola, is another parabola	whose directrix is	3
	(1) $x = a$ (2)	(2) $x = 0$		
	(3) $x = -a/2$	(4) $x = a/2$		
95.	Consider the lines L1: $x-1 = Y - 2 = x$			of the
	perpendiculars from the point P(5,			
	respectively. If the area of the triangle l			and N
	and the same are a series and the rest of the series of th	(2) 147		
	OTECHNOLOGY	(BIOLOGY AND BI		
	(3) 139	(4) 143		
96.	Number of permutations of 5 different of	THE STREET STREET		
	(1) 60	(2) 20		
	(3) 120 de bot a x south besid of the besides a contrata de sa	(4) 10		
		(2) Notoch and		
97.	How many ways to arrange 3 boys and	2 girls in a row?		
	(1) 120	(2) 60		
	(2) Sidn only (2)			
	(3) 20	(4) 30		

98.	which should include atleast 4 batsmen	lers, 10 players are to be chosen for a team, and atleast 4 bowlers. One batsmen and one respectively of the team should be included, ection can be made, is	
	(1) 14	(2) 165	
	(3) 155	(4) 135	
99.	From all the English alphabets, five letter order. The total number of ways, in which	ers are chosen and are arranged in alphabetical h the middle letter is 'M' is:	
	(1) 6084	(2) 5148	
	(3) 14950	(4) 4356	
100.	60 words can be made using all the lemeaning. If these words are written as in	etters of the word BHBJO, with or without a dictionary, then the 50th word is:	
	(1) OBBJH	(2) HBBJO	
	(3) OBBHJ	(4) JBBOH	
	SECTION - C		
	(BIOLOGY AND B)	(OTECHNOLOGY)	
101.	Which of the following is a characteristic	c of mammals?	
	(1) Feathers	(2) Mammary glands	
	(3) Gills	(4) Exoskeleton	
102.	In which group of animals is the body di	vided into head, thorax, and abdomen?	
	(1) Annelida	(2) Insects	
	(3) Mollusks	(4) Cnidarians	
103.	Amphibians can breathe through:		
	(1) Lungs only	(2) Skin only	
	(3) Lungs and skin	(4) Gills only	

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104	. Which animal is an invertebrate?			The lining of blo	
	(1) Earthworm	(2) D	og mulledi		
	(3) Frog . and shine behild (4)	(4) B	at mulishing		
105	Which animal lacks a true body cavity (	coelom	is respor?	Which organ sys	113.
	(1) Earthworm	(2) R	oundworm		
	(3) Spider Modellostic (4)	(4) F	latworm	(3) Digestive	
106.	Which of the following exhibits radial s	ymmeti	ry? ai muiladho		
	(1) Human	(2) Fi	ish		
	(3) Jellyfish	(4) S1	nake		
107.	What is the main characteristic of verteb	orates?		Whitespe of co	
	(1) Exoskeleto	(2) Se	egmented body		
	(3) Open circulatory system	(4) B	ackbone		
108.	Which of the following is the most evol-	ved?	cunder voluntary		
	(1) Mammalia https://discourse.com/discourse	(2) A	ves		
	(3) Amphibia	(4) R	eptilia		
109.	The presence of a four-chambered heart	is seen	in : la sulve of		117.
	(1) Reptiles	(2) A	mphibians	(1) Columbur	
	(3) Birds and mammals	(4) Fi	sh		
110.	What feature distinguishes vertebrates fr	rom inv	ertebrates?		118.
	(1) Presence of limbs	(2) N	otochord		
	(3) Closed circulatory system	(4) Ex	xoskeleton		
111.	Which of the following is not a connecti	ve tissu	e?		
	(1) Blood	(2) Ca	artilage		
	(3) Muscle	(4) B	one		
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			/(		

112.	The lining of blood vessels is made up o	Which appear is an inventorial?: fo
	(1) Cuboidal epithelium	(2) Columnar epithelium
	(3) Squamous epithelium	(4) Ciliated epithelium
113.	Which organ system is responsible for the	he transport of nutrients and gases?
	(1) Excretory	(2) Nervous
	(3) Digestive	(4) Circulatory
114.	Which type of epithelium is found in the	e kidney tubules ? woolfol and to do do W
	(1) Columnar	(2) Squamous
	(3) Cuboidal	(4) Ciliated
115.	What type of connective tissue connects	s muscles to bones ?
	(1) Ligaments	(2) Tendons
	(3) Cartilage	(4) Adipose
116.	Which muscle is under voluntary contro	1 0
	(1) Cardiac	(2) \$1-1-4-1
	(3) Smooth	(4) None
447		polial ticque 9
117.	Which of the following is NOT an epithe	(2) Cuboidal
	(1) Columnar (S)	(2) Cuboidal
	(3) Skeletal	(4) Squamous
118.	Which part of the neuron receives signal	ds?
	(1) Axon	(2) Dendrite
	(3) Myelin	(4) Node of Ranvier
119.	Which gland is considered both endocrin	ine and exocrine?
	(1) Thyroid	(2) Pituitary
	(3) Pancreas	(4) Adrenal

120.	Which system is primarily responsible f	For hormone secretion?	126.
	(1) Endocrine	(2) Digestive	
	(3) Lymphatic	(4) Respiratory	
121.	Which of the following statements is inc	14) Result in a explosive population	
	(1) Remains stable at incubation temper	White the animalist soft he sand this W	727
	(2) Does not react with media constitue	ents	
	(3) Does not use in micropropagation w	ork seeingeseemen same (1)	
	(4) Not digested by plant enzymes	(3) RNA polymerase	
122.	The ability of single cells to divide and p	produce all differentiated cells in the enti	ty.
	(1) Totipotency	(2) Multipotent	
	(3) Pluripotent	(4) Unipotent	
123.	Growth of plant tissues in artificial medi	ia is called:	129.
	(1) cell hybridization	(2) plant tissue culture	
	(3) transgenesis	(4) gene expression	
124.	Louis Pasteur created the first vaccines f	for:	
	(1) Rabies	(2) Cholera	
	(3) Anthrax	(4) All of the above	
125.	Diphtheria, whooping cough and tetanus		against
	(1) DPT vaccine	(2) BCG vaccine	
	(3) TAB vaccine	(4) HIB vaccine	

126.	Increased IMR and decreased MMR in a population will:		
	(1) Cause rapid increase in growth rate		
	(2) Result in decline in growth rate		
	(3) Not cause significant change in grow	th	
	(4) Result in an explosive population		
127.	Which one of the following enzymes is RNA?	responsible for the synthesis of DNA from	
		(2) DNA polymerase	
	(3) RNA polymerase	(4) DNA ligase.	
128.	To make the recombinant plasmid perchemicals is added?	rmeable to DNA molecules, which of the	
	(1) MgCl <sub>2</sub>	(2) CaCl <sub>2</sub>	
	(3) NaCI (4) HCI		
129.	Match the following:		
	Disease	Vaccine	
	1. Measles	a. Varicella vaccine	
	2. Tuberculosis	b. MMR	
	3. Chickenpox	c. Shingrix or Zostavax	
	4. Shingles	d. BCG vaccine	
	(1) 1-c, 2-d, 3-b, 4-a	(2) I-b, 2-d, 3-c, 4-a	
	(3) 1-b, 2-d, 3-a, 4-c	(4) 1-d, 2-c, 3-a, 4-b	

(1) amino acids

(3) a complex mixture of salts

130. This is not a basic component of culture media for plant cultivation:

(2) sucrose/sugar

(4) serum albumin

Total No. of Printed Pages: 21

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

# В

## UG-4Yr.-EE-June, 2025

**SET-Y** 

### **SUBJECT: Bachelor of Public Health Sciences**

Time : 11/4 Hours Roll No. (in figures)	Max. Marks: 100	10050 Total Questions : 130
Name		
Father's Name	Mother's Name	
Date of Examination		
(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**. 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 unfairmeans / mis-behaviour 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. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- 4. Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University Website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case, will be considered.
- 5. 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. Answers *must not* be ticked in the question booklet.
- 6. There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. Use only Black or Blue Ball Point Pen of good quality in the OMR Answer-Sheet.
- 8. Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.

UG-4Yr.-EE-June, 2025/(Bachelor of Pub. Health Sc.)(SET-Y)/(B)

### SECTION - A

١.	The first law of thermodynamics deals with?		
	(1) Conservation of mass	(2)	Conservation of energy
	(3) Entropy	(4)	Enthalpy
2.	In electrochemistry, the cathode is where	?	
	(1) Oxidation occurs	(2)	Reduction occurs
	(3) Both oxidation and reduction occur	(4)	No reaction occurs
3.	The unit of rate constant for a first-order	reac	etion is ?
	(1) $S^{-1}$	(2)	$mol\ L^{-l}\ s^{-l}$
	(3) $L \text{ mol}^{-1} \text{ s}^{-1}$	(4)	Unitless
4.	What does the term "activation energy":	meai	n ?
	(1) Energy released during a reaction		
	(2) Minimum energy required for a read	tion	to occur
	(3) Total energy in reactants		
	(4) Energy lost as heat		
5.	The entropy of an isolated system alway		
	(1) Decreases	(2)	Increases or remains constant
	(3) Remains constant	(4)	Fluctuates randomly
6.	The potential difference between the ele		des of a galvanic cell is called?
	(1) EMF	(2)	Current
	(3) Resistance	(4)	Voltage drop

- In which reaction does the catalyst remain unchanged? (2) Heterogeneous catalyst reaction (1) Homogeneous catalyst reaction (3) Both A and B (4) None of these For the following reaction at 300 K  $A_2(g) + 3B_2(g) \rightarrow 2AB_3(g)$ the enthalpy change is + 15 kJ, then the internal energy change is : (1) 19988.4 J (2) 200 J (3) 1999 J (4) 1.9988 kJ
- At a given temperature and pressure, the equilibrium constant values for the equilibria are given below:

$$3A_2 + B_2 \rightleftharpoons 2A_3B, K_1$$
  
 $A_3B \rightleftharpoons 3/2A_2 + 1/2B_2, K_2$ 

The relation between K, and  $K_2$  is:

(1)  $K_1^2 = 2K_2$ 

(2)  $K_2 = K_1/2$ 

(3)  $K_1 = 1/sqrt(K_2)$ 

- (4)  $K_2 = 1/sqrt(K_1)$
- Mass in grams of copper deposited by passing 9.6487 A current through a voltmeter 10. containing copper sulphate solution for 100 seconds is (Given: Molar mass of Cu: 63 g  $mol^{-1}$ , 1 F = 96487C):
  - (1) 3.15g

(2) 0.315g

(3) 31.5g

- (4) 0.0315g
- Calculate the refractive index of the material of an equilateral prism for which the angle of minimum deviation is 60°.
  - (1)  $\frac{\sqrt{3}}{2}$

(2)  $\sqrt{3}$ 

 $(3) \frac{1}{2}$ 

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

12.	Total internal reflection occurs when light travels from?		
	(1) Dense to rarer medium beyond critical angle		
	(2) Rarer to denser medium beyond critical angle		
	(3) Dense to denser medium beyond cr	itical angle	
	(4) None of these		
13.	The human eye focuses light on the?		
	(1) Cornea	(2) Retina	
	(3) Iris	(4) Lens	
14.	Chromatic aberration in lenses due to ?		
	(1) Dispersion of light	(2) Reflection of light	
	(3) Refraction of light	(4) Diffraction of light	
15.	The image formed by a plane mirror is ?		
	(1) Real and inverted	(2) Real and erect	
	(3) Virtual and inverted	(4) Virtual and erect	
16.	Which of the following has the smallest	wavelength?	
	(1) Radio waves	(2) Microwaves	
	(3) Ultraviolet rays	(4) Infrared rays	
17.	The unit of refractive index is ?	d the dual nature	
	(1) Meter	(2) Hertz	
	(3) Candela	(4) Dimensionless (no unit)	

18.	A convex lens is dipped in a liquid whose refractive index is equal to the refractive		
	index of the lens. Then what is its focal length?		
	(1) Focal Length will become zero		
	(2) Focal Length will become infinite		
	(3) Focal length will reduce, but not bed	come zero	
	(4) Remains unchanged		
19.	If a glass prism is dipped in water, what	happens to its dispersive power?	
	(1) Increases	(2) Decreases	
	(3) Does not change	(4) No effect	
20.	riggi er gornes an 1-1	parallel to each other and spaced 20 cm apart. m from A. Out of the following at which point	
	is an image not formed in mirror A.		
	(1) 15 cm	(2) 25 cm	
	(3) Real and even. (5)	(4) 55 cm	
21.	fixed on a wall. What should be the min	1.38 m from the ground stands before a mirror nimum length of the mirror so that he can view	
	himself fully?		
	(1) 0.8 m	(2) 0.75 m	
	(3) 0.69 m	(4) none of these	
22.	Which scientist proposed the dual nature	e of matter?	
	(1) de Broglie	(2) Einstein	

23.	The electrochemical cell converts?	In nuclear reactions, there is a con-	29,
	(1) Electrical energy into chemical energy	(1) Energy only send a send A	
	(2) Mechanical energy into electrical energy		
	(3) Chemical energy into electrical energy		30.
	(4) Electrical energy into mechanical energy	-(1) Will head towards normal	
24.	The entropy of a perfectly crystalline substance	ce at absolute zero is ?	
	(1) Maximum (2)	Zero adaid and has his material daid.	31.
	(3) Infinite (2) (4)	Undefined 1998(A) (1)	
25.	In the photoelectric effect, the emission of electric	ctrons depends on ?	
	(1) Frequency of incident light (2)	Intensity of incident light	32.
	(3) Both frequency and intensity (4)	None of the above	
26.		ls atmospheric pressure is ?	
	(1) Boiling point (2) I	Melting point	
	(3) Freezing point (4) (	Critical point	
27.	The wavelength corresponding to maximum	energy in the electromagnetic spec	ctrum
		What type of hybridization (spres	
	(1) Radio waves (2) (	Gamma rays	
	(3) Visible light (4) I	nfrared	
28.	Which of the following does the wave theory of	of light not explain ?	35.
	and an action of the second	Photocurrent serson (1)	
	(3) Polarization (4) In	nterference same A (E)	

29.	In nuclear reactions, there is a conservat	ion of:
	(1) Energy only	(2) Mass only
	(3) Mass, energy and momentum	(4) Momentum only
30.	What happens when the radio wave reac	hes the ionizing medium?
	(1) Will bend towards normal	(2) Will bend away from the normal
	(3) Will follow a straight path	(4) None of these
31.	Which element has the highest electrone	gativity ?
	(1) Oxygen	(2) Nitrogen
	(3) Chlorine	(4) Fluorine
32.	The bond formed by the sharing of elect	ron pairs between atoms is called?
	(1) Ionic bond	(2) Metallic bond
	(3) Covalent bond	(4) Hydrogen bond
33.	Which of the following is paramagnetic	
	$(1) N_2$	(2) O <sub>2</sub>
	(3) C0 <sub>2</sub>	(4) CH <sub>4</sub>
34.	What type of hybridization is present in	methane (CH <sub>4</sub> ) ?
	(1) sp	(2) Sp2
	(3) Sp3	(4) dsp2
35.	The atomic radius generally acro	oss a period from left to right.
	(1) Increase	(2) Decreases
	(3) Remains same	(4) Varies irregularly

36.	The color of transition metal complexes	s is due to?	
	(1) Nuclear reactions	(2) Atomic mass	
	(3) Ionization energy	(4) d-d electronic transitions	
37.	Which of the following is a property of	f-block elements?	
	(1) High ionization energy	(2) Exhibiting variable oxidation states	
	(3) Low melting points	(4) None of these	
38.	Which bond is strongest?	beder more and the colors and contains nitroge. Let Wille be of the colors any contains nitroge	
	(1) Single bond	(2) Double bond	
	(3) Triple bond	(4) Hydrogen bond	
39.	The ionic bond is formed by ?	10 8888(15) 10 10 10 10 10 10 10 10 10 10 10 10 10	
	(1) Transfer of electrons	(2) Sharing of electrons	
	(3) Attraction of dipoles	(4) Hydrogen bonding	
40.	The shape of BF <sub>3</sub> molecule is ?		
	(1) Tetrahedral	(2) Linear	
	(3) Trigonal planar	(4) Octahedral	
41.	Which of the following is an aromatic hy	ydrocarbon?	
	(1) Ethane	(2) Benzene	
	(3) Ethene	(4) Propane	
42.	Which compound contains a carbonyl gr	oun ?	
72.	and as the	(1) Alcohers	
	(1) Alcohol	(2) Alkane	
	(3) Amine	(4) Aldehyde	

Which reagent is commonly used to test for unsaturation in hydrocarbons?			
(1) Tollen's reagent	(2) Fehling's solution		
(3) KMn0 <sub>4</sub> (magazina)	(4) Bromine water		
The IUPAC name of CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -OH	is?		
(1) Methanol	(2) Ethanol		
(3) Propanol	(4) Butanol		
Which of the following contains nitroge	n ?		
(1) Alcohol	(2) Amine		
(3) Ketone	(4) Ether		
Polymerization is a process of ?			
(1) Breaking down molecules			
(2) Formation of large molecules from small ones			
(3) Crystallization			
(4) Distillation			
The empirical formula of glucose is ?			
(1) $C_6H_{12}O_6$	(2) $C_6H_{10}O_5$		
(3) CH <sub>2</sub> O	(4) $C_3H_6O_3$		
Which of the following organic comp	bounds is responsible for the sweet sme	ell o	
fruits?			
(1) Alcohols	(2) Esters		
(3) Aldehydes	(4) Ketones		
	<ul> <li>(1) Tollen's reagent</li> <li>(3) KMnO<sub>4</sub></li> <li>The IUPAC name of CH<sub>3</sub>-CH<sub>2</sub>-CH<sub>2</sub>-OH</li> <li>(1) Methanol</li> <li>(3) Propanol</li> <li>Which of the following contains nitroger</li> <li>(1) Alcohol</li> <li>(3) Ketone</li> <li>Polymerization is a process of?</li> <li>(1) Breaking down molecules</li> <li>(2) Formation of large molecules from s</li> <li>(3) Crystallization</li> <li>(4) Distillation</li> <li>The empirical formula of glucose is?</li> <li>(1) C<sub>6</sub>H<sub>12</sub>O<sub>6</sub></li> <li>(3) CH<sub>2</sub>O</li> <li>Which of the following organic compertuits?</li> <li>(1) Alcohols</li> </ul>	(1) Tollen's reagent (2) Fehling's solution (3) KMn04 (4) Bromine water  The IUPAC name of CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -OH is? (1) Methanol (2) Ethanol (3) Propanol (4) Butanol  Which of the following contains nitrogen? (1) Alcohol (2) Amine (3) Ketone (4) Ether  Polymerization is a process of? (1) Breaking down molecules (2) Formation of large molecules from small ones (3) Crystallization (4) Distillation  The empirical formula of glucose is? (1) C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> (2) C <sub>6</sub> H <sub>10</sub> O <sub>5</sub> (3) CH <sub>2</sub> O (4) C <sub>3</sub> H <sub>6</sub> O <sub>3</sub> Which of the following organic compounds is responsible for the sweet sme fruits? (1) Alcohols (2) Esters	

49.	What type of bond is found in benzeno	ight of the object		
	(1) Single bonds only			
	(2) Alternating single and double bon	ds (resonance)	at Baffel NE	
	(3) Triple bonds			
	(4) Ionic bonds	residui to Electrical		
50.	Which of the following organic compo	ounds contains an ether group?		
	(1) R-O-R'	(2) R-COOH		
	(3) R-NH <sub>2</sub> pointing to wal (4)	(4) R-CHO	int (E)	
51.	The work done by a force is zero when	the displacement is ?		
	(1) In the same direction as force	(2) Perpendicular to the force		
	(3) Opposite to the force	(4) None of these		
52.	A car moves with uniform acceleration. Its velocity-time graph is:			
	(1) Horizontal	(2) Parabolic		
	(3) Linear	(4) Exponential	(A) (b)	
53.	A train is moving with a uniform account of the seconds is a second of the seconds is a second of the second of th			
	(1) 1:1:1	(2) 1:2:3		
	(3) 1:4:9	(4) 1:3:5		
54.	The pressure exerted by a fluid in a con-	tainer is ?	62 What i	
	(1) Same at all points	(2) Maximum at the top		
	(3) Zero at the bottom	(4) Varies linearly with depth		
55.	Which of the following is a scalar quan	tity? Theb's of because is easeab		
	(1) Displacement	(2) Velocity		
	(3) Speed	(4) Force		

56.	The buoyant force on an object submerged in a fluid is equal to ?		
	(1) Weight of the object	(2)	Weight of fluid displaced
	(3) Volume of object	(4)	Mass of object
57.	What is the energy conversion in a hydroelectric power plant?		
	(1) Electrical to Mechanical	(2)	Mechanical to Electrical
٠	(3) Chemical to Electrical	(4)	Thermal to Mechanical
58.	The concept of inertia is associated with which law of motion?		
	(1) First Law	(2)	Second Law
	(3) Third Law	(4)	Law of Gravitation
59.	A car accelerates from rest and covers 10	00 m	in 5 s. What is its acceleration?
	$(1) 5 \text{ m/s}^2$	(2)	$8 \text{ m/s}^2$
	(3) $10 \text{ m/s}^2$	(4)	20 m/s <sup>2</sup>
60.	Which lens is used to correct myopia (nearsightedness)?		
	(1) Convex lens	(2)	Concave lens
	(3) Cylindrical lens	(4)	None of these
61.	Which hormone is known as the 'stress hormone'?		
	(1) Adrenaline	(2)	Thyroxine
	(3) Insulin	(4)	Cortisol
62.	What is the function of alveoli in the lungs?		
	(1) Exchange gases	(2)	Store oxygen
	(3) Filter blood	(4)	Produce mucus
63.	Which disease is caused by a deficiency	of V	itamin B1 ?
	(1) Pellagra	(2)	Rickets
	(3) Beriberi	(4)	Scurvy

64.	Which organ stores bile	e ?	OTIC		
	(1) Liver	(ATICS)	(2)	Pancreas	
	(3) Gallbladder				the time $2x + y =$ $\frac{1}{100} \text{ points (11)} \text{ and } \frac{1}{100} = \frac{1}{100}$
65.	What does HIV attack i	n the human bo	dy?		
	(1) Red blood cells		(2)	Nerves	
	(3) Platelets	of the latus rect	(4)	Immune cells	or the ellipse $3\chi^2$
66.	Which part of the brain of	controls breathin	g and	heart rate?	
	(1) Cerebrum	(4) '4 da sa seasy in		Cerebellum	CMT
	(3) Medulla oblongata	C be the circle n	(4)	Pons	
67. What is the main cause of rickets in children?			f) Olics inside C		
	(1) Lack of Vitamin D		(2)	Lack of protein	
	(3) Lack of iron				
68.	Which hormone regulates				s=x (1
	(1) Insulin		(2)	Melatonin	21 x = -10/2
	(3) Cortisol	and L2; x - 2 :	2 = 2		
69.	What is the largest intern	nal organ in the	humai	n body ?	perpandiculars for respectively. If the
	(1) Brain	(2) 147		Heart	181 (1)
	(3) Liver	(4) 143	(4) 1	Kidney	(3) 139
70.	Which blood group is kn	own as the univ	ersal	recipient?	
	(1) A	(2) 20	(2) I	3	09-(0)
	(3) O		(4) A	AB	

### SECTION - B (MATHEMATICS)

12

71.	If the line $2x + y = k$ passes through the points (11) and (2, 4) in the ratio 3:	he point which divides the line segment 2, then k equals	nt joining	
	(1) 29/5	(2) 5		
	(3) 6 ************************(S)	(4) 11/5		
72.	For the ellipse $3x^2 + 4y^2 = 12$ , the lengt	h of the latus rectum is:		
	(1) 2/5	(2) 3/5		
	(3) 3	(4) 4		
73.	73. Let E be the ellipse $x^2 / 9 + y^2 / 4 = 1$ and C be the circle $x^2 + y^2 = 9$ . Let P and Q to points $(1, 2)$ and $(2, 1)$ , respectively. Then			
	(1) Q lies inside C but outside E	(2) Q lies outside both C and E		
	(3) P lies inside both C and E	(4) P lies inside C but outside E		
74.	74. The locus of the mid-point of the line segment joining the focus of the part $y^2 = 4ax$ to a moving point of the parabola, is another parabola whose directrix is			
	(1) x = a	(2) $x = 0$		
	(3) $x = -a/2$	(4)  x = a/2		
75. Consider the lines L1: $x-1 = Y - 2 = z$ and L2: $x - 2 = y = z - 1$ . Let the perpendiculars from the point P(5, 1, -3) on the lines L1 and L2 be respectively. If the area of the triangle PQR is A, then $4A^2$ is equal to:				
	(1) Heart (2)	(2) 147		
	(3) 139 (4)	(4) 143		
76.	Number of permutations of 5 different	objects taken 3 at a time:		
	(1) 60	(2) 20		
	(3) 120 BA (b)	(4) 10		

LAC.	(1) 120	(2) 60	
	(3) 20	(4) 30	
78.	Then 10A is equal to: (w-1-42)		
	(1) 14	(2) 165	
	(3) 155	(4) 135 (4) (4) (4) (5) (4) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6	
79.	From all the English alphabets, five lett order. The total number of ways, in which	ers are chosen and are arranged in alphabetical ch the middle letter is 'M' is:	
	(1) 6084	(2) 5148	
	(3) 14950	(4) 4356 ( = p + 10 + 2 nonline to 1 . 33	
80. 60 words can be made using all the letters of the word meaning. If these words are written as in a dictionary, then the			
	(1) OBBJH	(2) HBBJO	
	(3) ОВВНЈ	(4) JBBOH Two newing at 90 to min 2 78	
81.	discriminant is .	on $ax^2 + bx + c = 0$ are equal, then the	
	(1) Greater than zero	(2) Less than zero	
	(3) Zero $\Box$ bas $A^TA = {}^TAA$ sodi de	(4) None of these	
82.	The sum of the first n natural numbers is	cquals	
	(1) $n(n+1)/2$	(2) n <sup>2</sup>	
	(3) n(n-1)/2	(4) n(n+l)	
83.	Find the number of terms if the sum of term is 20:	an AP is 100, the first term is 5, and the last	
	(2) 02	(2) 10	
	(3) 20 Seed to Seed (4)		
G-4V	rE.E. June 2025/(Rachelor of Pub. Ha	alth So )(SET V)/(P)	

**84.** If 
$$A = \begin{bmatrix} 2 & 2 \\ 9 & 4 \end{bmatrix}$$
 and  $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ 

Then  $10A^{-1}$  is equal to:

$$(1) A - 4I$$

$$(2) 6I - A$$

$$(3) A - 6I$$

$$(4) 4I - A$$

**85.** If 
$$S_n = 3n^2 + 5n$$
, then the first term is:

$$(1)$$
 8

**86.** For equation 
$$x^2 + px + q = 0$$
,  $\alpha^2 + \beta^2$  equals:

(1) 
$$p^2 - 2q$$

(2) 
$$p^2 + 2q$$

(3) 
$$q^2 - 2p$$

$$(4) q^2 + 2p$$

### 87. Sum of GP is given by:

(1) 
$$a(1-r^n)/(1-r)$$

(2) 
$$a(r^n - 1)/(r - 1)$$

**88.** If A is a 3 x 3 non-singular matrix such that 
$$AA^{T} = A^{T} A$$
 and  $B = A^{-1}A^{T}$ , then  $BB^{T}$  equals:

(3) 
$$B^{-1}$$

$$(4) (B^{-1})^{T}$$

89. If 
$$\alpha$$
 is a root of the equation  $2x(2x+1) = 1$ , then the other root is:

(1) 
$$3\alpha^3 + 4\alpha$$

(2) 
$$\alpha^2$$

(3) 
$$-2\alpha (\alpha+1)$$

90.	A value of b for which the equations $x^2 + bx - 1 = 0$ and $x^2 + x + b = 0$ have one root in			
	common is:			

 $(1) -\sqrt{2}$ 

(2)  $-i - \sqrt{3}$ 

(3)  $i\sqrt{5}$ 

(4) 298. Equation of a line with slope or and passing through f

91. 
$$\sin(2\theta)$$
 is equal to:

(1)  $2\sin\theta\cos\theta$ 

(2)  $\sin^2\theta + \cos^2\theta$ 

(3)  $\sin\theta + \cos\theta$ 

(4) None

92. 
$$tan^2\theta + 1$$
 equals:

(1)  $\sec^2\theta$ 

(2)  $\csc^2\theta$ 

(3) 1

(4)  $\sin^2\theta$ 

93. If 
$$\sin \theta$$
 and  $\cos \theta$  are the roots of  $ax^2$  -  $bx + c = 0$ , then the relation between a, b and c will be:

 $(1) a^2 + b^2 + 2ac = 0$ 

(2)  $a^2 - b^2 + 2ac = 0$ 

- (3)  $a^2 + c^2 + 2ab = 0$
- $(4) \ a^2 b^2 2ac = 0$

- $(1) 1/\sqrt{2}$
- Which of the following statements is accorded that

(3) 1

(1) -53/10

(2) Poes not use in micropro 7/10 (2) Work

(3) 37/10

(4) You digested by plant en 01/22 (4)

96. Number of solutions of the equation 
$$\tan x + \sec x = 2 \cos x$$
 lying in the interval  $[0, 2\pi]$  is:

(1) 0

(2) 1

(3) 2

(4) 3

97.	Standard form of a parabola opening right	ntward:
	$(1) y^2 = 4ax$	$(2) x^2 = 4ay$
	(3) $y^2 + 4ax$	(4) $x^2 + 4ay$
98.	Equation of a line with slope m and pass	ing through $(X_1, Y_1)$ :
	(1) y = mx + c	(2) $y - y_1 = m(x - x_1)$
	(3) y = m + X	(4) None
99.	A hyperbola has:	
	(1) One focus	(2) Two foci
	(3) No focus	(4) Three foci
100.	Eccentricity of ellipse is:	
	(1) >1	(2) 0
	(3) 1	(4) Between 0 and 1
		$\mathbf{ON} - \mathbf{C}$
	(BIOLOGY AND B	IOTECHNOLOGY)
101.	Which of the following statements is inc	correct about agar ?
	(1) Remains stable at incubation temper	rature
	(2) Does not react with media constitue	
	(3) Does not use in micropropagation w	ork
	(4) Not digested by plant enzymes	
102.	The ability of single cells to divide and	produce all differentiated cells in the entity
		(2) Multipotent

(4) Unipotent

(3) Pluripotent

103.	Growth of plant tissues in artificial medi	a is called:
	(1) cell hybridization	(2) plant tissue culture
	(3) transgenesis	(4) gene expression
104.	Louis Pasteur created the first vaccines f	3. Chickenpox
	(1) Rabies	(2) Cholera
	(3) Anthrax	(4) All of the above
105.	Diphtheria, whooping cough and tetanus  (1) DPT vaccine	(2) BCG vaccine
	(3) TAB vaccine	(4) HIB vaccine
106.	Increased IMR and decreased MMR in a	population will:
	(1) Cause rapid increase in growth rate	
	(2) Result in decline in growth rate	
	(3) Not cause significant change in grov	112, In which group of animals is the bod dtv
	(4) Result in an explosive population	
107.	Which one of the following enzymes in RNA?	is responsible for the synthesis of DNA from
	(1) Reverse transcriptase (3) RNA polymerase	<ul><li>(2) DNA polymerase</li><li>(4) DNA ligase.</li></ul>
108.	To make the recombinant plasmid p chemicals is added?	ermeable to DNA molecules, which of the
	(1) MgCl <sub>2</sub>	(2) CaCl <sub>2</sub>
	(3) NaCI	(4) HCI

Match the following: 109.

Match the following:	
Diagram	Vaccine
1. Measles	a. Varicella vaccine
1. Measies	b. MMR
2. Tuberculosis	- Pr
3. Chickenpox	c. Shingrix or Zostavax
5. emekenpox	d. BCG vaccine
4. Shingles	d. BCG vac-

(1)	l-c,	2-d,	3-b,	4-a

	- livotion
	enert of culture media for plant cultivation.
110.	This is not a basic component of culture media for plant cultivation:

(1) amino acids

- (2) sucrose/sugar
- (3) a complex mixture of salts
- (4) serum albumin

#### Which of the following is a characteristic of mammals? 111.

(1) Feathers

(2) Mammary glands

(3) Gills

(4) Exoskeleton

### In which group of animals is the body divided into head, thorax, and abdomen? 112.

(1) Annelida

(2) Insects

(3) Mollusks

(4) Cnidarians

#### Amphibians can breathe through: 113.

(1) Lungs only

(2) Skin only

(3) Lungs and skin

(4) Gills only

#### Which animal is an invertebrate? 114.

(1) Earthworm

(2) Dog

(3) Frog

(4) Bat

<sup>(2)</sup> I-b, 2-d, 3-c, 4-a

	he reasoned of natrients and over 2.			Which organisasi	
115.	Which animal lacks a true body cavity (	coel	om) ?		
	(1) Earthworm	(2)	Roundworm		
	(3) Spider		Flatworm		
446	Which of the following articles as diel		Weilum is found i		
116.	Which of the following exhibits radial s			maraulod (1)	
	(1) Human Detail (1)	(2)	Fish		
	(3) Jellyfish	(4)	Snake		
117.	What is the main characteristic of verteb	rate	s ?		
	(1) Exoskeleto		Segmented body		
	(3) Open circulatory system		Backbone		
	(2) Skeletal	(+)	Dackbone		
118.	Which of the following is the most evolve	ved?		(3) Smooth	
	(1) Mammalia	(2)	Aves		
	(3) Amphibia	(4)	Reptilia		
119.	The presence of a four-chambered heart	is se	en in :		
	(1) Reptiles				
	(2) Denorite				
	(3) Birds and mammals	(4)	Fish		
120.	What feature distinguishes vertebrates fr	rom	invertebrates?		
	(1) Presence of limbs	(2)	Notochord		
	(3) Closed circulatory system	(4)	Exoskeleton		
104					
121.	Which of the following is not a connecti	ve ti	ssue?		
	(1) Blood	(2)	Cartilage		
	(3) Muscle	(4)	Bone		
122.	The lining of blood vessels is made up of:				
	(1) Cuboidal epithelium		Columnar	1:	
	(3) Squamous epithelium		Columnar epithe		
	o dualious epimelium	(4)	Ciliated enithelia	ım	

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P. T. O.

123.	Which organ system is respo	onsible for th	e tra	ansport of nutrients and gases?
	(1) Excretory			Nervous
	(3) Digestive		(4)	Circulatory
124.	Which type of epithelium is	found in the	kidı	ney tubules?
	(1) Columnar	Symmetry 3	(2)	Squamous
	(3) Cuboidal	darid (C)	(4)	Ciliated (1)
125.	What type of connective tiss	sue connects	mus	cles to bones?
	(1) Ligaments	Contember 7	(2)	Tendons
	(3) Cartilage	omna? MX	(4)	Adipose
126.	Which muscle is under volu	ntary control	?	(3) Open circ stellors system
	(1) Cardiac	Gamo (e)	(2)	Skeletal
	(3) Smooth	lved?	(4)	None di a surveillo selli lo doll'A
127.	Which of the following is N	OT an epithe	elial	
	(1) Columnar	(f) Roptill	(2)	Cuboidal
	(3) Skeletal	i is seen in :	(4)	Squamous
128.	Which part of the neuron re-	ceives signals	s?	
	(1) Axon	4.7 (8)	(2)	Dendrite
	(3) Myelin	(4)		Node of Ranvier
129.	Which gland is considered b	ooth endocrin	e an	d exocrine?
	(1) Thyroid	(2) Notocl	(2)	Pituitary admit to some affective
	(3) Pancreas	(4) Exoski	(4)	Adrenal (2)
130.	Which system is primarily r	esponsible fo	or ho	ormone secretion ?
	(1) Endocrine	(2) Cartila	(2)	Digestive
	(3) Lymphatic	(4) Bone	(4)	Respiratory

## Total No. of Printed Pages : 21 (DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU

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## UG-4Yr.-EE-June, 2025

## **SUBJECT: Bachelor of Public Health Sciences**

		Sr. No10055
Time: 11/4 Hours	Max. Marks : 100	Total Questions: 130
Roll No. (in figures)	(in words)	
Name	Date of Birth	
Father's Name	Mother's Name	4
Date of Examination		
(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**. 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 unfairmeans / mis-behaviour 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. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- 4. Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University Website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case, will be considered.
- 5. 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. Answers *must not* be ticked in the question booklet.
- 6. There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. Use only Black or Blue Ball Point Pen of good quality in the OMR Answer-Sheet.
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SEAL

#### SECTION - A

1.	Calculate the refractive index of the angle of minimum deviation is 60°.	material of an equilateral prism for which the
	(1) $\frac{\sqrt{3}}{2}$	(2) $\sqrt{3}$
	(3) $\frac{1}{2}$	(2) $\sqrt{3}$ (4) $\frac{1}{\sqrt{2}}$
2.	Total internal reflection occurs when li	ght travels from ?
	(1) Dense to rarer medium beyond crit	ical angle
	(2) Rarer to denser medium beyond cri	itical angle
	(3) Dense to denser medium beyond cr	ritical angle
	(4) None of these	into ocas of consulator research
3.	The human eye focuses light on the?	Extra R <sup>o</sup> l of
	(1) Cornea	(2) Retina
	(3) Iris	(4) Lens
4.	Chromatic aberration in lenses due to ?	medials, one of the contract o
	(1) Dispersion of light	(2) Reflection of light
	(3) Refraction of light	(4) Diffraction of light
5.	The image formed by a plane mirror is	?
	(1) Real and inverted	(2) Real and erect
	(3) Virtual and inverted	(4) Virtual and erect
6.	Which of the following has the smallest	wavelength?
	(1) Radio waves	(2) Microwaves
	(3) Ultraviolet rays	(4) Infrared rays

7.	The unit of refractive index is ?				
	(1) Meter	(2) Hertz			
	(3) Candela	(4) Dimensionless (no unit)			
8.	A convex lens is dipped in a liquid whindex of the lens. Then what is its focal	nose refractive index is equal to the refractive length?			
	(1) Focal Length will become zero				
	(2) Focal Length will become infinite				
	(3) Focal length will reduce, but not bed	come zero			
	(4) Remains unchanged				
9.	If a glass prism is dipped in water, what	happens to its dispersive power?			
	(1) Increases	(2) Decreases			
	(3) Does not change	(4) No effect			
10.	-	parallel to each other and spaced 20 cm apart. m from A. Out of the following at which point			
	(1) 15 cm	(2) 25 cm			
	(3) 45 cm	(4) 55 cm			
11.	Which hormone is known as the 'stress'	hormone'?			
	(1) Adrenaline	(2) Thyroxine			
	(3) Insulin	(4) Cortisol			
12.	What is the function of alveoli in the lun	ngs?			
	(1) Exchange gases	(2) Store oxygen			
	(3) Filter blood	(4) Produce mucus			

13.	Which disease is caused by a deficiency	of V	itamin B1?	Wilder element has th	
	(1) Pellagra	(2)	Rickets	(1) Oxygen	
	(3) Beriberi	(4)	Scurvy	(3) Chlorine	
14.	Which organ stores bile?				
	(1) Liver	(2)	Pancreas		
	(3) Gallbladder	(4)	Stomach	(1) lonic bond	
15.	What does HIV attack in the human bod	iy?			
	(1) Red blood cells	(2)	Nerves	Whigh of the followin	
	(3) Platelets	(4)	Immune cell	s Man	
16.	Which part of the brain controls breathing	g and	heart rate?		
	(1) Cerebrum	(2)	Cerebellum		
	(3) Medulla oblongata	(4)	Pons	What type of hybridiz	
17.	What is the main cause of rickets in children	en?		q2 (1)	
	(1) Lack of Vitamin D	(2)	Lack of prot	ein 52 (E)	
	(3) Lack of iron	(4)	Lack of Vita	min A	
18.	Which hormone regulates the sleep-wake of	cycle	?	(1) Indrens	
	(1) Insulin	(2)	Melatonin	(3) Kemains same	
	(3) Cortisol	(4)	Estrogen	MILIAE GIRMANIA (A.)	
19.	What is the largest internal organ in the	hum	an body?		
	(1) Brain seam shoot A (2)	(2)	Heart	(1) Nuclear reactions	
	(3) Liver mortianent amanasis b-b (4)	(4)	Kidney	(3) Jordzation energy	
20.	Which blood group is known as the univ	versa	l recipient ?	Which of the followin	
	(1) Exhibiting variable oxidation A (1)	(2)	B verte	11) High louization en	
	(3) 0	(4)	AB	(3) Low melaine point	

21.	Which element has the highest electronegativity?		
	(1) Oxygen	(2) Nitrogen	
	(3) Chlorine	(4) Fluorine	
22.	The bond formed by the sharing of electr	on pairs between atoms is called?	
	(1) Ionic bond	(2) Metallic bond	
	(3) Covalent bond	(4) Hydrogen bond	
23.	Which of the following is paramagnetic	?	
	(1) $N_2$	(2) O <sub>2</sub>	
	(3) CO <sub>2</sub>	(4) CH <sub>4</sub>	
24.	What type of hybridization is present in a	methane (CH <sub>4</sub> ) ?	
	(1) sp	(2) Sp2	
	(1) sp (3) Sp <sup>3</sup>	(4) dsp2	
25.	The atomic radius generally acro	oss a period from left to right.	
	(1) Increase	(2) Decreases	
	(3) Remains same	(4) Varies irregularly	
26.	The color of transition metal complexes	is due to ?	
	(1) Nuclear reactions	(2) Atomic mass	
	(3) Ionization energy	(4) d-d electronic transitions	
27.	Which of the following is a property of f	F-block elements?	
	(1) High ionization energy	(2) Exhibiting variable oxidation states	
	(3) Low melting points	(4) None of these	
	= =	a 10	

Which hand is strongest 2		Which of the tollowing contains an
which bond is strongest?		(I) Alcohol
(1) Single bond	(2)	Double bond
(3) Triple bond	(4)	Hydrogen bond
The ionic hand is formed by 2		
(i) is inscutal		(1) Breaking down molecules
(1) Transfer of electrons	(2)	Sharing of electrons
(3) Attraction of dipoles	(4)	Hydrogen bonding
The shape of BF <sub>3</sub> molecule is ?		(4) Distillation
(1) Tetrahedral	(2)	Linear g lo alumnol lastuques aff
(3) Trigonal planar	(4)	Octahedral
Which of the following is an aromatic h	ydro	carbon ?
(1) Ethane	(2)	Benzene
(3) Ethene	(4)	Propane
(2) Esters		alodoulA (1)
Which compound contains a carbonyl gr	roup	? zobodstva (f.)
(1) 41-1-1		
(1) Alcohol	(2)	Alkane
(3) Amine	- drift	Alkane Aldehyde
A STATE OF THE STATE OF THE SECOND	(4)	Aldehyde
(3) Amine Which reagent is commonly used to test	(4)	Aldehyde
(3) Amine Which reagent is commonly used to test	(4) for u (2)	Aldehyde insaturation in hydrocarbons?
(3) Amine Which reagent is commonly used to test (1) Tollen's reagent	(4) for u (2) (4)	Aldehyde  Insaturation in hydrocarbons?  Fehling's solution  Bromine water
(3) Amine Which reagent is commonly used to test (1) Tollen's reagent (3) KMn0 <sub>4</sub>	(4) for u (2) (4) is ?	Aldehyde unsaturation in hydrocarbons? Fehling's solution Bromine water
	(3) Triple bond  The ionic bond is formed by?  (1) Transfer of electrons  (3) Attraction of dipoles  The shape of BF <sub>3</sub> molecule is?  (1) Tetrahedral  (3) Trigonal planar  Which of the following is an aromatic h  (1) Ethane  (3) Ethene	Which bond is strongest?  (1) Single bond (2) (3) Triple bond (4)  The ionic bond is formed by? (1) Transfer of electrons (2) (3) Attraction of dipoles (4)  The shape of BF <sub>3</sub> molecule is? (1) Tetrahedral (2) (3) Trigonal planar (4)  Which of the following is an aromatic hydrodynamic of the

35.	Which of the following contains nitroger	n ?
	(1) Alcohol	(2) Amine
	(3) Ketone	(4) Ether
36.	Polymerization is a process of ?	
	(1) Breaking down molecules	
	(2) Formation of large molecules from s	small ones
	(3) Crystallization	
	(4) Distillation	
37.	The empirical formula of glucose is ?	
	(1) $C_6H_{12}O_6$	(2) $C_6H_{10}O_5$
	(3) CH <sub>2</sub> O	(4) $C_3H_6O_3$
38.	Which of the following organic compruits?	pounds is responsible for the sweet smell of
	(1) Alcohols	(2) Esters
	(3) Aldehydes	(4) Ketones
39.	What type of bond is found in benzene	?
	(1) Single bonds only	
	(2) Alternating single and double bond	s (resonance)
	(3) Triple bonds	
	(4) Ionic bonds	
40.	Which of the following organic compo	unds contains an ether group?
	(1) R-O-R'	(2) R-COOH
	(3) R-NH <sub>2</sub>	(4) R-CHO

	0 min 5 s. What is its acceleration 2 =	A car accelerates from rest and covers 10	EN
41	. The work done by a force is zero when	the displacement is ?	
	(1) In the same direction as force	(2) Perpendicular to the force	
	(3) Opposite to the force	(4) None of these	
42	. A car moves with uniform acceleration	. Its velocity-time graph is:	50.
	(1) Horizontal	(2) Parabolic	
	(3) Linear	(4) Exponential	
43.	A train is moving with a uniform acc 1st, 2nd and 3rd seconds is:	eleration. The ratio of distances covered	in the
	(4) Enthalp) (4)	(2) 1:2:3	
	(3) 1:4:9	(4) 1:3:5	
44.	The pressure exerted by a fluid in a con	tainer is ?	
	(1) Same at all points	(2) Maximum at the top	
	(3) Zero at the bottom	(4) Varies linearly with depth	
45.	Which of the following is a scalar quant	ity?	
	(1) Displacement	(2) Velocity	
	(3) Speed	(4) Force	
46.	The buoyant force on an object submerg	ged in a fluid is equal to ?	
	(1) Weight of the object	(2) Weight of fluid displaced	
	(3) Volume of object	(4) Mass of object	
17.	What is the energy conversion in a hydro	pelectric power plant?	
	(1) Electrical to Mechanical	(2) Mechanical to Electrical	
	(3) Chemical to Electrical	(4) Thermal to Mechanical	
18.	The concept of inertia is associated with	which law of motion ?	
	(1) First Law	(2) Second Law	
	(3) Third Law	(4) Law of Gravitation	

49.	A car accelerates from rest and covers 10	00 m	in 5 s. What is its acceleration?
	(1) $5 \text{ m/s}^2$	(2)	8 m/s <sup>2</sup>
	(3) $10 \text{ m/s}^2$	(4)	20 m/s <sup>2</sup>
50.	Which lens is used to correct myopia (ne	arsi	ghtedness)?
	(1) Convex lens	(2)	Concave lens
	(3) Cylindrical lens	(4)	None of these
51.	The first law of thermodynamics deals w	ith '	mandam a dila anivone a miala
	(1) Conservation of mass		Conservation of energy
	(3) Entropy	(4)	Enthalpy
52.	In electrochemistry, the cathode is where	e ?	
0			Reduction occurs
	(3) Both oxidation and reduction occur	(4)	No reaction occurs
53.	The unit of rate constant for a first-order	rea	ction is ?
	(1) S <sup>-1</sup>		$mol L^{-1} s^{-1}$
	(3) $L \text{ mol}^{-1} \text{ s}^{-1}$		Unitless
	371071 (+)		
54.	What does the term "activation energy"	mea	
	(1) Energy released during a reaction		
	(2) Minimum energy required for a read	ction	to occur
	(3) Total energy in reactants		at 18 the energy conversion in a fr
	(4) Energy lost as heat		
55.	The entropy of an isolated system alway	ys?	
	(1) Decreases		) Increases or remains constant
	wallmost (C)		
	(3) Remains constant	(4	) Fluctuates randomly

			,
56.	The potential difference between the ele	ectrodes of a galvanic cell is called?	
	(1) EMF	(2) Current	
	(3) Resistance	(4) Voltage drop	
	(4) none of these	m 93.0 (5)	
57.	In which reaction does the catalyst rema	nin unchanged?	
	(1) Homogeneous catalyst reaction	(2) Heterogeneous catalyst reaction	
	(3) Both A and B	(4) None of these	
58.	For the following reaction at 300 K		
	$A_2(g) + 3B_2(g) \rightarrow 2AB_3(g)$	<ol> <li>(1) Electrical energy into phornical energy.</li> <li>(2) Auxiliarities energy into electrical en</li> </ol>	
	the enthalpy change is + 15 kJ, then the		
	(1) 19988.4 J	(2) 200 J	
	(3) 1999 J wai onex emilordis in consted	(4) 1.9988 kJ	
59.	are given below:	e equilibrium constant values for the equilib	
	$3A_2 + B_2 \rightleftharpoons 2A_3B, K_1$	To the physical court effect, the emission	
	$A_3B \Rightarrow 3/2A_2 + 1/2B_2, K_2$	(1) Prequency of incident light	

(1)  $K_1^2 = 2K_2$ 

(2)  $K_2 = K_1/2$ 

(3)  $K_1 = 1/sqrt(K_2)$ 

The relation between K, and K2 is:

(4)  $K_2 = 1/\operatorname{sqrt}(K_1)$ 

- 60. Mass in grams of copper deposited by passing 9.6487 A current through a voltmeter containing copper sulphate solution for 100 seconds is (Given: Molar mass of Cu: 63 g  $\text{mol}^{-1}$ , 1 F = 96487C):
  - (1) 3.15g

(2) 0.315g

(3) 31.5g

(4) 0.0315g

61.	J - 10 0 111 talk with his eye level u	t 1.38 m from the ground stands before a mirror inimum length of the mirror so that he can view
	(1) 0.8 m	(2) 0.75 m
	(3) 0.69 m	(4) none of these
62.	Which scientist proposed the dual natu	re of matter ?
	(1) de Broglie	(2) Einstein
	(3) Newton	(4) Planck
63.	The electrochemical cell converts?	
	(1) Electrical energy into chemical energy	ergy
	(2) Mechanical energy into electrical e	energy
	(3) Chemical energy into electrical ene	ergy
	(4) Electrical energy into mechanical e	energy
64.	The entropy of a perfectly crystalline s	ubstance at absolute zero is ?
	(1) Maximum	(2) Zero
	(3) Infinite	(4) Undefined
65.	In the photoelectric effect, the emission	n of electrons depends on ?
	(1) Frequency of incident light	(2) Intensity of incident light
	(3) Both frequency and intensity	(4) None of the above
66.	The temperature at which vapor pressu	re equals atmospheric pressure is ?
	(1) Boiling point	(2) Melting point
	(3) Freezing point	(4) Critical point
67.	The wavelength corresponding to malies in?	ximum energy in the electromagnetic spectrum
	(1) Radio waves	(2) Gamma rays
	(3) Visible light	(4) Infrared

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<b>68</b> .	Which of the following does the wave theor	y of light not explain?
-------------	--	-------------------------

(1) Diffraction

(2) Photocurrent

(3) Polarization

(4) Interference

In nuclear reactions, there is a conservation of: 69.

(1) Energy only

- (2) Mass only
- (3) Mass, energy and momentum
- (4) Momentum only

What happens when the radio wave reaches the ionizing medium?

- (1) Will bend towards normal
- (2) Will bend away from the normal
- (3) Will follow a straight path
- (4) None of these

SECTION - B (MATHEMATICS)

71. Number of solutions of the equation  $\tan x + \sec x = 2 \cos x$  lying in the interval  $[0, 2\pi]$ is:

(1) 0

(2) 1

(3) 2

(4) 3

Standard form of a parabola opening rightward:

(1)  $v^2 = 4ax$ 

(2)  $x^2 = 4ay$ 

(3)  $y^2 + 4ax$ 

(4)  $x^2 + 4ay$ 

**73.** Equation of a line with slope m and passing through  $(X_1, Y_1)$ :

(1) y = mx + c

(2)  $y - y_1 = m(x - x_1)$ 

(3) y = m + X

(4) None

- 74. A hyperbola has:
  - (1) One focus

(2) Two foci

(3) No focus

- (4) Three foci
- **75.** Eccentricity of ellipse is:
  - (1) > 1

(2) 0

(3) 1

(4) Between 0 and 1

- **76.**  $\sin(2\theta)$  is equal to :
  - (1)  $2\sin\theta\cos\theta$

(2)  $\sin^2\theta + \cos^2\theta$ 

(3)  $\sin\theta + \cos\theta$ 

(4) None

- 77.  $tan^2\theta + 1$  equals:
  - (1)  $sec^2\theta$

(2)  $\csc^2\theta$ 

(3) 1

- (4)  $\sin^2\theta$
- 78. If  $\sin \theta$  and  $\cos \theta$  are the roots of  $ax^2$  bx + c = 0, then the relation between a, b and c will be:
  - $(1) \ a^2 + b^2 + 2ac = 0$

 $(2) \ a^2 - b^2 + 2ac = 0$ 

(3)  $a^2 + c^2 + 2ab = 0$ 

- $(4) \ a^2 b^2 2ac = 0$
- 79. The value of  $\cos 1^{\circ} \cos 2^{\circ} \cos 3^{\circ} \dots \cos 179^{\circ}$  is :
  - (1)  $1/\sqrt{2}$

(2) 0

(3) 1

- (4) -1
- 80. If A lies in the second quadrant and 3 tan A + 4 = 0, then the value of  $(2 \cot A 5 \cos A + \sin A)$  is equal to:
  - (1) -53/10

(2) 7/10

(3) 37/10

(4) 23/10

81	If the line $2x + y = k$ passes through	the point which divides the line segment joining
	the points (11) and (2, 4) in the ratio 3	3: 2, then k equals
	(1) 29/5	(2) 5
	(3) 6	(4) 11/5
	term is 20 ? ? were ni shi:	
82.	For the ellipse $3x^2 + 4y^2 = 12$ , the leng	th of the latus rectum is:
	(1) 2/5	(2) 3/5
		tw (4) 40 in assurated 7 to queen a mort 88
0 6		nomited A leastin choloni blands doidw
83.	allowing as males	and C be the circle $x^2 + y^2 = 9$ . Let P and Q be the
	points (1, 2) and (2, 1), respectively. T	hen
	(1) Q lies inside C but outside E	(2) Q lies outside both C and E
etic	(3) P lies inside both C and E	(4) P lies inside C but outside E
84.	The locus of the mid-point of the li	ine segment joining the focus of the parabola
	$y^2 = 4ax$ to a moving point of the parab	ola, is another parabola whose directrix is
	(1) $x = a$	(2) $x = 0$
	euers of the word BMBIO, with or	90. 60 words can be made using all the l
	(3) x = -a/2	(4) $x = a/2$ is already product a unique.
35.	Consider the lines L1: $x-1 = Y - 2 = x$	z and L2: $x - 2 = y = z - 1$ . Let the feet of the
	perpendiculars from the point P(5,	1, -3) on the lines L1 and L2 be Q and R
45	respectively. If the area of the triangle I	
	(2) Less than zero (2)	(2) 147
	(3) 139 See of these (4)	(4) 143 max (a)

	(1) 60	(2) 20
	(3) 120	(4) 10
		(€)
87.	How many ways to arrange 3 boys and	2 girls in a row?
	(1) 120 simulation and lo	(2) 60 (2) = 12 100 (2) (2) (3) (4) (2) (6) (1) (1)
	(3) 20	
88. 76.	which should include atleast 4 batsme	owlers, 10 players are to be chosen for a team, en and atleast 4 bowlers. One batsmen and one ain respectively of the team should be included. selection can be made, is
	(1) 14 (3) 155	(2) 165 (4) 135
89.	From all the English alphabets, five le order. The total number of ways, in wh	tters are chosen and are arranged in alphabetical sich the middle letter is 'M' is:
	(1) 6084	(2) 5148
	(3) 14950	(4) 4356
	$(2) \times = 0$	$\mathbf{a} = \mathbf{x} \cdot (1)$
90.		e letters of the word BHBJO, with or without in a dictionary, then the 50th word is:
	(1) OBBJH	(2) HBBJO
	(3) ОВВНЈ	(4) JBBOH
H bps	o pd \$1 bas 11 and our on (c-	perpendiculars from the point Prs. 1,
91.	discriminant is:	tion $ax^2 + bx + c = 0$ are equal, then the
	(1) Greater than zero	(2) Less than zero
	(3) Zero	(4) None of these
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86. Number of permutations of 5 different objects taken 3 at a time:

92. The sum of the first n natural numbers is:

(1) n(n+1)/2

(2)  $n^2$ 

(3) n(n-1)/2

(4) n(n+1)

93. Find the number of terms if the sum of an AP is 100, the first term is 5, and the last term is 20:

- (1) 15
- If it is a root of the equation 2x 01 (2) 1. then the other root is:
- (3) 20

(4) 25

**94.** If 
$$A = \begin{bmatrix} 2 & 2 \\ 9 & 4 \end{bmatrix}$$
 and  $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ 

Then 10A<sup>-1</sup> is equal to:

(1) A-4I

(2) 6I - A

(3) A-6I

(4) 4I - A

95. If  $S_n = 3n^2 + 5n$ , then the first term is:

(1) 8

(2) 6

(3) 7

(4) 3

**96.** For equation  $x^2 + px + q = 0$ ,  $\alpha^2 + \beta^2$  equals:

(1)  $p^2 - 2q$ 

(2)  $p^2 + 2q$ 

(3)  $q^2 - 2p$ 

(4)  $q^2 + 2p$ 

97. Sum of GP is given by:

(1)  $a(1-r^n)/(1-r)$ 

(2)  $a(r^n - 1)/(r - 1)$ 

Which purt of the neuron receives signals

(3) Both A & B

(4) None

6			C
98.	If A is a 3 x 3 non-singular matrix such equals:	that $AA^T = A^T A$ and $B = A^{-1}A^T$ , then	BB <sup>T</sup>
	(1) I+B	(2) I	
	(3) B-1 (1991) 1237 - 341 (1991) 134 9/ 143 15	(4) $(B^{-1})^T$	
99.	If $\alpha$ is a root of the equation $2x(2x+1) = 1$	I, then the other root is:	
	$(1) 3\alpha^3 + 4\alpha$	(2) $\alpha^2$	
	$(3) -2\alpha (\alpha + 1)$	(4) none of these	
100.	A value of b for which the equations $x^2$	+ bx - 1 = 0 and $x^2 + x + b = 0$ have one re-	oot in
	common is:		
	(1) $-\sqrt{2}$	$(2)^{\cdot} - i - \sqrt{3}$	
	(3) $i\sqrt{5}$	(4) 2	
	SECTION	ON - C	
		IOTECHNOLOGY)	
101.	Which muscle is under voluntary control	1?	
	(1) Cardiac	(2) Skeletal	
	(3) Smooth	(4) None	
102.	Which of the following is NOT an epithe	poid 4 to 0 = p 4 m 4 to not more off	
	(1) Columnar	(2) Cuboidal	
	(3) Skeletal	(4) Squamous	
103.	Which part of the neuron receives signal		
	(1) Axon (1-1)(1-1)(1-1)(1-1)(1-1)(1-1)(1-1)(1-1	(2) Dendrite	

(4) Node of Ranvier

(3) Myelin

err

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104	4. Which gland is considered both endocr	ine a	nd exocrine ?
	(1) Thyroid		Pituitary Variation (1)
	(3) Pancreas		Adrenal
	(4) Unitsolvent		
105			
	(1) Endocrine		Digestive and the district of
	(3) Lymphatic	(4)	Respiratory more and the control of
106	. Which of the following is not a connect	tive ti	issue ?
	(1) Blood	(2)	Cartilage
	(3) Muscle	(4)	Bone Bone
107.	The lining of blood vessels is made up of	of:	
	(1) Cuboidal epithelium	(2)	Columnar epithelium
	(3) Squamous epithelium	(4)	Ciliated epithelium
108.	Which organ system is responsible for t	he tra	ansport of nutrients and gases?
100.			Nervous
	(1) Excretory		(1) DPF varcine
	(3) Digestive	(4)	Circulatory
109.	Which type of epithelium is found in the	kidı	
	(1) Columnar : Ilaw nodelagog s	(2)	Squamous
	(3) Cuboidal	(4)	Ciliated Company of the Ciliat
10.	What type of connective tissue connects	mus	cles to bones ?
	(1) Ligaments		Tendons against significant sold (E)
	(3) Cartilage	(4)	Adipose
11.	Which of the following statements is inc	orrec	t about agar ?
	(1) Remains stable at incubation tempera		Carlo Simplement and an eastern security
			(1) Reverse transcripting
	(2) Does not react with media constituen		
	(3) Does not use in micropropagation wo	ork	

(4) Not digested by plant enzymes

112.	The ability of single cells to divide and p	prod	uce all differentiate	d cells in the entity	<b>y</b> .
	(1) Totipotency	(2)	Multipotent		
	(3) Pluripotent	(4)	Unipotent		
	or hormone secucion?		practically responsi	Which system is	
113.	Growth of plant tissues in artificial medi	ia is	called:		
	(1) cell hybridization	(2)	plant tissue cultur	e of midding a feet	
		Hoor	luwing is dot a con		
	(3) transgenesis	(4)	gene expression		
114.	Louis Pasteur created the first vaccines to	for:		(a) Muscle	
	(1) Rabies	(2)	Cholera		
	(3) Anthrax	(4)	All of the above	igo labiento (1)	
	(4) Clifated epithelium		mustadin	citi Squamous ep	
115.	Which of the following is the combined	vac	cine given to childr	en for protection a	against
	Diphtheria, whooping cough and tetanus	s ?	ramwini je ar er ma		
	(1) DPT vaccine	(2)	BCG vaccine		
	(4) Circulatory				
	(3) TAB vaccine	, ,	HIB vaccine		
			thelium is found in		
116.	Increased IMR and decreased MMR in a	a po	pulation will:		
	(1) Cause rapid increase in growth rate			(3) Cuboidal	
	(2) Result in decline in growth rate	ects			
	(3) Not cause significant change in grow	wth			
	(4) Result in an explosive population				
117.	Which one of the following enzymes	is re	esponsible for the	synthesis of DNA	from
	RNA?		le at incobation ten		
	(1) Reverse transcriptase	(2)	DNA polymerase	(2) Door not read	
	(3) RNA polymerase	(4)	DNA ligase.		

(4) Not digested by plant enzymes:

C		
	118. To make the recombinant plasm chemicals is added?	id permeable to DNA molecules, which of the
	(1) MgCl <sub>2</sub>	(2) CaCl <sub>2</sub>
	(3) NaCI	(4) HCI
1	19. Match the following:	125. Which animal lacks a true body cavity (cool
	Disease mag Manuo M (	Vaccine Magnetine (1)
	1. Measles	a. Varicella vaccine
	2. Tuberculosis	to b. MMR se galwelled and to do did.
	3. Chickenpox	c. Shingrix or Zostavax
	4. Shingles	d. BCG vaccine
	(1) 1-c, 2-d, 3-b, 4-a	(2) I-b, 2-d, 3-c, 4-a
	(3) 1-b, 2-d, 3-a, 4-c	(4) 1-d 2-c 3-a 4-b
120	This is not a basic component of cultu	re media for plant cultivation:
	(1) amino acids	(2) sucrose/sugar
	(3) a complex mixture of salts	(4) serum albumin
121.	. Which of the following is a characteris	
	(1) Feathers	(2) Mammary glands
	(3) Gills	(4) Exoskeleton
122.	In which group of animals is the hody of	livided into head, thorax, and abdomen?
	(1) Annelida	(2) Insects
	Commission in the Commission of the Commission o	July What tenture distinguishes verrebrates for
	(3) Mollusks	(4) Cnidarians
123.	Amphibians can breathe through:	(3) Closed circulatory system
	(1) Lungs only	(2) Skin only
	(3) Lungs and skin	(4) Gills only

124.	Which animal is an invertebrate?		
	(1) Earthworm	(2)	Dog
	(3) Frog	(4)	Bat
125.	Which animal lacks a true body cavity (c	coelc	om) ?
	(1) Earthworm	(2)	Roundworm
	(3) Spider	(4)	Flatworm
126.	Which of the following exhibits radial sy	mm	etry?
	(1) Human	(2)	Fish
	(3) Jellyfish	(4)	Snake
127.	What is the main characteristic of verteb	rates	3?
	(1) Exoskeleto	(2)	Segmented body
	(3) Open circulatory system	(4)	Backbone
128.	Which of the following is the most evolv	ved?	
	(1) Mammalia	(2)	Aves
	(3) Amphibia	(4)	Reptilia
129.	The presence of a four-chambered heart	is se	en in :
	(1) Reptiles	(2)	Amphibians
	(3) Birds and mammals	(4)	Fish
130.	What feature distinguishes vertebrates fr	rom	invertebrates?
	(1) Presence of limbs	(2)	Notochord
	(3) Closed circulatory system	(4)	Exoskeleton

## Total No. of Printed Pages: 21 (DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO) UG-4Yr.-EE-June, 2025 SET-Y

# SUBJECT: Bachelor of Public Health Sciences

		Sr No
Time: 11/4 Hours  Roll No. (in figures)  Name  Father's Name  Date of Examination	Date of Righ	
Date of Examination	Mother's Name	
(Signature of the Candidate)		(Signature of the territory)
CANDIDATES MUST DE LE		(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. 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 unfairmeans / mis-behaviour 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. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- 4. Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University Website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case, will be
- 5. 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. Answers must not be ticked in the question booklet.
- 6. There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
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#### SECTION - A

1	. The work done by a force is zero whe	n the displacement is ?
	(1) In the same direction as force	(2) Perpendicular to the force
	(3) Opposite to the force	(4) None of these
2.	. A car moves with uniform acceleration	n. Its velocity-time graph is:
	(1) Horizontal	(2) Parabolic
	(3) Linear	(4) Exponential
3.	A train is moving with a uniform account and 3rd seconds is:	celeration. The ratio of distances covered in the
	(1) 1:1:1	(2) 1:2:3
	(3) 1:4:9	(4) 1:3:5
4.	The pressure exerted by a fluid in a con	ntainer is ?
	(1) Same at all points	(2) Maximum at the top
	(3) Zero at the bottom	(4) Varies linearly with depth
5.	Which of the following is a scalar quan	
	(1) Displacement	(2) Velocity
	(3) Speed	(4) Force
6.	The buoyant force on an object submer	ged in a fluid is equal to?
	(1) Weight of the object	(2) Weight of fluid displaced
	(3) Volume of object	(4) Mass of object
7.	What is the energy conversion in a hydr	roelectric nower plant ?
	(1) Electrical to Mechanical	(2) Mechanical to Electrical
	(3) Chemical to Electrical	(4) Thermal to Mechanical
8.	The concept of inertia is associated with	which law of motion?
	(1) First Law	(2) Second Law
	(3) Third Law	(4) Law of Gravitation

9.	A car accelerates from rest and covers 10	00 m in 5 s. What is its acceleration?
	(1) 5 m/s <sup>2</sup>	(2) 8 m/s <sup>2</sup>
	(3) 10 m/s <sup>2</sup>	(4) 20 m/s <sup>2</sup>
10.	Which lens is used to correct myopia (ne	earsightedness)?
	(1) Convex lens	(2) Concave lens
	(3) Cylindrical lens	(A) Mana of those
11.	The first law of thermodynamics deals w	with ?
	(1) Conservation of mass	(2) Conservation of energy
	(3) Entropy	(4) Enthalpy
12.	In electrochemistry, the cathode is where	re ?
		(2) Reduction occurs
	(3) Both oxidation and reduction occur	(4) No reaction occurs
13.	The unit of rate constant for a first-order	r reaction is ?
	(1) S <sup>-1</sup>	(2) mol L <sup>-1</sup> s <sup>-1</sup>
	(3) L mol <sup>-1</sup> s <sup>-1</sup>	(4) Unitless
4.4	What does the term "activation energy"	mean ?
14.		Weight of the object and to the winds
	(1) Energy released during a reaction	
	(2) Minimum energy required for a reac	ction to occur
	(3) Total energy in reactants	
	(4) Energy lost as heat	
4.5	The enterny of an isolated system always	ave 2
15.	The entropy of an isolated system alway	
	(1) Decreases	(2) Increases or remains constant
	(3) Remains constant	(4) Fluctuates randomly

16.	The potential difference between the electrodes of a galvanic cell is called?		
	(1) EMF	(2) Current	
(3) Resistance (4) Voltage drop		(4) Voltage drop	

- 17. In which reaction does the catalyst remain unchanged?
  - (1) Homogeneous catalyst reaction (2) Heterogeneous catalyst reaction
  - (3) Both A and B (4) None of these
- 18. For the following reaction at 300 K

$$A_2(g) + 3B_2(g) \rightarrow 2AB_3(g)$$

the enthalpy change is + 15 kJ, then the internal energy change is :

- (1) 19988.4 J (2) 200 J
- (3) 1999 J (4) 1.9988 kJ
- 19. At a given temperature and pressure, the equilibrium constant values for the equilibria are given below:

$$3A_2 + B_2 \rightleftharpoons 2A_3B, K_1$$
  
 $A_3B \rightleftharpoons 3/2A_2 + 1/2B_2, K_2$ 

The relation between K, and K2 is:

(1)  $K_1^2 = 2K_2$ 

(2)  $K_2 = K_1/2$ 

(3)  $K_1 = 1/sqrt(K_2)$ 

- (4)  $K_2 = 1/\operatorname{sqrt}(K_1)$
- 20. Mass in grams of copper deposited by passing 9.6487 A current through a voltmeter containing copper sulphate solution for 100 seconds is (Given: Molar mass of Cu: 63 g mol<sup>-1</sup>, 1 F = 96487C):
  - (1) 3.15g

(2) 0.315g

(3) 31.5g

(4) 0.0315g

21.	Which of the following is an aromatic hy	vdrocarbon?
	(1) Ethane	(2) Benzene
	(3) Ethene	(4) Propane
22.	Which compound contains a carbonyl gr	oup?
	(1) Alcohol	(2) Alkane
	(3) Amine	(4) Aldehyde
23.	Which reagent is commonly used to test	for unsaturation in hydrocarbons?
	(1) Tollen's reagent	(2) Fehling's solution
	(3) KMn0 <sub>4</sub>	(4) Bromine water
24.	The IUPAC name of CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -OH	is?
	(1) Methanol	(2) Ethanol
	(3) Propanol	(4) Butanol
25.	Which of the following contains nitroge	n ?
	(1) Alcohol	(2) Amine
	(3) Ketone	(4) Ether
26.	Polymerization is a process of ?	
	(1) Breaking down molecules	
	(2) Formation of large molecules from	small ones
	(3) Crystallization	
	(4) Distillation	
27.	The empirical formula of glucose is ?	
	(1) $C_6H_{12}O_6$	(2) $C_6H_{10}O_5$
	(3) CH <sub>2</sub> O	(4) $C_3H_6O_3$
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D		5
28	Which of the following organic compounds is responsible for the sweet smell of fruits?	
	(1) Alcohols	(2) Esters
	(3) Aldehydes	(4) Ketones
29	. What type of bond is found in benze	ene ?
	(1) Single bonds only	
	(2) Alternating single and double be	onds (resonance)
	(3) Triple bonds	
	(4) Ionic bonds	THE PERSON NAMED IN COLUMN TO SERVICE AND ADDRESS OF THE PERSON NAMED IN COLUMN TO SE
30.	Which of the following organic com	pounds contains an ether group?
	(1) R-O-R'	(2) R-COOH
	(3) R-NH <sub>2</sub>	(4) R-CHO
31.	Calculate the refractive index of the angle of minimum deviation is 60°.	ne material of an equilateral prism for which the
	(1) $\frac{\sqrt{3}}{2}$	(2) $\sqrt{3}$
	(3) $\frac{1}{2}$	(2) $\sqrt{3}$ (4) $\frac{1}{\sqrt{2}}$
32.	Total internal reflection occurs when	light travels from ?
	(1) Dense to rarer medium beyond c	ritical angle
	(2) Rarer to denser medium beyond	critical angle
	(3) Dense to denser medium beyond	critical angle
	(4) None of these	
33.	The human eye focuses light on the?	
	(1) Cornea	(2) Retina
	(3) Iris	(4) Lens

34.	Chromatic aberration in lenses due to ?	
	(1) Dispersion of light	(2) Reflection of light
	(3) Refraction of light	(4) Diffraction of light
35.	The image formed by a plane mirror is ?	
	(1) Real and inverted	(2) Real and erect
	(3) Virtual and inverted	(4) Virtual and erect
36.	Which of the following has the smallest	wavelength?
	(1) Radio waves	(2) Microwaves
	(3) Ultraviolet rays	(4) Infrared rays
37.	The unit of refractive index is ?	
	(1) Meter	(2) Hertz
	(3) Candela	(4) Dimensionless (no unit)
38.	A convex lens is dipped in a liquid while index of the lens. Then what is its focal l	nose refractive index is equal to the refractive ength?
	(1) Focal Length will become zero	
	(2) Focal Length will become infinite	
	(3) Focal length will reduce, but not bed	come zero
	(4) Remains unchanged	
39.	If a glass prism is dipped in water, what	happens to its dispersive power?
	(1) Increases	(2) Decreases
	(3) Does not change	(4) No effect

40.	An object is kept in between them 15 is an image not formed in mirror A.	d parallel to each other and spaced 20 cm apart cm from A. Out of the following at which poin
	(1) 15 cm	(2) 25 cm
	(3) 45 cm	(4) 55 cm
41.	A boy 1.50 m tall with his eye level at fixed on a wall. What should be the minimself fully?	t 1.38 m from the ground stands before a mirro inimum length of the mirror so that he can view
	(1) 0.8 m	(2) 0.75 m
	(3) 0.69 m	(4) none of these
42.	Which scientist proposed the dual natur	re of matter ?
	(1) de Broglie	(2) Einstein
	(3) Newton	(4) Planck
43.	The electrochemical cell converts?	
	(1) Electrical energy into chemical energy	rgy
	(2) Mechanical energy into electrical en	nergy
	(3) Chemical energy into electrical energy	rgy
	(4) Electrical energy into mechanical en	nergy
14.	The entropy of a perfectly crystalline su	bstance at absolute zero is ?
	(1) Maximum	(2) Zero
	(3) Infinite	(4) Undefined
15.	In the photoelectric effect, the emission	of electrons depends on ?
	(1) Frequency of incident light	(2) Intensity of incident light
	(3) Both frequency and intensity	(4) None of the above
	( ) = Jul Hoquelle J und Interioris	(.)

46.	The temperature at which vapor pressu	re equals atmospheric pressure is?
	(1) Boiling point	(2) Melting point
	(3) Freezing point	(4) Critical point
47.	The wavelength corresponding to man	ximum energy in the electromagnetic spectrum
	(1) Radio waves	(2) Gamma rays
	(3) Visible light	(4) Infrared
48.	Which of the following does the wave t	heory of light not explain?
	(1) Diffraction	(2) Photocurrent
	(3) Polarization	(4) Interference
49.	In nuclear reactions, there is a conserva-	tion of:
	(1) Energy only	(2) Mass only
	(3) Mass, energy and momentum	(4) Momentum only
50.	What happens when the radio wave read	ches the ionizing medium ?
	(1) Will bend towards normal	(2) Will bend away from the normal
	(3) Will follow a straight path	(4) None of these
51.	Which hormone is known as the 'stress h	normone' ?
	(1) Adrenaline	(2) Thyroxine
	(3) Insulin	(4) Cortisol
52.	What is the function of alveoli in the lun	gs?
	(1) Exchange gases	(2) Store oxygen
	(3) Filter blood	(4) Produce mucus

53.	. Which disease is caused by a deficiency of Vitamin B1?		
	(1) Pellagra	(2) Rickets	
	(3) Beriberi	(4) Scurvy	
54.	Which organ stores bile?		
	(1) Liver	(2) Pancreas	
	(3) Gallbladder	(4) Stomach	
55.	What does HIV attack in the human bo	dy?	
	(1) Red blood cells	(2) Nerves	
	(3) Platelets	(4) Immune cells	
56.	Which part of the brain controls breathin	g and heart rate?	
	(1) Cerebrum	(2) Cerebellum	
	(3) Medulla oblongata	(4) Pons	
57.	What is the main cause of rickets in children	en?	
	(1) Lack of Vitamin D	(2) Lack of protein	
	(3) Lack of iron	(4) Lack of Vitamin A	
58.	Which hormone regulates the sleep-wake	cycle ?	
	(1) Insulin	(2) Melatonin	
	(3) Cortisol	(4) Estrogen	
59.	What is the largest internal organ in the	human body?	
	(1) Brain	(2) Heart	
	(3) Liver	(4) Kidney	
60.	Which blood group is known as the univ	ersal recipient ?	
	(1) A	(2) B	
	(3) O	(4) AB	

61.	Which element has the highest electronegativity?			
	(1) Oxygen	(2)	Nitrogen	
	(3) Chlorine	(4)	Fluorine	
62.	The bond formed by the sharing of elect	ron J	pairs between atoms is called?	
	(1) Ionic bond	(2)	Metallic bond	
	(3) Covalent bond	(4)	Hydrogen bond	
63.	Which of the following is paramagnetic	?		
	(1) N <sub>2</sub>	(2)	O <sub>2</sub>	
	(3) CO <sub>2</sub>	(4)	CH4 learnest micad and a part of the Cerebran	
64.				
	(1) sp	(2)	Sp <sup>2</sup>	
	(3) Sp <sup>3</sup>	(4)	dsp <sup>2</sup>	
65.	The atomic radius generally acro	oss a	period from left to right.	
	(1) Increase	(2)	Decreases	
	(3) Remains same	(4)	Varies irregularly	
66.	The color of transition metal complexes	is du	ne to ?	
	(1) Nuclear reactions	(2)	Atomic mass	
	(3) Ionization energy	(4)	d-d electronic transitions	
67.	Which of the following is a property of f	f-blo	ck elements ?	
	(1) High ionization energy	(2)	Exhibiting variable oxidation states	
	(3) Low melting points	(4)	None of these	

68.	Which bond is strongest?	
	(1) Single bond	(2) Double bond
	(3) Triple bond	(4) Hydrogen bond
69.	The ionic bond is formed by ?	
	(1) Transfer of electrons	(2) Sharing of electrons
	(3) Attraction of dipoles	(4) Hydrogen bonding
70.	The shape of BF <sub>3</sub> molecule is ?	
	(1) Tetrahedral	(2) Linear
	(3) Trigonal planar	(4) Octahedral
		SECTION – B ATHEMATICS)
71.	Number of permutations of 5 diffe	erent objects taken 3 at a time:
	(1) 60	(2) 20
	(3) 120	(4) 10
72.	How many ways to arrange 3 boys	and 2 girls in a row?
	(1) 120	(2) 60
	(3) 20	(4) 30
73.	which should include atleast 4 ba	6 bowlers, 10 players are to be chosen for a team tsmen and atleast 4 bowlers. One batsmen and one captain respectively of the team should be included a selection can be made, is
	(1) 14	(2) 165
	(3) 155	(4) 135

(1) 6084

	(3) 14950	(4) 4356		
75.	60 words can be made using all the letters of the word BHBJO, with or without meaning. If these words are written as in a dictionary, then the 50th word is:			
	(1) OBBJH	(2) HBBJO		
	(3) ОВВНЈ	(4) JBBOH		
76.	If the line $2x + y = k$ passes through the the points (11) and (2, 4) in the ratio 3:2	e point which divides the line segment joining 2, then k equals		
	(1) 29/5	(2) 5		
	(3) 6	(4) 11/5		
77.	For the ellipse $3x^2 + 4y^2 = 12$ , the length	of the latus rectum is:		
	(1) 2/5	(2) 3/5		
	(3) 3	(4) 4		
78.	Let E be the ellipse $x^2 / 9 + y^2 / 4 = 1$ and	C be the circle $x^2 + y^2 = 9$ . Let P and Q be the		
	points (1, 2) and (2, 1), respectively. Then			
	(1) Q lies inside C but outside E	(2) Q lies outside both C and E		
	(3) P lies inside both C and E	(4) P lies inside C but outside E		
79.		the segment joining the focus of the parabolatela, is another parabola whose directrix is		
	(1)  x = a	(2) $x = 0$		
	(3) $x = -a/2$	(4) $x = a/2$		
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74. From all the English alphabets, five letters are chosen and are arranged in alphabetical

(2) 5148

order. The total number of ways, in which the middle letter is 'M' is:

80.	Consider the lines L1: $x-1 = Y - 2 = z$ and L2: $x - 2 = y = z - 1$ . Let the feet of the
	perpendiculars from the point P(5, 1, -3) on the lines L1 and L2 be Q and R
	respectively. If the area of the triangle PQR is A, then $4A^2$ is equal to:

(1) 151

(2) 147

(3) 139

(4) 143

81. Number of solutions of the equation  $\tan x + \sec x = 2 \cos x$  lying in the interval  $[0, 2\pi]$  is:

(1) 0

(2) 1

(3) 2

(4) 3

82. Standard form of a parabola opening rightward:

(1)  $y^2 = 4ax$ 

(2)  $x^2 = 4ay$ 

(3)  $y^2 + 4ax$ 

(4)  $x^2 + 4ay$ 

83. Equation of a line with slope m and passing through  $(X_1, Y_1)$ :

(1) y = mx + c

(2)  $y - y_1 = m(x - x_1)$ 

(3) y = m + X

(4) None

84. A hyperbola has:

(1) One focus

(2) Two foci

(3) No focus

(4) Three foci

85. Eccentricity of ellipse is:

(1) > 1

(2) 0

(3) 1

(4) Between 0 and 1

**86.** If the roots of the quadratic equation  $ax^2 + bx + c = 0$  are equal, then the discriminant is:

(1) Greater than zero

(2) Less than zero

(3) Zero

(4) None of these

87. The sum of the first n natural numbers is:

(1) n(n+1)/2

(2)  $n^2$ 

(3) n(n-1)/2

(4) n(n+l)

88. Find the number of terms if the sum of an AP is 100, the first term is 5, and the last term is 20:

(1) 15

(2) 10

(3) 20

(4) 25

**89.** If  $A = \begin{bmatrix} 2 & 2 \\ 9 & 4 \end{bmatrix}$  and  $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ 

Then  $10A^{-1}$  is equal to:

(1) A - 4I

(2) 6I - A

(3) A -6I

(4) 4I - A

90. If  $S_n = 3n^2 + 5n$ , then the first term is:

(1) 8

(2) 6

(3) 7

(4) 3

91. For equation  $x^2 + px + q = 0$ ,  $\alpha^2 + \beta^2$  equals:

(1)  $p^2 - 2q$ 

(2)  $p^2 + 2q$ 

(3)  $q^2 - 2p$ 

(4)  $q^2 + 2p$ 

92. Sum of GP is given by:

(1) 
$$a(1-r^n)/(1-r)$$

(2) 
$$a(r^n-1)/(r-1)$$

93. If A is a 3 x 3 non-singular matrix such that  $AA^T = A^T A$  and  $B = A^{-1}A^T$ , then  $BB^T$ equals:

$$(1)$$
 I+B

$$(4) (B^{-1})^{T}$$

94. If  $\alpha$  is a root of the equation 2x(2x+1) = 1, then the other root is:

(1) 
$$3\alpha^3 + 4\alpha$$

(2) 
$$\alpha^2$$

(3) 
$$-2\alpha(\alpha+1)$$

A value of b for which the equations  $x^2 + bx - 1 = 0$  and  $x^2 + x + b = 0$  have one root in common is:

(1) 
$$-\sqrt{2}$$

(2) 
$$-i - \sqrt{3}$$

96.  $\sin(2\theta)$  is equal to:

(1) 
$$2\sin\theta\cos\theta$$

(1) 
$$2\sin\theta\cos\theta$$
 (2)  $\sin^2\theta + \cos^2\theta$ 

(3) 
$$\sin\theta + \cos\theta$$

97.  $tan^2\theta + 1$  equals:

(1) 
$$\sec^2\theta$$

(2) 
$$\csc^2\theta$$

(3) 1 (4) 
$$\sin^2\theta$$

98. If  $\sin \theta$  and  $\cos \theta$  are the roots of  $ax^2$  - bx + c = 0, then the relation between a, b and c

$$(1) a^2 + b^2 + 2ac = 0$$

(2) 
$$a^2 - b^2 + 2ac = 0$$

(3) 
$$a^2 + c^2 + 2ab = 0$$

$$(4) \ a^2 - b^2 - 2ac = 0$$

99. The value of  $\cos 1^{\circ} \cos 2^{\circ} \cos 3^{\circ} \dots \cos 179^{\circ}$  is:

	(1) 1 <i>N</i> 2	(2) 0	
	(3) 1	(4) -1	
100.	If A lies in the second quadra	ant and 3 tan $A + 4 = 0$ , then the value of (2 of	cot A – 5 cos
	A + sin A) is equal to:		
	(1) -53/10	(2) 7/10	
	(3) 37/10	(4) 23/10	
		SECTION - C	
	(BIOLOG	GY AND BIOTECHNOLOGY)	
101.	Increased IMR and decreased	d MMR in a population will:	
	(1) Cause rapid increase in g	growth rate	
	(2) Result in decline in grow	vth rate	
	(3) Not cause significant cha	ange in growth	
	(4) Result in an explosive po	opulation	
102.	Which one of the following RNA?	g enzymes is responsible for the synthesis of	of DNA from
	(1) Reverse transcriptase	(2) DNA polymerase	
	(3) RNA polymerase	(4) DNA ligase.	
103.	To make the recombinant chemicals is added?	plasmid permeable to DNA molecules,	which of the
	(1) MgCl <sub>2</sub>	(2) CaCl <sub>2</sub>	
	(3) NaCI	(4) HCI	
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33.	The value of cos 1 cos 2 cos 3 cos	179 13.		
	(1) 1/√2	(2) 0		
	(3) 1	(4) -1		
100.	If A lies in the second quadrant and 3 to	an A + 4 = 0, then the value of $(2 \cot A - 5 \cos A)$		
	A + sin A) is equal to:			
	(1) -53/10	(2) 7/10		
	(3) 37/10	(4) 23/10		
	SECT	ION – C		
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	(3) NaCI	(4) HCI		
UG-4Y	rEE-June, 2025/(Bachelor of Pub. H	ealth Sc.)(SET-Y)/(D)		

104. Match the following .

Disease	Vaccine
1. Measles	a. Varicella vaccine
2. Tuberculosis	b. MMR
3. Chickenpox	c. Shingrix or Zostavax
4. Shingles	d. BCG vaccine

(1) 1-c, 2-d, 3-b, 4-a

(2) I-b, 2-d, 3-c, 4-a

(3) 1-b, 2-d, 3-a, 4-c

(4) 1-d, 2-c, 3-a, 4-b

This is not a basic component of culture media for plant cultivation: 105.

(1) amino acids

- (2) sucrose/sugar
- (3) a complex mixture of salts (4) serum albumin

Which of the following statements is incorrect about agar? 106.

- (1) Remains stable at incubation temperature
- (2) Does not react with media constituents
- (3) Does not use in micropropagation work
- (4) Not digested by plant enzymes

The ability of single cells to divide and produce all differentiated cells in the entity. 107.

(1) Totipotency

(2) Multipotent

(3) Pluripotent

(4) Unipotent

Growth of plant tissues in artificial media is called: 108.

(1) cell hybridization

(2) plant tissue culture

(3) transgenesis

(4) gene expression

109.	Louis Pasteur created the first vaccines for	or:
	(1) Rabies	(2) Cholera
	(3) Anthrax	(4) All of the above
110.	Which of the following is the combined Diphtheria, whooping cough and tetanus	vaccine given to children for protection against?
	(1) DPT vaccine	(2) BCG vaccine
	(3) TAB vaccine	(4) HIB vaccine
111.	Which muscle is under voluntary control	?
	(1) Cardiac	(2) Skeletal
	(3) Smooth	(4) None
112.	Which of the following is NOT an epithe	lial tissue?
	(1) Columnar	(2) Cuboidal
	(3) Skeletal	(4) Squamous
113.	Which part of the neuron receives signal	s?
	(1) Axon	(2) Dendrite
	(3) Myelin	(4) Node of Ranvier
114.	Which gland is considered both endocrin	e and exocrine ?
	(1) Thyroid	(2) Pituitary
	(3) Pancreas	(4) Adrenal
115.	Which system is primarily responsible for	or hormone secretion ?
	(1) Endocrine	(2) Digestive
	(3) Lymphatic	(4) Respiratory

116	. Which of the following is a character	eristic of mammals?		
	(1) Feathers		ls Regular (1)	
	(3) Gills	(4) Exoskeleton		
117	. In which group of animals is the boo	dy divided into head, thora	x, and abdomen?	
	(1) Annelida	(1) 1		
	(3) Mollusks	(A) Caldarians		
118.	Amphibians can breathe through:	wong is not a connective a	Which of the follo	
	(1) Lungs only	(2) Skin only		
	(3) Lungs and skin		(3) Muscle	
119.	Which animal is an invertebrate?	d vessels is made up of	The liming of bloc	
	(1) Earthworm	(2) Dog	(1) Cuboldat epit	
	(3) Frog mustallings helself (2)	(A) Pot	(3) Squamous ep	
120.	Which animal lacks a true body cavit		Which organ sym	.08
	(1) Earthworm	(2) Roundworm	countrie (1)	
	(3) Spider (3)	(4) Flatworm	эндээкі (і)	
121.	Which of the following exhibits radia	l symmetry ?	Which type of ep	.83
	(1) Human	(2) Fish		
	(3) Jellyfish	(4) Snake		
22.	What is the main characteristic of vert	ebrates ?	igo to sayt zad W	.08
	(1) Exoskeleto	(2) Segmented body	(1) Liganients	
	(3) Open circulatory system	(4) Backbone	epstimiD (E)	
23.	Which of the following is the most evo	olved?		
	(1) Mammalia	(2) Aves		
	(3) Amphibia	(4) Reptilia		

124.	The presence of a four-chambered heart is seen in:		
	(1) Reptiles	(2) Amphibians	
	(3) Birds and mammals	(4) Fish	
125.	. What feature distinguishes vertebrates from invertebrates ?		
	(1) Presence of limbs	(2) Notochord	
	(3) Closed circulatory system	(4) Exoskeleton	
126.	Which of the following is not a connecti	ve tissue ?	
	(1) Blood	(2) Cartilage	
	(3) Muscle	(4) Bone	
127.	The lining of blood vessels is made up o	<b>f</b> :	
	(1) Cuboidal epithelium	(2) Columnar epithelium	
	(3) Squamous epithelium	(4) Ciliated epithelium	
128.	Which organ system is responsible for the transport of nutrients and gases		
	(1) Excretory	(2) Nervous	
	(3) Digestive	(4) Circulatory	
129.	Which type of epithelium is found in the	kidney tubules ?	
	(1) Columnar	(2) Squamous	
	(3) Cuboidal	(4) Ciliated	
130.	What type of connective tissue connects	muscles to bones ?	
	(1) Ligaments	(2) Tendons	
	(3) Cartilage	(4) Adipose	

The Answer Key of BPHS Entrance Examination, Date:19.06.2025

The Ansv	wer Key of B	<b>SPHS</b> Entran	ice Examina	tion, Dat
S.NO.	SET A	SET B	SET C	SET D
1	4	2	2	2
2	1	2	1	3
3	3	1	2	4
4	3	2	1	4
5	4	2	4	3
6	3	1	3 "	2
7	1	3	4	2
8	2	1	. 2	1
9	3	4	2	2
10	4	2	3	2
11	2	2	4	2
12	3	1	1	2
13	4	2	3	1
14	4	1	3	2
15	3	4	4	2
16	2	3	3	1
17	2	4	1	3
18	1	2	2	1
19	2	2	3	4
20	2	3	4	2
21	2	2	4	2
22	1	1	3	4
23	2	3	2	4
24	1	2	3	3
25	4	1	2	2
26	3	1	4	2
27	4	2	2	3
28	2	2	3	2
29	2	4	1	2
30	3	1	3	1
31	2	4	2	2
32	1	3	4	1
33	3	2	4	2
34	2	3	3	1
35	1	2	2	4
36	1	4	2	3
37	2	2	3	4
38	2	3	2	2
39	4	1	2	2
40	1	3	1	3
41	4	2	2	2
42	3	4	3	1
43	2	4	4	3
44	3	3	4	2
45	2	2	3	1

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46	4	2	2	1
47	2	3	2	2
48	3	2	1	2
49	1	2	2	4
50	3	1		1
51	2	2	2 2	4
52	4	3	2	1
53	4	4	1	3
54	3	4		3
55	2	3	2	4
56	2	2	1	3
57	3	2	3	1
58	2	1	1	2
59	2	2	4	3
60	1	2	2	4
61	2	4	2	4
62	2	1	1	3
63	1	3	3	2
64	2	3	2	3
65	2	4	1	2
66	1	3	1	4
67	3	1	2	2
68	1	2	2	3
69	4	3	4	1
70	2	4	1	3
71	3	3	3	1
72	1	3	1	2
73	1	. 4	2	3
74	3	2	2 .	2
75	3	2	4	2 1
76	1	1	1	3
77	3	2	1	3
78	2	3	2	4
79	3	2	2	2
80	2	1	4	2
81	1	3	3	3
82	1	1	3	1
83	2	1	4	2
84	2	3	2	2
85	4	3	2	4
86	3	1	1	3
87	1	3	2	1
88	2	2	3	1
89	2	3	2	3
90	4	2	1	3
91	3	1	3	1
92	3	1	1	3

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93	4	2	1	2
94	2	2	3	3
95	2	4	3	2
96	1		1	1
97	2	3 1	3	1
98	3	2	2	2
99	2	2	3	2
100	1	4	2	4
101	2	3	2	3
102	2	1	3	1
103	3	2	2	2
104	1	1	3	3
105	4	1	1	4
106	3	3	3	3
107	4	1	3	1
108	1	2	4	2
109	3	3	3	1
110	2	4	2	1
111	3	2	3	2
112	3	2	1	3
113	4	3	, 2	2
114	3	1	1	3
115	2	4	1	1
116	2	3	3	2
117	3	4	1	2 3
118	2	1	2	
119	3	3	3	1 4
120	1	2	4	3
121	3	3	2	4
122	1	3 4	2	1
123	2		3	3
124	1	3	1 4	2
125	1	2	3	3
126	3	2	4	3
127	1	3	1	4
128	2	2	3	3
129	3	3	2	2
130	4	1	2	-

fearth follows