Total No. of Printed Pages: 21

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BPH-EE-2018(SET-Y)

Δ				10005
/ \			Sr. No.	
Time: 11/4 Hours (75 minutes)	Total Questi	ions : 130		Max. Marks: 100
Candidate's Name			Date of Birth_	
Father's Name		Mother's Name		
Roll No. (in figures)	(in words)			
Date of Exam :				
	* P			
(Signature of the Invigilator)	· //		(Signature o	f the Candidate)

CANDIDATES MUST READ THE FOLLOWING INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER & FOLLOW THEM.

- All questions under Part A and Part B are compulsory. Part C is optional.
 The candidates may attempt either Optional Part C(i) OR Optional Part C(ii). All questions carry equal marks i.e. one mark each.
- 2. The candidates must return this question booklet and the OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means/misbehaviour will be registered against him/her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
- 3. The candidate *must not* do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself.
- 4. In case there is any discrepancy in any question(s) in the Question Booklet, the same may be brought to the notice of the Controller of Examinations in writing within two hours after the test is over. No such complaint(s) will be entertained thereafter.
- 5. Use only blue or black ball point pen of good quality in the OMR Answer-Sheet.
- 6. There will be 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. Before answering the questions, the candidates should ensure that they have been supplied correct & complete question booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after the start of examination.

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are:

PART - A

(PHYSICS)

1. If σ is the Stefan's constant and b is the Wien's constant, then the dimensions of σb^4

	(3) $[M^1L^0T^{-3}]$ (4) $[M^1L^4T^{-3}]$	
2.	 A boy is hanging from a horizontal branch of a tree. The tension in the armaximum when the angle between the arms is: (1) 0° (2) 60° (3) 90° (4) 120° 	ms will be
3.	3. A body is projected such that it's K.E at the top is $\frac{3}{4}$ th of it's initial K. E. V angle of projection with horizontal?	Vhat is the
4.	(1) 30° (2) 60° (3) 45° (4) 120° 4. A bomb of mass 16 kg at rest explodes into two pieces of masses 4 kg and velocity of the 12 kg mass is 4 m/s. The kinetic energy of the other mass is:	12 kg. The
	(1) 288 J (2) 192 J (3) 96 J (4) 144 J	
5.	5. The potential energy of a long spring when stretched by 2 cm is u. If the stretched by 8 cm, the potential energy stored in it is:	spring is
	(1) $\frac{u}{4}$ (2) $4u$ (3) $16u$ (4) $8u$	
6.	6. A body is projected vertically up. At certain height h above the ground, it	s P. E and
	K. E are in the ratio 1:4. At what height above the ground, P. E and K. E wi ratio 4:1?	ll be in the
	(1) $4h$ (2) $\frac{h}{4}$ (3) $5h$ (4) $\frac{h}{5}$	
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in the ratio:

(1) 1:2

	that of the earth. If the escape velocity from the earth is v, then the escape velocity from the planet is:
	(1) $\sqrt{3}v$ (2) $\sqrt{2}v$ (3) v (4) $\sqrt{5}v$
9.	If the earth shrinks such that it's mass does not change but radius decreases to one
	quarter of it's original value then one complete day will be of:
	(1) 96 hrs (2) 48 hrs (3) 6 hrs (4) 1.5 hrs
10.	A liquid will not wet the surface of a solid if its angle of contact is:
117	(1) zero (2) Less than 90°
	(3) more than 90° (4) 90°
11.	Two rain drops reach the earth with different terminal velocities having ratio 9:4.
	Then the ratio of their volume is:
	(1) 3:2 (2) 4:9 (3) 9:4 (4) 27:8
12.	A gas undergoes an adiabatic change it's specific heat in the process is :
	(1) zero (2) 1 (3) ∞ (4) 0.5
13.	At which of the following temperatures would the molecules of a gas have twice the
	average kinetic energy they have at 27°C?
	(1) 327° C (2) 377° C (3) 397° C (4) 587° C
14.	A refrigerator absorbs 2000 cals of heat from ice trays. If coefficient of performance is
	4, then work done by the motor is:
- 3	(1) 2100 J (2) 4200 J (3) 8400 J (4) 500 J
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7. Two bodies have their moments of inertia I and 2I respectively about the axis of

8. The mass of a planet is six times that of the earth. The radius of the planet is twice

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

rotation. If their kinetic energies of rotation are equal, their angular momenta will be

(3) $1:\sqrt{2}$

(4) 2:1

	(1) 120 Hz (2) 128 Hz (3) 112 Hz (4) 240 Hz
17.	A pipe closed at one end produces a fundamental note at 412 Hz. It is cut into two
	pieces of equal length. The fundamental frequencies produced in the two pieces are :
	(1) 206 Hz, 412 Hz (2) 824 Hz, 1648 Hz
	(3) 412 Hz, 824 Hz (4) 206 Hz, 824 Hz
18.	An α-particle and a proton are accelerated through same potential difference from
141	rest. The ratio of their final velocities is:
	(1) $\sqrt{2}:1$ (2) $1:1$ (3) $1:\sqrt{2}$ (4) $1:2$
19.	The resistance of a wire of uniform length L and diameter D is R . The resistance of
	another wire of same material but length 4L and diameter 2D will be:
	(1) $2R$ (2) R (3) $\frac{R}{2}$ (4) $\frac{R}{4}$
20.	A 10 μF capacitor is charged by a battery of emf 100 V. The energy drawn from the
	battery and the energy stored in the capacitor, are respectively:
	(1) 0.10 J and 0.05 J (2) 0.05 J and 0.10 J
	(3) 1.0 mJ and 0.5 mJ (4) 0.05 J and 0.05 J
21.	Two cells, each of emf E and internal resistance r are connected in parallel across a
, i s	resistor R. The power delivered to the resistor is maximum if:
	(1) $R = \frac{r}{2}$ (2) $R = r$ (3) $R = 2r$ (4) $R = 0$
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15. When the displacement is half of the amplitude, then what fraction of the total energy

16. A tuning fork produces 8 beats/sec with both, 80 and 70 cm of stretched wire of

(3) $\frac{2}{9}$ th (4) $\frac{5}{7}$ th

of a simple harmonic oscillator is kinetic?

sonometer. Frequency of the fork is:

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

	The new magnetic moment is:
	(1) $\frac{M}{\sqrt{2}}$ (2) $\frac{M}{2}$ (3) $\sqrt{2}M$ (4) $2M$
23.	A proton, a deuteron and an α -particle enter a magnetic field perpendicular to it with
	same velocities. What is the ratio of radii of circular path?
	(1) 1:2:2 (2) 2:1:1 (3) 1:1:2 (4) 1:2:1
24.	If the self-inductance of 500 turn coil is 125 mH, then the self-inductance of similar
	coil of 800 turns is:
	(1) 48.8 mH (2) 200 mH (3) 187.5 mH (4) 320 mH
25.	In an LCR circuit having L = 8 henry, C = 0.5 μF and R = 100 ohm in series, the
	resonance frequency in Hz is:
	(1) 600 (2) 600π (3) $\frac{250}{\pi}$ (4) 5000
26.	The frequency of ultraviolet light is of the order of:
	(1) 10^7 Hz (2) 10^{10} Hz (3) 10^{12}Hz (4) 10^{15} Hz
27.	In Young's double slit experiment, n th bright fringe of red light ($\lambda_1 = 7500 \mathring{A}$) coincides with (n + 1)th bright fringe of green light ($\lambda_2 = 6000 \mathring{A}$). The value of n is:
	(1) 4 (2) 5 (3) 3 (4) 2
28.	An endoscope is employed to view the internal parts of the body. It is based on the
	principle of:
	(1) Reflection (2) Refraction
	(3) Total internal reflection (4) Dispersion
29.	Focal lengths of objective and eye-piece of a telescope are 200 cm and 4 cm
	respectively. The length of the telescope in normal adjustment is:
рн-г	(1) 196 cm (2) 204 cm (3) 250 cm (4) 225 cm (5-2018/(SET - Y)/(A)

22. A steel wire of length l has a magnetic moment M, it is bent into L shape from middle.

30.	 Which of the following series of hydrogen 	spectrum is in the visible region?
a 8	(1) Lymann series (2) Balmer series
	(3) Paschen series (4) Bracket series
31.	The rest mass of a photon is:	
	$(1) \frac{hv}{c} \qquad (2) \frac{hv}{c^2} \qquad (3)$	$\frac{hc}{\lambda}$ (4) zero
32.	2. For nuclear fission to take place the neutron	ns must have :
	(1) Very very low energy (2)	Thermal energy
	(3) Very high energy (4)	No kinetic energy
33.	The half value period of a radioactive nuc	lide is 3 hours. In 9 hours, it's activity will
	be reduced to :	
e 1	(1) $\frac{1}{9}$ (2) $\frac{1}{27}$ (3)	$\frac{1}{6}$ (4) $\frac{1}{8}$
34.	. Digital circuits can be made by repetitive us	se of:
	(1) OR gate (2) AND gate (3)	NOT gate (4) NAND gate
35.	. In a common base transistor amplifier the c	urrent gain is :
	(1) One (2)	More than one
	(3) Less than one (4)	Infinite
	PART	-в
	(CHEMI	STRY)
36.	Atomic wt. of barium is 137.34. The equiva	llent weight of barium in BaCrO ₄ used as
X	oxidizing agent in acid medium is:	
	(1) 137.34 (2) 45.78 (3)	114.45 (4) 68.67
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	37.	The density of 1 M solution of NaCl is 1.0585 g/ml. The molality of the solution is :
		(1) 1.0585 (2) 1.00 (3) 0.10 (4) 0.0585
	38.	The strength of an Oxo acid (E-O-H) where E is the central atom, depends upon the : (1) Electronegativity of E
		(2) Atomic size of E
		(3) Ability of E to share electron pair with O(4) Atomic size and electronegativity of E.
	39.	$2CuSO_4 + 4KI \rightarrow Cu_2I_2 + 2K_2SO_4 + I_2$ I_2 obtained from 0.1 mole of $CuSO_4$ sample
		required 100 ml of 1 M hypo, hence mole percentage of pure CuSO ₄ is:
		(1) 100 (2) 50 (3) 25 (4) None is correct
	40.	The hybridization of carbon atoms in C – C single bond of $HC \equiv C - CH = CH_2$ is:
		(1) $sp^3 - sp^3$ (2) $sp - sp^2$ (3) $sp^2 - sp^2$ (4) $sp^3 - sp$
	41.	Which of the following is not true for resonance?
	4 -	(1) Identical arrangement of atoms (2) Identical bonding
		(3) Same no. of paired electron (4) Structure with same energies
	42.	The geometry of $Ni(CO)_4$ and $Ni(PPh_3)_2$ Cl_2 are:
		(1) Both square planar (2) Tetrahedral and square planar
		(3) Both tetrahedral (4) Square planar and tetrahedral
	43.	The paramagnetism of O_2 molecule is believed to be due to the presence of two
		electrons with parallel spins in:
		(1) Bonding π orbitals (2) Antibonding π orbitals
		(3) Bonding σ orbitals (4) Antibonding σ orbitals
	44.	Trisoxalato aluminate (III) ion is :
		(1) $\left[Al\left(C_{2}O_{4}\right)_{3}\right]$ (2) $\left[Al\left(C_{2}O_{4}\right)_{3}\right]^{3+}$
		(3) $\left[Al\left(C_{2}O_{4}\right)_{3}\right]^{2-}$ (4) $Al\left[\left(C_{2}O_{4}\right)_{3}\right]^{3-}$
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45.	$[CrF_6]^{3-}$	has Cr atom		hybridized.
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- (1) sp^2d^2 (2) d^2sp^3 (3) dsp^2
- (4) $sp^{3}d$
- For an α -emitting isotope, the value of disintegration constant is 0.49×10^{-10} per year. The amount of the isotope of a given sample will reduce to half its value after a period (in years) of nearly:
 - (1) 0.45×10^{10}
- (2) 0.9×10^{10}
- (3) 1.41×10^{10} (4) 2.82×10^{10}
- 47. Number of photons of light of wavelength 4000 \mathring{A} required to provide 1.00 J of energy is:
 - (1) 2.01×10^{18}
- (2) 12.01×10^{31} (3) 1.35×10^{17}
- (4) None is correct
- Vander Waal's equation for one mole of CO₂ gas at low pressure will be:
 - $(1) \left(P + \frac{a}{V^2} \right) V = RT$
- (2) $P(V-b) = RT \frac{a}{V^2}$

(3) $P = \frac{RT}{V}$

- (4) $P = \left(\frac{RT}{V h} \frac{a}{V^2}\right)$
- 49. A gas in an open container is heated from 27°C to 127°C, the fraction of the original amount of gas remaining in the container will be:
 - $(1) \ 3/4$
- (2) 1/2
- (3) 1/4
- (4) 1/8
- The temperature at which a real gas obeys the ideal gas laws over a fairly wide range of pressure is:
 - (1) Critical temperature
- (2) Inversion temperature
- (3) Boyle's temperature

- (4) Reduced temperature
- What is normality of 0.30 M H_3PO_4 (a tribasic acid) in the following reaction?

$$H_3PO_4 + 2OH^- \rightarrow HPO_4^{2-} + 2H_2O$$

- (1) 0.30 N
- (2) 0.60 N
- (3) 0.90 N
- (4) 0.15 N

52.	At 25°C, the vapour pressure of pure methyl alcohol is 92.0 torr. Mole fraction of
	CH_3OH in a solution in which vapour pressure of CH_3OH is 23.0 torr at 25°C is:
	(1) 0.25 (2) 0.75 (3) 0.50 (4) 0.66
53.	Which has maximum osmotic pressure at temperature T?
	(1) 100 ml of 1 M urea solution
	(2) 300 ml of 1 M glucose solution
	(3) Mixture of 100 ml of 1 M urea solution and 300 ml of 1M glucose solution
	(4) All are isotonic
54.	Rate constant of a reaction is 0.0693 min ⁻¹ , starting with 10 mol, rate of reaction after
	10 min is:
	(1) $0.693 \text{ mol min}^{-1}$ (2) $0.0693 \times 2 \text{ mol min}^{-1}$
	(3) $0.0693 \times 5 \text{ mol min}^{-1}$ (4) $0.0693 \times (5)^2 \text{ mol min}^{-1}$
55.	Equilibrium constant for the reaction :
	$NH_4OH + H^+ \Longrightarrow NH_4^+ + H_2O$
	is 1.8×10^9 . Hence equilibrium constant for $NH_3(aq) + H_2O \rightleftharpoons NH_4^+ + {}^-OH$ is :
1.5	(1) 1.8×10^{-5} (2) 1.8×10^{5} (3) 1.8×10^{-9} (4) 5.55×10^{-10}
56.	If ΔH of a reaction is 100 KJ mol^{-1} , then activation energy must be :
2	(1) Less than 100 KJ mol^{-1} (2) Greater than 100 KJ mol^{-1}
	(3) Equal to 100 KJ mol^{-1} (4) None is correct
57.	A gas expands against a constant external pressure of 2.00 atm, increasing its volume by 3.40 L. Simultaneously, the system absorbs 400 J of heat from its surroundings.

(3) -289

(4) + 400

(1) -689

What is ΔE , in joules for this gas?

(2) + 289

58. Which reacts faster with conc. HCl?

(1) \bigcirc -CH₂CH₂OH

(2) \bigcirc $CH-CH_3$ OH

(3) $CH_3 - C - OH$ $CH_3 - C - OH$ CH_3

 $(4) \quad CH_2 = CH - CH_2OH$

59. \bigcirc - CH_2OH on dehydration with conc. H_2SO_4 forms predominantly :

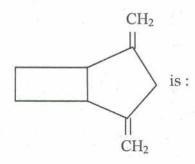
(1) $\langle - \rangle = CH_2$

(2) CH₃

(3) $\left\langle -\right\rangle - CH_3$

(4) None of these

60. Degree of unsaturation in



- (1) 2
- (2) 3
- (3) 4
- (4) 5

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P. T. O.

61.
$$CH_3$$
 $\xrightarrow{alcoholic}$ product major product is:

(1)
$$CH_3$$
 CH_3

(2)
$$CH_3$$
 CH_3

62. Perchloroethane is:

(2)
$$C_2Cl_6$$

(3)
$$CH_3 - CCl_3$$

63.
$$C_3H_6Cl_2$$
 (i) KCN (ii) H_3O^+ $H_3C CH-COOH$ A is: (iii) Δ CH_3

- (1) 1, 1 dichloropropane
- (2) 1, 2-dichloropropane
- (3) 2, 2 dichloropropane
- (4) 1, 3-dichloropropane

64.
$$Y \leftarrow Br_2 \longrightarrow COOH \longrightarrow HNO_3 \longrightarrow X$$

X and Y are:

- (1) Picric acid, 2, 4, 6 tribromophenol
- (2) 4-nitrosalicylic acid, 4-bromosalicylic acid
- (3) o-nitrophenol, o-bromophenol
- (4) None is correct

65. In
$$\bigcirc$$
 C (CH₃)₃ $\xrightarrow{KMnO_4}$ product

Product is:

(3) Both are correct

- (2) $(CH_3)_3C COOH$
- (4) None is correct

66. In
$$\bigcirc$$
 $\xrightarrow{aq \ KOH}$ product

Product is:

OH
$$+ CH_3 OK (mixture)$$

67.
$$HC = CH + 2HCHO \xrightarrow{-OCH_3} X$$

X is:

- (1) $HOH_2C C \equiv C CH_2OH$
- (3) Both are correct

- (2) $HOH_2C C \equiv C CH_2OCH_3$
- (4) None is correct

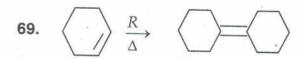
68.
$$H_2C = CH_2 \xrightarrow{hv} A$$

A is:

- (1) $H_2C = CH CH = CH_2$
- (2) $H_3C CH = CH CH_2$

(3)

(4) None is correct



A can be:

(1) Conc. H_2SO_4

(2) alcoholic KOH

(3) Et_3N

(4) t-BuOK

70. Identify the correct statement:

- (1) Gypsum is obtained by heating Plaster of Paris
- (2) Plaster of Paris can be obtained by hydration of gypsum
- (3) Plaster of Paris contains higher percentage of calcium than does gypsum
- (4) Plaster of Paris is obtained from gypsum by oxidation

OPTIONAL

PART - C (i)

(MATHEMATICS)

71. Domain of the function $y = \sqrt{4 - x^2}$ is:

- (1) R [0, 2], where R is the set of real numbers
- (2) [-2,2]
- (3) [0, 2]
- $(4) \quad (-\infty,-2) \cup (2,\infty)$

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- **72.** Let X be the universal set for sets A and B. If n(A) = 200, n(B) = 300 and $n(A \cap B) = 100$, $n(A^c \cap B^c) = 300$, then n(X) is equal to:
- (2) 600
- (3) 700
- (4) 400

- 73. The value of $\tan \left| \cos^{-1} \left(\frac{4}{5} \right) + \tan^{-1} \left(\frac{2}{3} \right) \right|$ is:
 - (1) $\frac{17}{6}$ (2) $\frac{16}{7}$ (3) $\frac{6}{17}$

- (4) None of these

- **74.** If $\sec A + \tan A = \frac{3}{2}$, then:
 - (1) $\sin A = \frac{12}{13}$

(2) $\sin 2A = \frac{5}{13}$

(3) $\sin A = \frac{5}{13}$

- (4) $\sin 2A = \frac{12}{13}$
- **75.** If *n* is a positive integer, then $2.4^{2n+1} + 3^{3n+1}$ is divisible by :
 - (1) 27
- (2) 11
- (3) 2
- (4) 9

- Which is not correct?
 - (1) Each of the two complex roots of unity is the square of the other.
 - (2) Sum of the three cube roots of unity is zero.
 - (3) Product of the three cube roots of unity is one.
 - (4) None of these
- **77.** If (1+i) is a root of the equation $x^2 + ax + 2 = 0$. where $a \in R$, then the value of 'a' is:
- (2) 2

- Solution set of inequality $|3x-2| \le \frac{1}{2}$ is:
 - (1) $\left[-\frac{1}{2}, \frac{1}{2}\right]$

(2) $\left[\frac{1}{2}, \frac{5}{6}\right]$

(3) $\left[-\frac{1}{2}, \frac{3}{2}\right]$

 $(4) \quad \left[\frac{3}{2}, \frac{5}{2}\right]$

- 79. Sum of all the odd divisors of 720 is:
 - (1) 78
- (2) 76
- (3) 84
- (4) 80
- **80.** The binomial co-efficient of the 4th term in the expansion of $(x-q)^5$ is:
 - (1) 5

- **81.** If $\frac{1}{b+c}$, $\frac{1}{c+a}$ and $\frac{1}{a+b}$ are in A. P., then a^2 , b^2 and c^2 are in :
 - (1) Geometric Progression
- (2) Arithmetic Progression
- (3) Harmonic Progression
- (4) None of these
- The equation of the straight line passing through the point (2, 3) and making intercepts on axes equal in magnitude and sign is:
 - (1) x + y = 3
- (2) x y = 5
- (3) x + y = -5 (4) x + y = 5
- The foci of an ellipse are $(\pm 4,0)$ and vertices at $(\pm 5,0)$. Then the equation of the 83. ellipse is:
 - (1) $\frac{x^2}{25} + \frac{y^2}{9} = 1$

(2) $\frac{x^2}{9} + \frac{y^2}{16} = 1$

(3) $9x^2 + 25y^2 = 1$

- (4) None of these
- **84.** The point which divides the line joining the points (2, 4, 5) and (3,5,-4) in the ratio -2:3 lies on:
 - (1) ZOX plane

(2) XOY plane

(3) YOZ plane

- (4) None of these
- The value of $\lim_{x\to 0} \frac{x}{1-\sqrt{1-x}}$ is:
 - (1) $\sqrt{2}$
- (2) 2
- (3) $\frac{1}{2\sqrt{2}}$
- (4) 0

- **86.** If $x = a\cos^3\theta$, $y = a\sin^3\theta$, then $\frac{dy}{dx}$ is equal to :
 - (1) cot t
- (2) cos t
- (3) tan t
- (4) tan t
- **87.** If X, M, Z are denoting Mean, median and mode of a data and X: M = 9:8, then the ratio M: Z is given by:
 - (1) 8:9
- (2) 4:3
- (3) 7:6
- (4) 5:4
- **88.** Two dice are rolled together, the probability that the total score on the two dice is greater than 10 is given by:
 - (1) $\frac{1}{4}$
- (2) $\frac{1}{6}$
- (3) $\frac{1}{12}$
- (4) $\frac{5}{6}$

- **89.** If $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$, then $A^2 + 2A$ is equal to:
 - (1) 3A
- (2) 4A
- (3) 2A
- (4) A

90. The value of the determinant

$$\begin{vmatrix} 1 & x & y+z \\ 1 & y & z+x \\ 1 & z & x+y \end{vmatrix}$$
 is

- (1) x+y+z
- (2) 0
- (3) 1
- (4) (1+x+y+z)

- **91.** If $x^y = e^{x-y}$, then $\frac{dy}{dx}$ is:
 - $(1) \quad \frac{\log x}{(1+\log x)^2}$

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

 $(3) \ \frac{\log x}{(1-\log x)}$

- $(4) \log x(\log ex)^{-1}$
- **92.** If x be real, the minimum value of $x^2 8x + 17$ is:
 - (1) -1
- (2) 0
- (3) 1
- (4) 2

93. The value of $\int \frac{2e^x}{e^{2x}+1} dx$ is equal to :

(1)
$$\log (e^x + e^{-x}) + c$$

(2)
$$2 \tan^{-1}(e^x) + c$$

(3)
$$\log (1 + e^{2x}) + c$$

(4)
$$\tan^{-1}(2e^x + 1) + c$$

94. The area bounded by the curve $y^2 = 4x$ and $x^2 = 4y$ is:

(1)
$$\frac{16}{3}$$
 sq. units

(2)
$$\frac{3}{16}$$
 sq. units

(3)
$$\frac{14}{3}$$
 sq. units

(4)
$$\frac{3}{14}$$
 sq. units

95. The solution of the differential equation $\frac{dy}{dx} + \frac{y}{x} = x^2$ is:

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

(2)
$$xy = \frac{1}{4}\dot{x}^4 + c$$

(3)
$$x-y=\frac{1}{3}x^3+c$$

(4)
$$y-x=\frac{1}{4}x^4+c$$

96. A random variable X has the following probability distribution values of X:

X:	1	2	3	4	- 5
P(X):	k	3k	2k	k	2k

Then the value of P(X < 3) is:

(1)
$$\frac{6}{9}$$

(2)
$$\frac{1}{9}$$

(3)
$$\frac{4}{9}$$

(4)
$$\frac{7}{9}$$

97. A unit vector perpendicular to each of the vectors $-6\hat{i} + 8\hat{k}$ and $8\hat{i} + 6\hat{k}$ forming a right handed system is :

(1)
$$\hat{j}$$

(2)
$$-\hat{j}$$

(3)
$$\frac{1}{10}(6\hat{i} + 8\hat{k})$$

(4)
$$\frac{1}{10}(-6\hat{i} + 8\hat{k})$$

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98.	Which of the following is <i>not</i> associated with any LPP?
	(1) Feasible Solution (2) Optimum Solution
	(3) Basic Solution (4) None of these
99.	The distance of the plane $2x-3y+6z+14=0$ from the origin is:
ē	(1) 14 (2) 2 (3) -2 (4) 11
100.	The direction cosines of the line joining the points $(4, 3, -5)$ and $(-2, 1, -8)$ are:
	(1) $\langle 2, 4, -13 \rangle$ (2) $\langle 6, 2, 3 \rangle$ (3) $\langle \frac{6}{7}, \frac{2}{7}, \frac{3}{7} \rangle$ (4) None of these
	OPTIONAL
	PART – C (ii) (BIOLOGY)
101.	Which of the following is developed by parthenogenesis?
	(1) Drones (2) Queen honey bee
	(3) Worker honey bee (4) Both (2) and (3)
102.	Apomixis is a type of reproduction that results in the development of a/an: (1) New organism without fusion of gametes. (2) New organisms from fusion products of gametes (3) Embryo from endosperm (4) Embryo from nucleus
103.	Medical Termination of Pregnancy (MTP) is considered safe up to how many weeks of pregnancy?
	(1) Six weeks (2) Eight weeks (3) Twelve weeks (4) Eighteen weeks
104.	Conditions of a karyotype $2n \pm 1$ and $2n \pm 2$ are called:
	(1) Aneuploidy (2) Polyploidy
	(3) Klinfelter's & Turner's syndrome (4) Monosomy
 -	

105.	The clouds of cosmic dust and gases from which the entire solar system is believed to be formed by condensation, is called:
	(1) Ylem (2) Whey (3) Cosmos (4) Galaxy
106.	During DNA replication, Okazaki fragments are used to elongate: (1) The lagging strand towards replication fork. (2) The leading strand away from replication fork. (3) The lagging strand away from the replication fork. (4) The leading strand towards replication fork.
107.	Infection of Ascaris occurs due to:
	(1) Contaminated food and water (2) Mosquito bite
	(3) Tse-tse fly (4) Sand fly
108.	Name the process by which the nutritional quality of food crops is improved through biological means such as conventional plant breeding.
	(1) Hybridization (2) Nutrification
	(3) Bioaccumulation (4) Biofortification
109.	In which of the following year the Yamuna Action Plan (YAP) was implemented?
	(1) 1987 (2) 1991 (3) 1993 (4) 1999
110.	To remove negatively charged molecules through matrix of agarose, nucleic acid molecules are separated by applying :
* .	(1) Electrical field (2) Electric current
	(3) Magnetic field (4) UV radiation
111.	Bacillus thuringiensis forms protein crystals which contain insecticidal protein. This protein :
	(1) Binds with epithelial cells of midgut of the pest ultimately killing it.
	(2) Does not kill the carrier bacterium which is itself resistant to this toxin
#) 	(3) Is activated by acid pH of the foregut of the insect pest
	(4) Is coded by several genes including the cry gene.

(2) Xylem of gymnosperms

(4) All of the above

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121. Vessels and fibers occurs in :

(1) Xylem of angiosperms

(3) Xylem of pteridophytes

P. T. O.

122.	Tendon and ligament are examples of:	
	(1) Loose connective tissues (2) Special connective tissues
16	(a) D) Dense regular connective tissues
123.		
	(1) DNA but no histones (2) Both DNA and histones
* .	(3) Neither DNA nor histones (4)	Either DNA or histone
124.	In order to enter the cell cycle of cell must molecule provides this stimulation?	t be stimulated from outside. What type of
		Cyclins-dependent kinases
	(3) Cytokines and growth factors (4)) Tyrosine
125.	The absorption of minerals due to differen use of energy is:	ce in the electro potential gradient without
		Passive absorption
		None of the above
126.	Fig. (2) 170 AND SECTION SECTI	plants with the help of:
	(1) PEP carboxylase and pyruvate carboxy	
	(2) PEP carboxylase and RuBP carboxylasa	
	(3) RuBP carboxylasae and PEP carboxylas	
	(4) RuBP carboxylasae and pyruvate carbo	xylase
127.	As compared to anaerobic respiration, the is:	energy gained during aerobic respiration
	(1) 8 times (2) 12 times (3)	19 times (4) 36 times
128.	Fruit and leaf drop at early stages can be pr	evented by the application of :
	(1) 6	Ethylene
	(3) Auxins (4)	Gibberellic acid
129.	The dental formula for humans (as well as a	ipes and some monkeys) is:
	(1) 0 1 (0 (0)	2-1-2-3 (4) 2-2-1-3
130.	Total oxygen that can be carried by blood in	
	(1) 1000-1200 ml (2)	2000-3000 ml
	(3) 200 ml (4)	100 ml

Total No. of Printed Pages: 21

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BPH-EE-2018(SET-Y)

D				10002
D			Sr. No.	
Time: 11/4 Hours (75 minutes)	Total Quest	ions : 130		Max. Marks: 100
Candidate's Name			_ Date of Birth_	
Father's Name		Mother's Nam	ne	3 A
Roll No. (in figures)	(in words)		.7-	
Date of Exam :		ada"		
(Signature of the Invigilator)		1	(Signature of	the Candidate)

CANDIDATES MUST READ THE FOLLOWING INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER & FOLLOW THEM.

- All questions under Part A and Part B are compulsory. Part C is optional.
 The candidates may attempt either Optional Part C(i) OR Optional Part C(ii). All questions carry equal marks i.e. one mark each.
- 2. The candidates must return this question booklet and the OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means/misbehaviour will be registered against him/her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
- 3. The candidate *must not* do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself.
- **4.** In case there is any discrepancy in any question(s) in the Question Booklet, the same may be brought to the notice of the Controller of Examinations in writing **within two hours** after the test is over. No such complaint(s) will be entertained thereafter.
- 5. Use only blue or black ball point pen of good quality in the OMR Answer-Sheet.
- 6. There will be 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. Before answering the questions, the candidates should ensure that they have been supplied correct & complete question booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after the start of examination.

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EAL

PART - A

(PHYSICS)

	1.	The rest mass of a photon is:
		(1) $\frac{hv}{c}$ (2) $\frac{hv}{c^2}$ (3) $\frac{hc}{\lambda}$ (4) zero
	2.	For nuclear fission to take place the neutrons must have:
		(1) Very very low energy (2) Thermal energy
a.		(3) Very high energy (4) No kinetic energy
	3.	The half value period of a radioactive nuclide is 3 hours. In 9 hours, it's activity will
		be reduced to: (1) $\frac{1}{9}$ (2) $\frac{1}{27}$ (3) $\frac{1}{6}$ (4) $\frac{1}{8}$
	4.	Digital circuits can be made by repetitive use of:
		(1) OR gate (2) AND gate (3) NOT gate (4) NAND gate
	5.	In a common base transistor amplifier the current gain is:
		(1) One (2) More than one (3) Less than one (4) Infinite
	6.	The frequency of ultraviolet light is of the order of: (1) 10^7Hz (2) 10^{10}Hz (3) 10^{12}Hz (4) 10^{15}Hz
	7.	In Young's double slit experiment, n th bright fringe of red light ($\lambda_1 = 7500 \mathring{A}$) coincides with (n + 1)th bright fringe of green light ($\lambda_2 = 6000 \mathring{A}$). The value of n is :
		(1) 4 (2) 5 (3) 3 (4) 2
	8.	An endoscope is employed to view the internal parts of the body. It is based on the
		principle of:
		(1) Reflection (2) Refraction
		(3) Total internal reflection (4) Dispersion
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(1) 196 cm

(1) Lymann series

	(3) Paschen series (4) Bracket series
11.	Two cells, each of emf E and internal resistance r are connected in parallel across a
	resistor R. The power delivered to the resistor is maximum if: (1) $R = \frac{r}{2}$ (2) $R = r$ (3) $R = 2r$ (4) $R = 0$
12.	A steel wire of length l has a magnetic moment M , it is bent into L shape from middle.
	The new magnetic moment is : (1) $\frac{M}{\sqrt{2}}$
13.	A proton, a deuteron and an α -particle enter a magnetic field perpendicular to it with same velocities. What is the ratio of radii of circular path ?
	(1) 1:2:2 (2) 2:1:1 (3) 1:1:2 (4) 1:2:1
14.	If the self-inductance of 500 turn coil is 125 mH, then the self-inductance of similar coil of 800 turns is :
	(1) 48.8 mH (2) 200 mH (3) 187.5 mH (4) 320 mH
15.	In an LCR circuit having L = 8 henry, C = 0.5 μF and R = 100 ohm in series, the resonance frequency in Hz is :
	(1) 600 (2) 600π (3) $\frac{250}{\pi}$ (4) 5000
16.	Two rain drops reach the earth with different terminal velocities having ratio 9:4.
	Then the ratio of their volume is:
	(1) 3:2 (2) 4:9 (3) 9:4 (4) 27:8
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9. Focal lengths of objective and eye-piece of a telescope are 200 cm and 4 cm

(3) 250 cm

(2) Balmer series

(4) 225 cm

respectively. The length of the telescope in normal adjustment is:

10. Which of the following series of hydrogen spectrum is in the visible region?

(2) 204 cm

(1) zero

(1) 327°C

(4) 587°C

	4, then work done by the motor is:	
	(1) 2100 J (2) 4200 J (3) 8400 J (4) 500 J	
20.	When the displacement is half of the amplitude, then what fraction of the total energy of a simple harmonic oscillator is kinetic?	y
	(1) $\frac{2}{7}$ th (2) $\frac{3}{4}$ th (3) $\frac{2}{9}$ th (4) $\frac{5}{7}$ th	
21.	A body is projected vertically up. At certain height h above the ground, it's P. E and K. E are in the ratio 1:4. At what height above the ground, P. E and K. E will be in the ratio 4:1?	
	(1) $4h$ (2) $\frac{h}{4}$ (3) $5h$ (4) $\frac{h}{5}$,
22.	Two bodies have their moments of inertia I and 2I respectively about the axis of rotation. If their kinetic energies of rotation are equal, their angular momenta will be in the ratio:	
	(1) $1:2$ (2) $\sqrt{2}:1$ (3) $1:\sqrt{2}$ (4) $2:1$	
23	The mass of a planet is six times that of the earth. The radius of the planet is twice that of the earth. If the escape velocity from the earth is v, then the escape velocity from the planet is:	
	(1) $\sqrt{3}v$ (2) $\sqrt{2}v$ (3) v (4) $\sqrt{5}v$	
24	If the earth shrinks such that it's mass does not change but radius decreases to or quarter of it's original value then one complete day will be of :	ıe
	(1) 96 hrs (2) 48 hrs (3) 6 hrs (4) 1.5 hrs	
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17. A gas undergoes an adiabatic change it's specific heat in the process is :

(2) 1

average kinetic energy they have at 27°C?

(2) 377°C

(3) ∞

(3) 397°C

18. At which of the following temperatures would the molecules of a gas have twice the

19. A refrigerator absorbs 2000 cals of heat from ice trays. If coefficient of performance is

(1) zero

(3) more than 90°

		are:								
		$(1) \ \left[M^0 L^0 T^0 \right]$	(2)	$\left[M^1L^{-2}T^1\right]$	(3) [M	$\begin{bmatrix} ^1L^6T^{-3} \end{bmatrix}$		$(4) \left[M^1 L^4 \right]$	T^{-3}	
	27.	A boy is hang maximum wh					. The ter	nsion in th	e arms	will be
		(1) 0°	(2)	60°	(3)	90°		(4) 120°		
	28.	A body is pro	jected su	ch that it's K h horizontal	E.E at the	e top is $\frac{3}{4}$	th of it's	s initial K.	E. Wha	t is the
		(1) 30°	(2)	60°	(3)	45°		(4) 120°		
	29.	A bomb of ma								cg. The
		(1) 288 J	(2)	192 J	(3)	96 J		(4) 144 J		
	30.	The potential	energy (of a long spr	ing whe	en stretch	ed by 2	cm is u. I	f the sp	ring is
		stretched by 8								
		(1) $\frac{u}{4}$	(2)	4u	(3)	16 <i>u</i>		(4) 8 <i>u</i>		
	31.	A tuning forl	c produc	es 8 beats/s	ec with	both, 80	and 70	cm of stre	etched v	wire of
		sonometer. Fr		20 min 20 min A					. 40	
		(1) 120 Hz	(2)	128 Hz	(3)	112 Hz		(4) 240 Hz	Z	
	32.	A pipe closed	at one e	end produces	s a fund	amental i	note at 4	12 Hz. It i	is cut in	to two
		pieces of equa								
*		(1) 206 Hz, 41				824 Hz,				
		(3) 412 Hz, 82	24 Hz		(4)	206 Hz,	824 Hz			
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25. A liquid will not wet the surface of a solid if its angle of contact is :

(2) Less than 90°

(4) 90°

26. If σ is the Stefan's constant and b is the Wien's constant, then the dimensions of σb^4

- An α -particle and a proton are accelerated through same potential difference from rest. The ratio of their final velocities is:
 - (1) $\sqrt{2}:1$
- (2) 1:1
- (3) $1:\sqrt{2}$ (4) 1:2
- The resistance of a wire of uniform length L and diameter D is R. The resistance of 34. another wire of same material but length 4L and diameter 2D will be:
 - (1) 2R
- (2) R
- (3) $\frac{R}{2}$ (4) $\frac{R}{4}$
- A 10 μF capacitor is charged by a battery of emf 100 V. The energy drawn from the battery and the energy stored in the capacitor, are respectively:
 - (1) 0.10 J and 0.05 J

(2) 0.05 J and 0.10 J

(3) 1.0 mJ and 0.5 mJ

(4) 0.05 J and 0.05 J

PART - B

(CHEMISTRY)

36. In
$$\bigcirc$$
 $\stackrel{aq \ KOH}{\longrightarrow}$ product

Product is:

OH
$$(4) \bigcirc + CH_3 OK \text{ (mixture)}$$

37.
$$HC = CH + 2HCHO \xrightarrow{-OCH_3} X$$

X is:

- (1) $HOH_2C C \equiv C CH_2OH$
- (2) $HOH_2C C \equiv C CH_2OCH_3$

(3) Both are correct

(4) None is correct

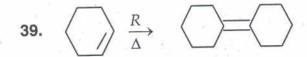
38.
$$H_2C = CH_2 \xrightarrow{hv} A$$

A is:

- (1) $H_2C = CH CH = CH_2$
- $(2) \quad H_3C CH = CH CH_2$

(3)

(4) None is correct



A can be:

(1) Conc. H₂SO₄

(2) alcoholic KOH

(3) Et_3N

(4) t-BuOK

40. Identify the correct statement:

- (1) Gypsum is obtained by heating Plaster of Paris
- (2) Plaster of Paris can be obtained by hydration of gypsum
- (3) Plaster of Paris contains higher percentage of calcium than does gypsum
- (4) Plaster of Paris is obtained from gypsum by oxidation

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41.
$$CH_3$$
 CH_3 CH_3 CH_3 product major product is:

(2)
$$CH_3$$
 CH_3

42. Perchloroethane is:

(2)
$$C_2Cl_6$$

(3)
$$CH_3 - CCl_3$$

43.
$$C_3H_6Cl_2$$
 (i) KCN (ii) H_3O^+ $H_3C CH-COOH$ A is: (iii) Δ CH_3

44.
$$Y \leftarrow Br_2 \longrightarrow COOH \longrightarrow HNO_3 \longrightarrow X$$

X and Y are:

- (1) Picric acid, 2, 4, 6 tribromophenol
- (2) 4-nitrosalicylic acid, 4-bromosalicylic acid
- (3) o-nitrophenol, o-bromophenol
- (4) None is correct

45. In
$$\bigcirc$$
 $\stackrel{C (CH_3)_3}{} \xrightarrow{KMnO_4}$ product

Product is:

(2) $(CH_3)_3C - COOH$

(3) Both are correct

- (4) None is correct
- **46.** If ΔH of a reaction is 100 KJ mol⁻¹, then activation energy must be :
 - (1) Less than 100 KJ mol⁻¹
- (2) Greater than 100 KJ mol⁻¹
- (3) Equal to 100 KJ mol^{-1}
- (4) None is correct
- 47. A gas expands against a constant external pressure of 2.00 atm, increasing its volume by 3.40 L. Simultaneously, the system absorbs 400 J of heat from its surroundings. What is ΔE , in joules for this gas?

$$(1)$$
 -689

$$(2) + 289$$

$$(3) -289$$

$$(4) + 400$$

48. Which reacts faster with conc. HCl?

(3)
$$CH_3 - C - OH$$

$$(4) \quad CH_2 = CH - CH_2OH$$

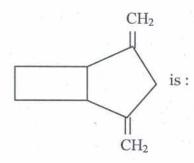
- **49.** \bigcirc -CH₂OH on dehydration with conc. H_2SO_4 forms predominantly :
 - (1) $\bigcirc = CH_2$

(2) CH₃

(3) $\left(\begin{array}{c} -CH_3 \end{array}\right)$

(4) None of these

50. Degree of unsaturation in



- (1) 2
- (2) 3
- (3) 4
- (4) 5
- 51. For an α -emitting isotope, the value of disintegration constant is 0.49×10^{-10} per year. The amount of the isotope of a given sample will reduce to half its value after a period (in years) of nearly:
 - (1) 0.45×10^{10}

(2) 0.9×10^{10}

(3) 1.41×10^{10}

- (4) 2.82×10^{10}
- **52.** Number of photons of light of wavelength 4000 \mathring{A} required to provide 1.00 J of energy is:
 - (1) 2.01×10^{18}

(2) 12.01×10^{31}

(3) 1.35×10^{17}

(4) None is correct

- Vander Waal's equation for one mole of CO₂ gas at low pressure will be:
 - $(1) \left(P + \frac{a}{V^2}\right) V = RT$

(2) $P(V-b) = RT - \frac{a}{V^2}$

 $(3) \quad P = \frac{RT}{V_{c}}$

- (4) $P = \left(\frac{RT}{V h} \frac{a}{V^2}\right)$
- A gas in an open container is heated from 27°C to 127°C, the fraction of the original amount of gas remaining in the container will be:
 - (1) 3/4
- (2) 1/2
- (3) 1/4
- (4) 1/8
- The temperature at which a real gas obeys the ideal gas laws over a fairly wide range of pressure is:
 - (1) Critical temperature
- (2) Inversion temperature

- (3) Boyle's temperature
- (4) Reduced temperature
- Which of the following is not true for resonance?
 - (1) Identical arrangement of atoms
- (2) Identical bonding
- (3) Same no. of paired electron
- (4) Structure with same energies
- **57.** The geometry of $Ni(CO)_4$ and $Ni(PPh_3)_2$ Cl_2 are :
 - (1) Both square planar

(2) Tetrahedral and square planar

(3) Both tetrahedral

- (4) Square planar and tetrahedral
- **58.** The paramagnetism of O_2 molecule is believed to be due to the presence of two electrons with parallel spins in:
 - (1) Bonding π orbitals

(2) Antibonding π orbitals

(3) Bonding σ orbitals

- (4) Antibonding σ orbitals
- Trisoxalato aluminate (III) ion is:
 - (1) $[Al(C_2O_4)_3]$

(3) $\left[Al\left(C_2O_4\right)_3\right]^{2-}$

(2) $\left[Al\left(C_{2}O_{4}\right)_{3}\right]^{3+}$ (4) $Al\left[\left(C_{2}O_{4}\right)_{3}\right]^{3-}$

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60. $[CrF_6]^{3-}$ has Cr atom hybridized.

	$(1) sp^2d^2$	$(2) d^2sp^3$	$(3) dsp^2$	$(4) sp^3d$					
61.			equivalent weight	of barium in BaCrO	used as				
	oxidizing agent ir	n acid medium is :							
	(1) 137.34	(2) 45.78	(3) 114.45	(4) 68.67					
62.	The density of 1 N	M solution of NaCl	is 1.0585 g/ml. The 1	molality of the soluti	on is:				
	(1) 1.0585	(2) 1.00	(3) 0.10	(4) 0.0585					
63.	The strength of a	n Oxo acid (E-O-H)	where E is the centr	al atom, depends up	on the :				
	(1) Electronegati			, 1					
	(2) Atomic size of								
	(3) Ability of E to	share electron pai	r with O						
	(4) Atomic size a	nd electronegativit	y of E.						
2.2		275412.23			·				
64.		$2CuSO_4 + 4KI \rightarrow Cu_2I_2 + 2K_2SO_4 + I_2$ I_2 obtained from 0.1 mole of $CuSO_4$ sample							
	required 100 ml o	of 1 M hypo, hence	mole percentage of p	oure $CuSO_4$ is:					
	(1) 100	(2) 50	(3) 25	(4) None is cor	rect				
65.	The hybridization	n of carbon atoms in	C – C single bond	of $HC \equiv C - CH = CH$	<i>I</i> ₂ is:				
	$(1) sp^3 - sp^3$		$(2) sp - sp^2$						
	$(3) sp^2 - sp^2$		$(4) sp^3 - sp$						
66.	What is normalit	v of 0.30 M H ₂ PO ₄	(a tribasic acid) in	the following reaction	on?				
		y 4		O					
	$H_3PO_4 + 2OH^$	$\rightarrow HPO_4^{2-} + 2H_2O$							
	(1) 0.30 N	(2) 0.60·N	(3) 0.90 N	(4) 0.15 N					
67.	At 25°C, the va	pour pressure of p	oure methyl alcohol	is 92.0 torr. Mole f	raction of				
	CH ₂ OH in a solu	ution in which vapo	our pressure of CH ₃	OH is 23.0 torr at 25	°C is:				
	9	Ţ	1	1 (4)					
	(1) 0.25	(2) 0.75	(3) 0.50	(4) 0.66					
	(1) 0.25	(2) 0.75	(3) 0.50	(4) 0.66					
врн-	(1) 0.25 EE-2018/(SET - Y)/(220 5	(3) 0.50	(4) 0.66	P. T. O.				

- **68.** Which has maximum osmotic pressure at temperature T?
 - (1) 100 ml of 1 M urea solution
 - (2) 300 ml of 1 M glucose solution
 - (3) Mixture of 100 ml of 1 M urea solution and 300 ml of 1M glucose solution
 - (4) All are isotonic
- **69.** Rate constant of a reaction is 0.0693 min⁻¹, starting with 10 mol, rate of reaction after 10 min is:
 - (1) $0.693 \text{ mol min}^{-1}$

- (2) $0.0693 \times 2 \text{ mol min}^{-1}$
- (3) $0.0693 \times 5 \text{ mol min}^{-1}$
- (4) $0.0693 \times (5)^2 \text{ mol min}^{-1}$
- **70.** Equilibrium constant for the reaction :

$$NH_4OH + H^+ \rightleftharpoons NH_4^+ + H_2O$$

is 1.8×10^9 . Hence equilibrium constant for $NH_3(aq) + H_2O \rightleftharpoons NH_4^+ + {}^-OH$ is :

- (1) 1.8×10^{-5} (2) 1.8×10^{5}
- (3) 1.8×10^{-9} (4) 5.55×10^{-10}

OPTIONAL

PART - C (i)

(MATHEMATICS)

71. A random variable X has the following probability distribution values of X:

X:	1	2	3	4	5
P(X):	k	3k	2k	k	2k

Then the value of P(X < 3) is:

- (1) $\frac{6}{9}$
- (2) $\frac{1}{9}$
- (3) $\frac{4}{9}$
- (4) $\frac{7}{9}$

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- **72.** A unit vector perpendicular to each of the vectors $-6\hat{i} + 8\hat{k}$ and $8\hat{i} + 6\hat{k}$ forming a right handed system is:
 - (1) \hat{j}

(2) $-\hat{j}$

(3) $\frac{1}{10}(6\hat{i} + 8\hat{k})$

- (4) $\frac{1}{10}(-6\hat{i} + 8\hat{k})$
- Which of the following is not associated with any LPP ?
 - (1) Feasible Solution

(2) Optimum Solution

(3) Basic Solution

- (4) None of these
- The distance of the plane 2x 3y + 6z + 14 = 0 from the origin is :
 - (1) 14
- (2) 2
- (4) 11
- **75.** The direction cosines of the line joining the points (4, 3, -5) and (-2, 1, -8) are:
- (1) < 2, 4, -13 > (2) < 6, 2, 3 > (3) $< \frac{6}{7}, \frac{2}{7}, \frac{3}{7} >$ (4) None of these

- **76.** If $x^y = e^{x-y}$, then $\frac{dy}{dx}$ is:
 - $(1) \frac{\log x}{(1+\log x)^2}$
- (2) $\frac{1}{(1+\log x)^2}$
- (3) $\frac{\log x}{(1-\log x)}$

- $(4) \log x(\log ex)^{-1}$
- **77.** If x be real, the minimum value of $x^2 8x + 17$ is:
 - (1) -1
- (2) 0
- (3) 1

- The value of $\int \frac{2e^x}{e^{2x}+1} dx$ is equal to:
 - (1) $\log (e^x + e^{-x}) + c$

(2) $2 \tan^{-1}(e^x) + c$

(3) $\log (1 + e^{2x}) + c$

(4) $\tan^{-1}(2e^x + 1) + c$

- **79.** The area bounded by the curve $y^2 = 4x$ and $x^2 = 4y$ is:
 - (1) $\frac{16}{3}$ sq. units

(2) $\frac{3}{16}$ sq. units

(3) $\frac{14}{3}$ sq. units

- (4) $\frac{3}{14}$ sq. units
- **80.** The solution of the differential equation $\frac{dy}{dx} + \frac{y}{x} = x^2$ is:
 - (1) $x+y=\frac{x^2}{2}+c$

(2) $xy = \frac{1}{4}x^4 + c$

(3) $x-y = \frac{1}{3}x^3 + c$

- (4) $y-x = \frac{1}{4}x^4 + c$
- **81.** Domain of the function $y = \sqrt{4 x^2}$ is:
 - (1) R [0, 2], where R is the set of real numbers
 - (2) [-2,2]
 - (3) [0, 2]
 - (4) $(-\infty, -2) \cup (2, \infty)$
- **82.** Let X be the universal set for sets A and B. If n(A) = 200, n(B) = 300 and $n(A \cap B) = 100$, $n(A^c \cap B^c) = 300$, then n(X) is equal to:
 - (1) 500
- (2) 600
- (3) 700
- (4) 400

- **83.** The value of $\tan \left[\cos^{-1}\left(\frac{4}{5}\right) + \tan^{-1}\left(\frac{2}{3}\right)\right]$ is:
 - (1) $\frac{17}{6}$
- (2) $\frac{16}{7}$
- (3) $\frac{6}{17}$
- (4) None of these

- **84.** If $\sec A + \tan A = \frac{3}{2}$, then:
 - (1) $\sin A = \frac{12}{13}$

(2) $\sin 2A = \frac{5}{13}$

(3) $\sin A = \frac{5}{13}$

(4) $\sin 2A = \frac{12}{13}$

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- **85.** If *n* is a positive integer, then $2.4^{2n+1} + 3^{3n+1}$ is divisible by :
 - (1) 27
- (2) 11
- (4) 9
- **86.** If $\frac{1}{b+c}$, $\frac{1}{c+a}$ and $\frac{1}{a+b}$ are in A. P., then a^2 , b^2 and c^2 are in :
 - (1) Geometric Progression
- (2) Arithmetic Progression
- (3) Harmonic Progression
- (4) None of these
- The equation of the straight line passing through the point (2, 3) and making intercepts on axes equal in magnitude and sign is:
 - (1) x + y = 3
- (2) x y = 5
- (3) x + y = -5 (4) x + y = 5
- The foci of an ellipse are $(\pm 4,0)$ and vertices at $(\pm 5,0)$. Then the equation of the ellipse is:
 - (1) $\frac{x^2}{25} + \frac{y^2}{9} = 1$

(2) $\frac{x^2}{9} + \frac{y^2}{16} = 1$

(3) $9x^2 + 25y^2 = 1$

- (4) None of these
- The point which divides the line joining the points (2, 4, 5) and (3,5,-4) in the ratio -2:3 lies on:
 - (1) ZOX plane
- (2) XOY plane
- (3) YOZ plane
- (4) None of these

- The value of $\lim_{x\to 0} \frac{x}{1-\sqrt{1-x}}$ is: 90.
 - $(1) \sqrt{2}$
- (3) $\frac{1}{2\sqrt{2}}$
- (4) 0

- Which is not correct?
 - (1) Each of the two complex roots of unity is the square of the other.
 - (2) Sum of the three cube roots of unity is zero.
 - (3) Product of the three cube roots of unity is one.
 - (4) None of these

					**		
92.	If $(1+i)$ is a root	of the equat	ion x^2	+ax+2=0). where a	$\in R$, then the va	lue of 'a' is:
	(1) -2	(2) 2		(3) 1		(4) -1	
93.	Solution set of in	nequality 3x	$ x-2 \leq \frac{1}{2}$	· is:			
e	(1) $\left[-\frac{1}{2},\frac{1}{2}\right]$			(2)	$\frac{1}{2}, \frac{5}{6}$		



(2) 15

- **94.** Sum of all the odd divisors of 720 is:
 (1) 78
 (2) 76
 (3) 84
 (4) 80
- **95.** The binomial co-efficient of the 4th term in the expansion of $(x-q)^5$ is:
- **96.** If $x = a\cos^3 \theta$, $y = a\sin^3 \theta$, then $\frac{dy}{dx}$ is equal to :

 (1) cot t

 (2) cos t

 (3) tan t

 (4) tan t
- **97.** If X, M, Z are denoting Mean, median and mode of a data and X: M = 9:8, then the ratio M: Z is given by :

(3) 10

(4) 20

- (1) 8:9 (2) 4:3 (3) 7:6 (4) 5:4
- **98.** Two dice are rolled together, the probability that the total score on the two dice is greater than 10 is given by :
 - (1) $\frac{1}{4}$ (2) $\frac{1}{6}$ (3) $\frac{1}{12}$ (4) $\frac{5}{6}$
- **99.** If $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$, then $A^2 + 2A$ is equal to:
 - (1) 3A · (2) 4A (3) 2A (4) A

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(1) 5

101.

102.

103.

104.

105.

106.

100.	The va	llue	of	the	determinant
------	--------	------	----	-----	-------------

		x 1	y+z	
	1	y = 2	$\begin{vmatrix} y+z \\ z+x \end{vmatrix}$ is:	
(1)				
(1)	$x + y + z \tag{2} 0$		1	(4) $(1+x+y+z)$
	10		DNAL	
			– C (ii)	
			OGY)	
Pri	mary carboxylation occurs in C3 and	C4	plants with the h	elp of :
	PEP carboxylase and pyruvate carb			
(2)	PEP carboxylase and RuBP carboxy RuBP carboxylasae and PEP carbox			_ * *
	RuBP carboxylasae and pyruvate ca			
			vij	
is:	compared to anaerobic respiration,	me	energy gained o	luring aerobic respiration
(1)	8 times (2) 12 times	(3)	19 times	(4) 36 times
Fru	it and leaf drop at early stages can b	e pr	evented by the ap	oplication of :
	Cytokinins		Ethylene	
(3)	Auxins	(4)	Gibberellic acid	
The	e dental formula for humans (as well	as a	pes and some me	onkeys) is :
	2-1-6-2 (2) 2-1-2-2		2-1-2-3	(4) 2-2-1-3
Tot	al oxygen that can be carried by bloo	d in		
(1)	1000-1200 ml	(2)	2000-3000 ml	
(3)	200 ml	(4)	100 ml	
Ves	sels and fibers occurs in :	42		
(1)	Xylem of angiosperms	(2)	Xylem of gymno	osperms
(3)	Xylem of pteridophytes	(4)	All of the above	*

(4) All of the above

107.	Tendon and ligament are examples of :					
	(1) Loose connective tissues	(2) Special connective tissues				
	(3) Dense irregular connective tissues	(4) Dense regular connective tissues				
108.	Prokaryotic genetic system has:					
	(1) DNA but no histones	(2) Both DNA and histones				
	(3) Neither DNA nor histones	(4) Either DNA or histone				
109.	In order to enter the cell cycle of cell n molecule provides this stimulation?	nust be stimulated from outside. What type of				
	(1) Cyclins	(2) Cyclins-dependent kinases				
	(3) Cytokines and growth factors	(4) Tyrosine				
110.	The absorption of minerals due to difference use of energy is:	erence in the electro potential gradient without				
9	(1) Active absorption	(2) Passive absorption				
	(3) Osmotic absorption	(4) None of the above				
111.	Which of the following is developed by	parthenogenesis?				
	(1) Drones	(2) Queen honey bee				
	(3) Worker honey bee	(4) Both (2) and (3)				
112.	Apomixis is a type of reproduction that results in the development of a/an:					
	(1) New organism without fusion of ga	ametes.				
	(2) New organisms from fusion produ	cts of gametes				
	(3) Embryo from endosperm					
3	(4) Embryo from nucleus					
113.	Medical Termination of Pregnancy (M of pregnancy ?	TP) is considered safe up to how many weeks				
5	(1) Six weeks (2) Eight weeks	(3) Twelve weeks (4) Eighteen weeks				
114.	Conditions of a karyotype 2n ± 1 and 2	n ± 2 are called :				
	(1) Aneuploidy	(2) Polyploidy				
	(3) Klinfelter's & Turner's syndrome	(4) Monosomy				
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The clouds of cosmic dust and gase be formed by condensation, is called	es from which the entire solar system is bel d :	ieved to			
(1) Ylem (2) Whey	(3) Cosmos (4) Galaxy				
Bacillus thuringiensis forms protein protein :	n crystals which contain insecticidal prote	ein. This			
(1) Binds with epithelial cells of mi	dgut of the pest ultimately killing it.				
Walter and the second s					
		,			
(1) Hydrach					
(3) Monarch	(4) None of the above				
The term Alpha diversity refers to:					
(1) Genetic diversity	(2) Species diversity				
(3) Ecosystem diversity	(4) None of the above				
Montreal protocol is related to the:					
(1) Global warming	(2) Ozone layer depletion				
(3) Sustainable development	(4) Greenhouse gases				
During DNA replication, Okazaki fr	ragments are used to elongate:				
(1) The lagging strand towards replication fork.					
(2) The leading strand away from replication fork.					
(4) The leading strand towards repl	lication fork.				
Infection of Ascaris occurs due to:					
(1) Contaminated food and water	(2) Mosquito bite				
(3) Tse-tse fly	(4) Sand fly				
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	be formed by condensation, is called (1) Ylem (2) Whey Bacillus thuringiensis forms protein protein: (1) Binds with epithelial cells of mid (2) Does not kill the carrier bacterial (3) Is activated by acid pH of the following the common examples of temporary (4) Is coded by several genes included the common examples of temporary (1) epiphytes (3) bed bug, leech and mosquito the succession taking place on rock (1) Hydrach (3) Monarch The term Alpha diversity refers to: (1) Genetic diversity (3) Ecosystem diversity Montreal protocol is related to the: (1) Global warming (3) Sustainable development During DNA replication, Okazaki for (1) The lagging strand towards repercent to the leading strand away from the lagging strand away from the lagging strand away from the lagging strand towards repercent to the leading strand towards repercent to the leading strand away from the lagging strand away from the lagging strand towards repercent to the leading strand towards repercent to the leading strand away from the lagging strand away from the lagging strand away from the lagging strand towards repercent to the leading strand towards reperc	Bacillus thuringiensis forms protein crystals which contain insecticidal proteroretein: (1) Binds with epithelial cells of midgut of the pest ultimately killing it. (2) Does not kill the carrier bacterium which is itself resistant to this toxin (3) Is activated by acid pH of the foregut of the insect pest (4) Is coded by several genes including the cry gene. The common examples of temporary parasites includes: (1) epiphytes (2) sucker fish (3) bed bug, leech and mosquito (4) rhizobium The succession taking place on rock is known as			

of

123.	Name the process by which the nutrition biological means such as conventional pl	nal quality of food crops is improved through ant breeding.
	(1) Hybridization	(2) Nutrification
	(3) Bioaccumulation	(4) Biofortification
124.	In which of the following year the Yamu	na Action Plan (YAP) was implemented?
	(1) 1987 (2) 1991	(3) 1993 (4) 1999
125.	To remove negatively charged molecules are separated by applying:	lles through matrix of agarose, nucleic acid
	(1) Electrical field	(2) Electric current
	(3) Magnetic field	(4) UV radiation
126.		ic aids can give comprehensive account of
		one genus or family at a particular time?
	(1) Taxonomic key	(2) Flora
	(3) Herbarium	(4) Monograph
127.	In five kingdom system, the main basis	
	(1) Structure of cell wall	(2) Nutrition
	(3) Structure of nucleus	(4) Reproduction
128.	. Who proposed artificial system of class	ification?
	(1) John Ray (2) Lamarck	(3) Linnaeus (4) Wallace
129.	Flame cells present in Platyhelminthes	are specialized in:
	(1) Respiration and adsorption	(2) Respiration and excretion
	(3) Osmoregulation and excretion	(4) Sosmoregulation and circulation
130	 Vexillary aestivation is characteristic o 	f family:
	(1) Fabaceae (2) Solanaceae	(3) Liliaceae (4) Brassicaceae

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

BPH-EE-2018(SET-Y)

			* W	10043
			Sr. No.	
Time: 11/4 Hours (75 minutes)	Total Questic	ons : 130		Max. Marks: 10
Candidate's Name			_ Date of Birth_	
Father's Name		Mother's Nar	ne	
Roll No. (in figures)	(in words) _	2/		
Date of Exam :				
(Signature of the Invigilator)			(Signature of	of the Candidate)

CANDIDATES MUST READ THE FOLLOWING INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER & FOLLOW THEM.

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

PART – A (PHYSICS)

1.	 The frequency of ultraviolet light 	t is of the order of:	* (B)
	(1) 10^7 Hz (2) 10^{10} Hz	(3) 10^{12} Hz	(4) 10^{15}Hz
2.	In Young's double slit experim	ment, nth bright fringe o	of red light $(\lambda_1 = 7500 \text{ Å})$
	coincides with (n + 1)th bright fri	inge of green light ($\lambda_2 = 600$	00 Å). The value of n is:
	(1) 4 (2) 5	(3) 3	(4) 2
3.	. An endoscope is employed to vi	iew the internal parts of th	ne body. It is based on the
ï	principle of :		
	(1) Reflection	(2) Refraction	
	(3) Total internal reflection	(4) Dispersion	
4.	respectively. The length of the te		
	(1) 196 cm (2) 204 cm	(3) 250 cm	(4) 225 cm
5.	. Which of the following series of	hydrogen spectrum is in th	e visible region?
	(1) Lymann series	(2) Balmer series	
	(3) Paschen series	(4) Bracket series	
6.	Two cells, each of emf E and ir	nternal resistance r are con	nected in parallel across
	resistor R. The power delivered	to the resistor is maximum	if:
	(1) $R = \frac{r}{2}$ (2) $R = r$	(3) R = 2r	(4) $R = 0$

7. A steel wire of length l has a magnetic moment M, it is bent into L shape from middle.

(2) $\frac{M}{2}$ (3) $\sqrt{2}M$

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The new magnetic moment is:

(4) 2M

7	,	١,
b		
L		
ŀ		,
k		9
ř		

8.	A proton, a deut	eron and an α-particl	e enter a magnetic f	ield perpendicular to it wit	h
	same velocities.	What is the ratio of ra	dii of circular path?		
	(1) 1:2:2	(2) 2:1:1	(3) 1:1:2	(4) 1:2:1	
9.			is 125 mH, then th	ne self-inductance of simila	r
	coil of 800 turns	is:			
	(1) 48.8 mH	(2) 200 mH	(3) 187.5 mH	(4) 320 mH	
10.			ry, $C = 0.5 \mu F$ and	R = 100 ohm in series, th	e
	resonance freque	ency in Hz is:			
	(1) 600	(2) 600π	(3) $\frac{250}{\pi}$	(4) 5000	
11.	A tuning fork p	produces 8 beats/sec	with both, 80 and	70 cm of stretched wire of	ıf
	sonometer. Freq	uency of the fork is:			
	(1) 120 Hz	(2) 128 Hz	(3) 112 Hz	(4) 240 Hz	

2. A pipe closed at one end produces a fundamental note at 412 Hz. It is cut into two pieces of equal length. The fundamental frequencies produced in the two pieces are:

(1) 206 Hz, 412 Hz

(2) 824 Hz, 1648 Hz

(3) 412 Hz, 824 Hz

(4) 206 Hz, 824 Hz

13. An α -particle and a proton are accelerated through same potential difference from rest. The ratio of their final velocities is :

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

(2) 1:1

(3) $1:\sqrt{2}$

(4) 1:2

14. The resistance of a wire of uniform length L and diameter D is R. The resistance of another wire of same material but length 4L and diameter 2D will be:

(1) 2R

(2) R

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

 $(4) \quad \frac{R}{4}$

15.	battery and the energy stored in the cap	ery of emf 100 V. The energy drawn from the pacitor, are respectively:
	(1) 0.10 J and 0.05 J	(2) 0.05 J and 0.10 J
	(3) 1.0 mJ and 0.5 mJ	(4) 0.05 J and 0.05 J
16.	, , , , , , , , , , , , , , , , , , , ,	ertain height h above the ground, it's P. E and it above the ground, P. E and K. E will be in the
	(1) $4h$ (2) $\frac{h}{4}$	(3) $5h$ (4) $\frac{h}{5}$
17.		nertia I and 2I respectively about the axis of ation are equal, their angular momenta will be
	(1) $1:2$ (2) $\sqrt{2}:1$	(3) $1:\sqrt{2}$ (4) $2:1$
18.		of the earth. The radius of the planet is twice y from the earth is v, then the escape velocity
	$(1) \sqrt{3}v \qquad \qquad (2) \sqrt{2}v$	$(3) v \qquad \qquad (4) \sqrt{5}v$
19.	If the earth shrinks such that it's mass quarter of it's original value then one co	s does not change but radius decreases to one omplete day will be of :
	(1) 96 hrs (2) 48 hrs	(3) 6 hrs (4) 1.5 hrs
20.	A liquid will not wet the surface of a so	olid if its angle of contact is:
	(1) zero	(2) Less than 90°
	(3) more than 90°	(4) 90°
21.	If σ is the Stefan's constant and b is th	ne Wien's constant, then the dimensions of σb^4
	are:	
	$(1) \left[M^0 L^0 T^0 \right]$	(2) $\left[M^{1}L^{-2}T^{1}\right]$
	(3) $\left[M^{1}L^{6}T^{-3}\right]$	(4) $\left[M^{1}L^{4}T^{-3}\right]$
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1	
22.	A boy is hanging from a horizontal branch of a tree. The tension in the arms will be
	maximum when the angle between the arms is:
	(1) 0° (2) 60° (3) 90° (4) 120°
23.	A body is projected such that it's K.E at the top is $\frac{3}{4}$ th of it's initial K.E. What is the
	angle of projection with horizontal?
	(1) 30° (2) 60° (3) 45° (4) 120°
24.	A bomb of mass 16 kg at rest explodes into two pieces of masses 4 kg and 12 kg. The
	velocity of the 12 kg mass is 4 m/s. The kinetic energy of the other mass is :
	(1) 288 J (2) 192 J (3) 96 J (4) 144 J

The potential energy of a long spring when stretched by 2 cm is u. If the spring is stretched by 8 cm, the potential energy stored in it is:

(4) 144 J

(1) $\frac{u}{4}$ (3) 16u (4) 8u

The rest mass of a photon is: 26.

> (1) $\frac{hv}{c}$ (3) $\frac{hc}{\lambda}$ (2) $\frac{hv}{c^2}$ (4) zero

27. For nuclear fission to take place the neutrons must have:

(1) Very very low energy (2) Thermal energy (3) Very high energy (4) No kinetic energy

The half value period of a radioactive nuclide is 3 hours. In 9 hours, it's activity will be reduced to:

(3) $\frac{1}{6}$ (2) $\frac{1}{27}$ $(4) \frac{1}{8}$

29. Digital circuits can be made by repetitive use of :

(1) OR gate (3) NOT gate (2) AND gate (4) NAND gate

- 30. In a common base transistor amplifier the current gain is:
 - (1) One
- (2) More than one (3) Less than one (4) Infinite

- Two rain drops reach the earth with different terminal velocities having ratio 9:4. Then the ratio of their volume is:
 - (1) 3:2
- (2) 4:9
- (3) 9:4
- (4) 27:8
- 32. A gas undergoes an adiabatic change it's specific heat in the process is:
 - (1) zero
- (2) 1
- (4) 0.5
- 33. At which of the following temperatures would the molecules of a gas have twice the average kinetic energy they have at 27°C?
 - (1) 327°C
- (2) 377°C (3) 397°C
- (4) 587°C
- 34. A refrigerator absorbs 2000 cals of heat from ice trays. If coefficient of performance is 4, then work done by the motor is:
 - (1) 2100 J
- (2) 4200 J
- (3) 8400 J
- (4) 500 J
- When the displacement is half of the amplitude, then what fraction of the total energy of a simple harmonic oscillator is kinetic?
 - (1) $\frac{2}{7}$ th
- (2) $\frac{3}{4}$ th
- (3) $\frac{2}{9}$ th (4) $\frac{5}{7}$ th

PART - B

(CHEMISTRY)

 $\xrightarrow{Alcoholic}$ product CH_3 36. major product is:

- CH₃

- CH₃CH₃
- CH₃

37. Perchloroethane is:

(1) $CH_3CH_2ClO_4$

(2) C_2Cl_6

(3) $CH_3 - CCl_3$

(4) CCl₃.CHO

38.
$$C_3H_6Cl_2$$
 (i) KCN A (ii) H_3O^+ $H_3C CH-COOH$ A is: (iii) Δ CH_3

- (1) 1, 1 dichloropropane
- (2) 1, 2-dichloropropane
- (3) 2, 2 dichloropropane
- (4) 1, 3-dichloropropane

39.
$$Y \leftarrow Br_2 \longrightarrow COOH \longrightarrow HNO_3 \longrightarrow X$$

X and Y are:

- (1) Picric acid, 2, 4, 6 tribromophenol
- (2) 4-nitrosalicylic acid, 4-bromosalicylic acid
- (3) o-nitrophenol, o-bromophenol
- (4) None is correct

40. In
$$\bigcirc$$
 $\stackrel{C (CH_3)_3}{\longrightarrow} \xrightarrow{KMnO_4}$ product

Product is:

(2) $(CH_3)_3C - COOH$

(3) Both are correct

(4) None is correct

- **41.** If ΔH of a reaction is 100 KJ mol⁻¹, then activation energy must be:
 - (1) Less than 100 KJ mol⁻¹
- (2) Greater than 100 KJ mol⁻¹
- (3) Equal to 100 KJ mol⁻¹
- (4) None is correct
- **42.** A gas expands against a constant external pressure of 2.00 atm, increasing its volume by 3.40 L. Simultaneously, the system absorbs 400 J of heat from its surroundings. What is ΔE , in joules for this gas?
 - (1) -689
- (2) + 289
- (3) -289
- (4) + 400

- 43. Which reacts faster with conc. HCl?
 - (1) O-CH₂CH₂OH

(2) \bigcirc $CH-CH_3$ OH

(3) $CH_3 - C - OH$ $CH_3 - C - OH$

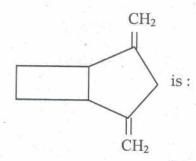
- $(4) \quad CH_2 = CH CH_2OH$
- **44.** \bigcirc -CH₂OH on dehydration with conc. H_2SO_4 forms predominantly :
 - (1) CH_2

(2) CH₃

(3) (=)-CH₃

(4) None of these

45. Degree of unsaturation in



- (1) 2
- (2) 3
- (3) 4
- (4) 5

46. What is normality of 0.30 M H_3PO_4 (a tribasic acid) in the following reaction?

$$H_3PO_4 + 2OH^- \rightarrow HPO_4^{2-} + 2H_2O$$

- (1) 0.30 N
- (2) 0.60 N
- (3) 0.90 N
- (4) 0.15 N

47. At 25°C, the vapour pressure of pure methyl alcohol is 92.0 torr. Mole fraction of CH_3OH in a solution in which vapour pressure of CH_3OH is 23.0 torr at 25°C is:

- (1) 0.25
- (2) 0.75
- (3) 0.50
- (4) 0.66

48. Which has maximum osmotic pressure at temperature T?

- (1) 100 ml of 1 M urea solution
- (2) 300 ml of 1 M glucose solution
- (3) Mixture of 100 ml of 1 M urea solution and 300 ml of 1M glucose solution
- (4) All are isotonic

49. Rate constant of a reaction is 0.0693 min⁻¹, starting with 10 mol, rate of reaction after 10 min is:

(1) $0.693 \text{ mol min}^{-1}$

- (2) $0.0693 \times 2 \text{ mol min}^{-1}$
- (3) $0.0693 \times 5 \text{ mol min}^{-1}$
- (4) $0.0693 \times (5)^2 \text{ mol min}^{-1}$

50.	Equilibrium	constant	for	the	reaction	
00.	Lidampirari	COLIDERTIE	TOT	LILL	TOUCHE	13

$$NH_4OH + H^+ \rightleftharpoons NH_4^+ + H_2O$$

is 1.8×10^9 . Hence equilibrium constant for $NH_3(aq) + H_2O \rightleftharpoons NH_4^+ + {}^-OH$ is :

- (1) 1.8×10^{-5}

- (2) 1.8×10^5 (3) 1.8×10^{-9} (4) 5.55×10^{-10}
- **51.** Which of the following is not true for resonance?
 - (1) Identical arrangement of atoms
- (2) Identical bonding
- (3) Same no. of paired electron
- (4) Structure with same energies
- The geometry of $Ni(CO)_4$ and $Ni(PPh_3)_2$ Cl_2 are: 52.
 - (1) Both square planar

(2) Tetrahedral and square planar

(3) Both tetrahedral

- (4) Square planar and tetrahedral
- 53. The paramagnetism of O_2 molecule is believed to be due to the presence of two electrons with parallel spins in:
 - (1) Bonding π orbitals

(2) Antibonding π orbitals

(3) Bonding σ orbitals

- (4) Antibonding σ orbitals
- Trisoxalato aluminate (III) ion is: 54.
 - (1) $[Al(C_2O_4)_3]$

(2) $\left[Al\left(C_{2}O_{4}\right)_{3}\right]^{3+}$

(3) $\left[Al\left(C_{2}O_{4}\right)_{3}\right]^{2-}$

- (4) $Al[(C_2O_4)_3]^{3-}$
- **55.** $[CrF_6]^{3-}$ has Cr atom hybridized.
 - (1) sp^2d^2 (2) d^2sp^3 (3) dsp^2
- (4) sp^3d
- **56.** Atomic wt. of barium is 137.34. The equivalent weight of barium in BaCrO₄ used as oxidizing agent in acid medium is:
 - (1) 137.34
- (2) 45.78
- (3) 114.45
- (4) 68.67

- **57.** The density of 1 M solution of NaCl is 1.0585 g/ml. The molality of the solution is : .
 - (1) 1.0585
- (2) 1.00
- (3) 0.10
- (4) 0.0585
- The strength of an Oxo acid (E-O-H) where E is the central atom, depends upon the : 58.
 - (1) Electronegativity of E
 - (2) Atomic size of E
 - (3) Ability of E to share electron pair with O
 - (4) Atomic size and electronegativity of E.
- $2CuSO_4 + 4KI \rightarrow Cu_2I_2 + 2K_2SO_4 + I_2$ I_2 obtained from 0.1 mole of $CuSO_4$ sample required 100 ml of 1 M hypo, hence mole percentage of pure $\ensuremath{\textit{CuSO}}_4$ is :
 - (1) 100
- (2) 50
- (3) 25
- (4) None is correct
- **60.** The hybridization of carbon atoms in C C single bond of $HC = C CH = CH_2$ is:
 - (1) $sp^3 sp^3$
- (2) $sp sp^2$
- (3) $sp^2 sp^2$ (4) $sp^3 sp$

61. In
$$\bigcirc$$
 $\stackrel{aq\ KOH}{\longrightarrow}$ produc

Product is:

62.
$$HC = CH + 2HCHO \xrightarrow{-OCH_3} X$$

X is:

- (1) $HOH_2C C \equiv C CH_2OH$
- (2) $HOH_2C-C \equiv C-CH_2OCH_3$

(3) Both are correct

(4) None is correct

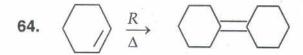
63.
$$H_2C = CH_2 \xrightarrow{hv} A$$

A is:

- (1) $H_2C = CH CH = CH_2$
- (2) $H_3C CH = CH CH_2$

(3)

(4) None is correct



A can be:

(1) Conc. H_2SO_4

(2) alcoholic KOH

(3) Et_3N

(4) t-BuOK

65. Identify the correct statement :

- (1) Gypsum is obtained by heating Plaster of Paris
- (2) Plaster of Paris can be obtained by hydration of gypsum
- (3) Plaster of Paris contains higher percentage of calcium than does gypsum
- (4) Plaster of Paris is obtained from gypsum by oxidation
- 66. For an α -emitting isotope, the value of disintegration constant is 0.49×10^{-10} per year. The amount of the isotope of a given sample will reduce to half its value after a period (in years) of nearly :
 - (1) 0.45×10^{10}
- (2) 0.9×10^{10}
- (3) 1.41×10^{10}
- (4) 2.82×10^{10}

- Number of photons of light of wavelength 4000 Å required to provide 1.00 J of energy is:
 - (1) 2.01×10^{18}
- (2) 12.01×10^{31} (3) 1.35×10^{17}
- (4) None is correct
- Vander Waal's equation for one mole of ${\it CO}_2\,$ gas at low pressure will be :

$$(1) \quad \left(P + \frac{a}{V^2}\right) V = RT$$

(2)
$$P(V-b) = RT - \frac{a}{V^2}$$

$$(3) \quad P = \frac{RT}{V - b}$$

$$(4) P = \left(\frac{RT}{V - b} - \frac{a}{V^2}\right)^{-1}$$

- A gas in an open container is heated from 27°C to 127°C, the fraction of the original amount of gas remaining in the container will be:
 - $(1) \ 3/4$
- (2) 1/2
- (3) 1/4
- (4) 1/8
- The temperature at which a real gas obeys the ideal gas laws over a fairly wide range of pressure is:
 - (1) Critical temperature
- (2) Inversion temperature

(3) Boyle's temperature

(4) Reduced temperature

OPTIONAL

PART - C (i)

(MATHEMATICS)

71. If $x^y = e^{x-y}$, then $\frac{dy}{dx}$ is:

$$(1) \quad \frac{\log x}{(1+\log x)^2}$$

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

$$(3) \quad \frac{\log x}{(1-\log x)}$$

- $(4) \log x (\log ex)^{-1}$
- **72.** If x be real, the minimum value of $x^2 8x + 17$ is:
 - (1) -1
- (2) 0
- (3) 1
- (4) 2

- **73.** The value of $\int \frac{2e^x}{e^{2x} + 1} dx$ is equal to : (1) $\log (e^x + e^{-x}) + c$

(2) $2 \tan^{-1}(e^x) + c$

(3) $\log (1+e^{2x})+c$

- (4) $\tan^{-1}(2e^x + 1) + c$
- The area bounded by the curve $y^2 = 4x$ and $x^2 = 4y$ is:
 - (1) $\frac{16}{3}$ sq. units

(2) $\frac{3}{16}$ sq. units

(3) $\frac{14}{3}$ sq. units

- (4) $\frac{3}{14}$ sq. units
- The solution of the differential equation $\frac{dy}{dx} + \frac{y}{x} = x^2$ is:
 - (1) $x + y = \frac{x^2}{2} + c$

(2) $xy = \frac{1}{4}x^4 + c$

(3) $x-y=\frac{1}{3}x^3+c$

- (4) $y-x=\frac{1}{4}x^4+c$
- **76.** If $x = a\cos^3\theta$, $y = a\sin^3\theta$, then $\frac{dy}{dx}$ is equal to :
 - (1) cot t
- (2) cos t
- (3) tan t
- (4) tan t
- 77. If X, M, Z are denoting Mean, median and mode of a data and X: M = 9:8, then the ratio M : Z is given by :
 - (1) 8:9
- (2) 4:3
- (3) 7:6
- (4) 5:4
- Two dice are rolled together, the probability that the total score on the two dice is greater than 10 is given by:
- (3) $\frac{1}{12}$ (4) $\frac{5}{6}$

- **79.** If $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$, then $A^2 + 2A$ is equal to:
 - (1) 3A
- (2) 4A
- (3) 2A

The value of the determinant

$$\begin{vmatrix} 1 & x & y+z \\ 1 & y & z+x \\ 1 & z & x+y \end{vmatrix}$$
 is:

- (1) x+y+z
- (2) 0
- (4) (1+x+y+z)

81. Which is not correct?

- (1) Each of the two complex roots of unity is the square of the other.
- (2) Sum of the three cube roots of unity is zero.
- (3) Product of the three cube roots of unity is one.
- (4) None of these

82. If (1+i) is a root of the equation $x^2 + ax + 2 = 0$. where $a \in R$, then the value of 'a' is:

- (3) 1

Solution set of inequality $|3x-2| \le \frac{1}{2}$ is:

- $(1) \left[-\frac{1}{2}, \frac{1}{2} \right]. \qquad (2) \left[\frac{1}{2}, \frac{5}{6} \right] \qquad (3) \left[-\frac{1}{2}, \frac{3}{2} \right] \qquad (4) \left[\frac{3}{2}, \frac{5}{2} \right]$

84. Sum of all the odd divisors of 720 is:

- (1) 78
- (2) 76
- (3) 84
- (4) 80

The binomial co-efficient of the 4th term in the expansion of $(x-q)^5$ is: 85.

- (1) 5.
- (2) 15
- (3) 10
- (4) 20

86. Domain of the function $y = \sqrt{4 - x^2}$ is:

- (1) R [0, 2], where R is the set of real numbers
- (2) [-2,2]
- (3) [0, 2]
- (4) $(-\infty, -2) \cup (2, \infty)$

f

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f

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- 87. Let X be the universal set for sets A and B. If n(A) = 200, n(B) = 300 and $n(A \cap B) = 100$, $n(A^c \cap B^c) = 300$, then n(X) is equal to:
 - (1) 500

C

- (2) 600
- (4) 400
- The value of $\tan \left[\cos^{-1}\left(\frac{4}{5}\right) + \tan^{-1}\left(\frac{2}{3}\right)\right]$ is: (1) $\frac{17}{6}$ (2) $\frac{16}{7}$ (3) $\frac{6}{17}$

- (4) None of these

- If $\sec A + \tan A = \frac{3}{2}$, then:
 - (1) $\sin A = \frac{12}{13}$

(2) $\sin 2A = \frac{5}{13}$

(3) $\sin A = \frac{5}{13}$

- (4) $\sin 2A = \frac{12}{13}$
- If *n* is a positive integer, then $2.4^{2n+1} + 3^{3n+1}$ is divisible by :
 - (1) 27
- (2) 11
- (3) 2
- (4) 9
- **91.** A random variable X has the following probability distribution values of X:

muoni van	addie .	ne following I	2	1	5
X:	1	2	3	1	
D(V)	k	3k	2k	k	2k
P(X):	k	3k	ZK		

Then the value of P(X < 3) is:

- (3) $\frac{4}{9}$
- $(4) \frac{7}{9}$
- A unit vector perpendicular to each of the vectors $-6\hat{i}+8\hat{k}$ and $8\hat{i}+6\hat{k}$ forming a right handed system is:
 - (1) \hat{j}

 $(2) -\hat{j}$

(3) $\frac{1}{10}(6\hat{i} + 8\hat{k})$

(4) $\frac{1}{10}(-6\hat{i} + 8\hat{k})$

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93.	Which of the following is <i>not</i> associated with any LPP?
	(1) Feasible Solution (2) Optimum Solution
3.6	(3) Basic Solution (4) None of these
94.	The distance of the plane $2x-3y+6z+14=0$ from the origin is:
	(1) 14 (2) 2 (3) -2 (4) 11
95.	and $(-2, 1, -8)$ are:
	(1) $\langle 2, 4, -13 \rangle$ (2) $\langle 6, 2, 3 \rangle$ (3) $\langle \frac{6}{7}, \frac{2}{7}, \frac{3}{7} \rangle$ (4) None of these
96.	If $\frac{1}{b+c}$, $\frac{1}{c+a}$ and $\frac{1}{a+b}$ are in A. P., then a^2 , b^2 and c^2 are in:
	(1) Geometric Progression (2) Arithmetic Progression
	(3) Harmonic Progression (4) None of these
97.	The equation of the straight line passing through the point (2, 3) and making intercepts on axes equal in magnitude and sign is:
	(1) $x + y = 3$ (2) $x - y = 5$ (3) $x + y = -5$ (4) $x + y = 5$
98.	The foci of an ellipse are $(\pm 4,0)$ and vertices at $(\pm 5,0)$. Then the equation of the
	ellipse is :
	(1) $\frac{x^2}{25} + \frac{y^2}{9} = 1$ (2) $\frac{x^2}{9} + \frac{y^2}{16} = 1$
	(3) $9x^2 + 25y^2 = 1$ (4) None of these
99.	The point which divides the line joining the points $(2, 4, 5)$ and $(3,5,-4)$ in the ratio $-2:3$ lies on:
	(1) ZOX plane (2) YOY 1

(2) XOY plane

(3) YOZ plane

(4) None of these

100. The value of $\lim_{x\to 0} \frac{x}{1-\sqrt{1-x}}$ is:

	(1) $\sqrt{2}$ (2) 2 (3) $\frac{1}{2\sqrt{2}}$ (4) 0
	OPTIONAL
	PART - C (ii)
	(BIOLOGY)
01.	Vessels and fibers occurs in:
	(1) Xylem of angiosperms (2) Xylem of gymnosperms
	(3) Xylem of pteridophytes (4) All of the above
102.	Tendon and ligament are examples of :
	(1) Loose connective tissues (2) Special connective tissues
	(3) Dense irregular connective tissues (4) Dense regular connective tissues
103.	Prokaryotic genetic system has:
	(1) DNA but no histones (2) Both DNA and histones
	(3) Neither DNA nor histones (4) Either DNA or histone
104.	In order to enter the cell cycle of cell must be stimulated from outside. What type of molecule provides this stimulation?
	(1) Cyclins (2) Cyclins-dependent kinases
	(3) Cytokines and growth factors (4) Tyrosine
105.	The absorption of minerals due to difference in the electro potential gradient without use of energy is:
	(1) Active absorption (2) Passive absorption
	(3) Osmotic absorption (4) None of the above
106.	Which one of the following taxonomic aids can give comprehensive account of complete compiled information of any one genus or family at a particular time?
	(1) Taxonomic key (2) Flora
	(3) Herbarium (4) Monograph
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	107. In five kingdom system, the main basis of classification is:
	(1) Structure of cell wall (2) Nutrition
	(3) Structure of nucleus (4) Reproduction
	108 Who proposed artificial system of classification?
	(1) John Ray (2) Lamarck (3) Linnaeus (4) Wallace
	109. Flame cells present in Platyhelminthes, are specialized in :
	(1) Respiration and adsorption (2) Respiration and excretion
	(3) Osmoregulation and excretion (4) Sosmoregulation and circulation
	110. Vexillary aestivation is characteristic of family:
3	(1) Fabaceae (2) Solanaceae (3) Liliaceae (4) Brassicaceae
	111. During DNA replication, Okazaki fragments are used to elongate:
	(1) The lagging strand towards replication fork.
	(2) The leading strand away from replication fork.
	(3) The lagging strand away from the replication fork.
	(4) The leading strand towards replication fork.
	112. Infection of Ascaris occurs due to :
9	(1) Contaminated food and water (2) Mosquito bite
	(3) Tse-tse fly (4) Sand fly
	113. Name the process by which the nutritional quality of food crops is improved throug biological means such as conventional plant breeding.
	(1) Hybridization (2) Nutrification
	(3) Bioaccumulation (4) Biofortification
99.	114. In which of the following year the Yamuna Action Plan (YAP) was implemented?
	(1) 1987 (2) 1991 (3) 1993 (4) 1999
	115. To remove negatively charged molecules through matrix of agarose, nucleic ac molecules are separated by applying:
ВРН-Е	(1) Electrical field (2) Electric current
	(3) Magnetic field (4) UV radiation
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116	Which of the following is developed by parthenogenesis?
	(1) Drones (2) Queen honey bee
	(3) Worker honey bee (4) Both (2) and (3)
117	 Apomixis is a type of reproduction that results in the development of a/an: (1) New organism without fusion of gametes. (2) New organisms from fusion products of gametes (3) Embryo from endosperm (4) Embryo from nucleus
118.	Medical Termination of Pregnancy (MTP) is considered safe up to how many weeks of pregnancy?
	(1) Six weeks (2) Eight weeks (3) Twelve weeks (4) Eighteen weeks
119.	Conditions of a karyotype $2n \pm 1$ and $2n \pm 2$ are called:
	(1) Aneuploidy (2) Polyploidy
	(3) Klinfelter's & Turner's syndrome (4) Monosomy
120.	The clouds of cosmic dust and gases from which the entire solar system is believed to be formed by condensation, is called:
121.	(1) Ylem (2) Whey (3) Cosmos (4) Galaxy Primary carboxylation occurs in C3 and C4 plants with the help of: (1) PEP carboxylase and pyruvate carboxylase (2) PEP carboxylase and RuBP carboxylasae (3) RuBP carboxylasae and PEP carboxylase (4) RuBP carboxylasae and pyruvate carboxylase
122.	As compared to anaerobic respiration, the energy gained during aerobic respiration
122	(1) 8 times (2) 12 times (3) 19 times (4) 36 times
123.	Fruit and leaf drop at early stages can be prevented by the application of:
	(1) Cytokinins (2) Ethylene
	(3) Auxins (4) Gibberellic acid
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124.	The dental formula for humans (as well	as apes and some monkeys) is :
	(1) 2-1-6-2 (2) 2-1-2-2	(3) 2-1-2-3 (4) 2-2-1-3
125.	Total oxygen that can be carried by bloc	od in:
	(1) 1000-1200 ml	(2) 2000-3000 ml
	(3) 200 ml	(4) 100 ml
126.	Bacillus thuringiensis forms protein cryprotein:	ystals which contain insecticidal protein. This
	(1) Binds with epithelial cells of midgu	t of the pest ultimately killing it.
	(2) Does not kill the carrier bacterium v	which is itself resistant to this toxin
	(3) Is activated by acid pH of the forego	ut of the insect pest
	(4) Is coded by several genes including	the cry gene.
127.	The common examples of temporary pa	arasites includes :
	(1) epiphytes	(2) sucker fish
	(3) bed bug, leech and mosquito	(4) rhizobium
128.	The succession taking place on rock is k	nown as
	(1) Hydrach	(2) Xerach
	(3) Monarch	(4) None of the above
129.	The term Alpha diversity refers to:	
7.	(1) Genetic diversity	(2) Species diversity
	(3) Ecosystem diversity	(4) None of the above
130.	Montreal protocol is related to the:	
	(1) Global warming	(2) Ozone layer depletion
	(3) Sustainable development	(4) Greenhouse gases

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

BPH-EE-2018(SET-Y)

D			Sr. No.	10036
Time: 11/4 Hours (75 minutes)	Total Quest	ions : 130		Max. Marks: 100
Candidate's Name			Date of Birth.	
Father's Name		Mother's Nar	me	
Roll No. (in figures)	(in words)			<u> </u>
Date of Exam :			e e	
(Signature of the Invigilator)			(Signature	of the Candidate)

CANDIDATES MUST READ THE FOLLOWING INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER & FOLLOW THEM.

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

PART – A (PHYSICS)

1. Two cells, each of emf E and internal resistance r are connected in parallel across a

resistor R. The power delivered to the resistor is maximum if :

- " N &	(1) $R = \frac{r}{2}$ (2) $R = r$	(3)	R = 2r (4) $R = 0$
2.	A steel wire of length <i>l</i> has a ma	agnetic mome	nt M, it is bent in	to L shape from middle
	The new magnetic moment is: (1) $\frac{M}{\sqrt{2}}$ (2) $\frac{M}{2}$	(3)		4) 2 <i>M</i>
3.	A proton, a deuteron and an α -	particle enter	a magnetic field	perpendicular to it with
	same velocities. What is the rati			
	(1) 1:2:2 (2) 2:1:1	(3)	1:1:2	4) 1:2:1
4.	coil of 800 turns is:			
	(1) 48.8 mH (2) 200 mH	I (3) 1	187.5 mH (4) 320 mH
5.	In an LCR circuit having L = resonance frequency in Hz is:	8 henry, C =	$0.5~\mu F$ and $R=$	100 ohm in series, the
	(1) 600 (2) 600π	(3)	$\frac{250}{\pi}$	4) 5000
6.	A tuning fork produces 8 beat sonometer. Frequency of the for		oth, 80 and 70 c	cm of stretched wire of
	(1) 120 Hz (2) 128 Hz	(3) 1	112 Hz (4	4) 240 Hz
7.	A pipe closed at one end produpieces of equal length. The fund	uces a fundan lamental frequ	mental note at 41 uencies produced	2 Hz. It is cut into two lin the two pieces are:
	(1) 206 Hz, 412 Hz	4	324 Hz, 1648 Hz	-
	(3) 412 Hz, 824 Hz	(4) 2	206 Hz, 824 Hz	
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				E

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

(1) 2R

10.	A 10 µF capacitor is charged i	by a batter	y or enu ro	o v. me	energy	diawn iio	it tite
	battery and the energy stored	in the capa	citor, are re	spectively	y:		
	(1) 0.10 J and 0.05 J	17.	(2) 0.05 J ar	nd 0.10 J			
	(3) 1.0 mJ and 0.5 mJ		(4) 0.05 J ar	nd 0.05 J			
11.	A body is projected vertically	up. At cer	tain height	h above	the grou	ınd, it's P.	E and
és	K. E are in the ratio 1:4. At w						
	ratio 4:1?						
	(1) $4h$ (2) $\frac{h}{4}$		(3) 5h		(4) $\frac{h}{5}$		ere ere er
12.	Two bodies have their mom						
		les of Total	ion are equ	iai, iiicii	an Guiar		1
	in the ratio :		- F				
	(1) $1:2$ (2) $\sqrt{2}:1$	l ,	(3) 1:√2		(4) 2:1		
13.	The mass of a planet is six to that of the earth. If the escap from the planet is:	imes that one velocity	of the earth from the e	. The rad arth is v,	ius of th then th	ne planet is e escape v	twice elocity
	$(1) \sqrt{3}v \qquad \qquad (2) \sqrt{2}v$		(3) v		$(4) \sqrt{5}i$	U	
14.	If the earth shrinks such that quarter of it's original value to	t it's mass hen one co	does not c mplete day	hange bu will be o	t radius f :	decreases	to one
	(1) 96 hrs (2) 48 hr	rs	(3) 6 hrs	500	(4) 1.5	hrs	
BPH-	EE-2018/(SET - Y)/(D)					981187	

8. An α-particle and a proton are accelerated through same potential difference from

(3) $1:\sqrt{2}$

The resistance of a wire of uniform length L and diameter D is R. The resistance of

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

another wire of same material but length 4L and diameter 2D will be :

(4) 1:2

rest. The ratio of their final velocities is:

(2) 1:1

(2) R

15	A liquid will not wet the surface of a solid if its angle of contact is:
	(1) zero (2) Less than 90°
	(3) more than 90° (4) 90°
16	. The rest mass of a photon is:
W	(1) $\frac{hv}{c}$ (2) $\frac{hv}{c^2}$ (3) $\frac{hc}{\lambda}$ (4) zero
17	For nuclear fission to take place the neutrons must have :
	(1) Very very low energy (2) Thermal energy
	(3) Very high energy (4) No kinetic energy
18	The half value period of a radioactive nuclide is 3 hours. In 9 hours, it's activity wil
	be reduced to:
	(1) $\frac{1}{9}$ (2) $\frac{1}{27}$ (3) $\frac{1}{6}$ (4) $\frac{1}{8}$
19	Digital circuits can be made by repetitive use of :
4	(1) OR gate (2) AND gate (3) NOT gate (4) NAND gate
20	In a common base transistor amplifier the current gain is:
	(1) One (2) More than one
	(3) Less than one (4) Infinite
21	The frequency of ultraviolet light is of the order of:
	(1) 10^7 Hz (2) 10^{10} Hz (3) 10^{12} Hz (4) 10^{15} Hz
22	In Young's double slit experiment, <i>n</i> th bright fringe of red light $(\lambda_1 = 7500 \text{Å})$
· v	coincides with $(n + 1)$ th bright fringe of green light $(\lambda_2 = 6000 \text{ Å})$. The value of n is :
	(1) 4 (2) 5 (3) 3 (4) 2
BPH	-EE-2018/(SET - Y)/(D)

23. An endoscope is employed to view the internal parts of the body. It is based on the

principle of:

P. T. O.

31.	If σ is the Stefan are:	s constant and b is t	he Wier	n's constant, the	en the dimer	nsions of σb^4
	$(1) \left[M^0 L^0 T^0 \right]$		(2)	$M^1L^{-2}T^1$ $M^1L^4T^{-3}$		
	(3) $\left[M^{1}L^{6}T^{-3}\right]$		(4)	$\left[M^1L^4T^{-3}\right]$		
32.		ng from a horizontal b n the angle between th			ension in the	arms will be
	(1) 0°	(2) 60°	(3)	90°	(4) 120°	
33.	A body is projec	cted such that it's K.E	at the t	sop is $\frac{3}{4}$ th of it	t's initial K. I	E. What is the
	angle of projecti	on with horizontal?				
	(1) 30°	(2) 60°	(3)	45°	(4) 120°	
34.		s 16 kg at rest explode 2 kg mass is 4 m/s. Th				
	(1) 288 J	(2) 192 J	(3)	96 J	(4) 144 J	
35.		nergy of a long sprin m, the potential energ			2 cm is u. If	the spring is
	(1) $\frac{u}{4}$	(2) 4u	(3)	16 <i>u</i>	(4) 8 <i>u</i>	
			PART -	-В		
		(0	HEMIS	TRY)		
36.	If ΔH of a reacti	on is 100 KJ mol^{-1} , th	ien activ	ation energy n	nust be :	
	(1) Less than 10	00 KJ mol ⁻¹	(2)	Greater than 10	00 KJ mol ⁻¹	
	(3) Equal to 100	KJ mol ⁻¹	(4)	None is correct		
37.	by 3.40 L. Simu	against a constant ext ultaneously, the syste oules for this gas?				11.00 October
9	(1) -689	(2) + 289	(3)	-289	(4) + 400	

38. Which reacts faster with conc. HCl?

(1) \bigcirc -CH₂CH₂OH

(2) CH-CH₃

(3) $CH_3 - C - OH$ $CH_3 - C - OH$ CH_3

(4) $CH_2 = CH - CH_2OH$

39. \bigcirc -CH₂OH on dehydration with conc. H₂SO₄ forms predominantly :

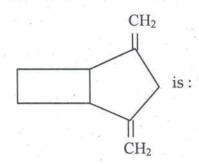
(1) \bigcirc = CH_2

(2) CH₃

(3) \bigcirc $-CH_3$

(4) None of these

40. Degree of unsaturation in



- (1) 2
- (2) 3
- (3) 4
- (4) 5

ď,	
41.	What is normality of 0.30 M H_3PO_4 , (a tribasic acid) in the following reaction?
	$H_3PO_4 + 2OH^- \rightarrow HPO_4^{2-} + 2H_2O$
	(1) 0.30 N (2) 0.60 N (3) 0.90 N (4) 0.15 N
42.	At 25°C, the vapour pressure of pure methyl alcohol is 92.0 torr. Mole fraction of
	CH_3OH in a solution in which vapour pressure of CH_3OH is 23.0 torr at 25°C is:
	(1) 0.25 (2) 0.75 (3) 0.50 (4) 0.66
43.	Which has maximum osmotic pressure at temperature T?
	(1) 100 ml of 1 M urea solution
	(2) 300 ml of 1 M glucose solution
	(3) Mixture of 100 ml of 1 M urea solution and 300 ml of 1M glucose solution
	(4) All are isotonic
44.	Rate constant of a reaction is 0.0693 min ⁻¹ , starting with 10 mol, rate of reaction after
105	10 min is :
	(1) $0.693 \text{ mol min}^{-1}$ (2) $0.0693 \times 2 \text{ mol min}^{-1}$
	(3) $0.0693 \times 5 \text{ mol min}^{-1}$ (4) $0.0693 \times (5)^2 \text{ mol min}^{-1}$
45.	Equilibrium constant for the reaction:
	$NH \cap H : H^{+} \Longrightarrow NH^{+} : H \cap G$
	$NH_4OH + H^+ \rightleftharpoons NH_4^+ + H_2O$
	is 1.8×10^9 . Hence equilibrium constant for $NH_3(aq) + H_2O \rightleftharpoons NH_4^+ + {}^-OH$ is :
	(1) 1.8×10^{-5} (2) 1.8×10^{5} (3) 1.8×10^{-9} (4) 5.55×10^{-10}
46.	Which of the following is not true for resonance?
	(1) Identical arrangement of atoms (2) Identical bonding

(3) Same no. of paired electron

(4) Structure with same energies

- **47.** The geometry of $Ni(CO)_4$ and $Ni(PPh_3)_2$ Cl_2 are:
 - (1) Both square planar

(2) Tetrahedral and square planar

(3) Both tetrahedral

- (4) Square planar and tetrahedral
- The paramagnetism of O_2 molecule is believed to be due to the presence of two electrons with parallel spins in:
 - (1) Bonding π orbitals

(2) Antibonding π orbitals

(3) Bonding σ orbitals

- (4) Antibonding σ orbitals
- 49. Trisoxalato aluminate (III) ion is:

 - (1) $\left[Al\left(C_{2}O_{4}\right)_{3}\right]$ (2) $\left[Al\left(C_{2}O_{4}\right)_{3}\right]^{3+}$ (3) $\left[Al\left(C_{2}O_{4}\right)_{3}\right]^{2-}$ (4) $Al\left[\left(C_{2}O_{4}\right)_{3}\right]^{3-}$

- $[CrF_6]^{3-}$ has Cr atom hybridized.
 - (1) sp^2d^2
- (2) d^2sp^3 (3) dsp^2

OCH₃ aq KOH → product

Product is:

52.
$$HC \equiv CH + 2HCHO \xrightarrow{-OCH_3} X$$

OCH₃ (2)

OH
$$+ CH_3 OK (mixture)$$

- X is:
- (1) $HOH_2C C \equiv C CH_2OH$
- (2) $HOH_2C C \equiv C CH_2OCH_3$

(3) Both are correct

(4) None is correct

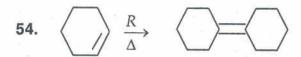
53.
$$H_2C = CH_2 \xrightarrow{hv} A$$

A is:

- (1) $H_2C = CH CH = CH_2$
- (2) $H_3C-CH=CH-CH_2$

(3)

(4) None is correct



A can be:

(1) Conc. H_2SO_4

(2) alcoholic KOH

(3) Et_3N

(4) t-BuOK

55. Identify the correct statement:

- (1) Gypsum is obtained by heating Plaster of Paris
- (2) Plaster of Paris can be obtained by hydration of gypsum
- (3) Plaster of Paris contains higher percentage of calcium than does gypsum
- (4) Plaster of Paris is obtained from gypsum by oxidation

56.
$$\xrightarrow{\text{Br}} \xrightarrow{\text{CH}_3} \xrightarrow{\text{alcoholic}} \text{product}$$

major product is:

(1)
$$CH_3$$

- **57.** Perchloroethane is:
 - (1) $CH_3CH_2ClO_4$ (2) C_2Cl_6 (3) CH_3-CCl_3 (4) $CCl_3.CHO$
- **58.** $C_3H_6Cl_2$ (i) KCN (ii) H_3O^+ H_3C- CH-COOH A is:
 - (1) 1, 1 dichloropropane
- (2) 1, 2-dichloropropane
- (3) 2, 2 dichloropropane
- (4) 1, 3-dichloropropane

59.
$$Y \leftarrow Br_2 \longrightarrow COOH \longrightarrow HNO_3 \longrightarrow X$$

X and Y are:

- (1) Picric acid, 2, 4, 6 tribromophenol
- (2) 4-nitrosalicylic acid, 4-bromosalicylic acid
- (3) o-nitrophenol, o-bromophenol
- (4) None is correct

60. In
$$\bigcirc$$
 $\stackrel{C (CH_3)_3}{\longrightarrow} \frac{KMnO_4}{\triangle}$ product

Product is:

(2) (CH₃)₃C - COOH

(3) Both are correct

- (4) None is correct
- For an α -emitting isotope, the value of disintegration constant is 0.49×10^{-10} per year. The amount of the isotope of a given sample will reduce to half its value after a period (in years) of nearly:
 - (1) 0.45×10^{10}
- (2) 0.9×10^{10} (3) 1.41×10^{10} (4) 2.82×10^{10}

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62.	Number of	photons	of	light	of	wavelength	4000	Å	required	to	provide	1.00	J	of
	energy is:													

- (1) 2.01×10^{18}
- (2) 12.01×10^{31}
- (3) 1.35×10^{17}
- (4) None is correct

63. Vander Waal's equation for one mole of
$$CO_2$$
 gas at low pressure will be:

 $(1) \quad \left(P + \frac{a}{V^2}\right) \ V = RT$

(2) $P(V-b) = RT - \frac{a}{V^2}$

 $(3) \quad P = \frac{RT}{V - b}$

 $(4) P = \left(\frac{RT}{V-b} - \frac{a}{V^2}\right)$

- (1) 3/4
- (2) 1/2
- (3) 1/4
- (4) 1/8

- (1) Critical temperature
- (2) Inversion temperature
- (3) Boyle's temperature

(4) Reduced temperature

66. Atomic wt. of barium is 137.34. The equivalent weight of barium in
$$BaCrO_4$$
 used as oxidizing agent in acid medium is:

- (1) 137.34
- (2) 45.78
- (3) 114.45
- (4) 68.67

- (1) 1.0585
- (2) 1.00
- (3) 0.10
- (4) 0.0585

- (1) Electronegativity of E
- (2) Atomic size of E
- (3) Ability of E to share electron pair with O
- (4) Atomic size and electronegativity of E.

	- CHOO4 + 4RI -	$Cu_2I_2 + 2K_2SO_4 +$	I_2 I_2 obtained from	0.1 mole of CuSO ₄ samp
	required 100 ml	of 1 M hypo, hence	mole percentage of pr	ure CuSO. is
	(1) 100	(2) 50	(3) 25	(4) None is correct
70.	The hybridization	n of carbon atoms i	n C - C single hand of	$HC \equiv C - CH = CH_2$ is:
	$(1) sp^3 - sp^3$	$(2) sp - sp^2$	(3) $sp^2 - sp^2$	$HC \equiv C - CH = CH_2 \text{ is}:$ $(4) sp^3 - sp$
			OPTIONAL	
			PART - C (i)	
*		(M	ATHEMATICS)	Onen
71. I	If $x = a\cos^3\theta$, $y =$	$a \sin^3 \theta$, then $\frac{dy}{dx}$ i	s equal to :	
(1) cot t	(2) cos t	(3) tan t	(4) - tan t
72. I	f X, M , Z are den atio $M : Z$ is given	oting Mean, media h by :	n and mode of a data	and $X: M = 9:8$, then the
(1	1) 8:9	(2) 4:3	(3) 7:6	(4) 5:4
73. T	wo dice are rolle reater than 10 is g	ed together, the pro-	obability that the tota	al score on the two dice is
(1	$\frac{1}{4}$	(2) $\frac{1}{6}$	(3) $\frac{1}{12}$	(4) $\frac{5}{6}$
	[1 0 0]			
74. If	$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$, the	$A^2 + 2A$ is equal	al to:	
(1)) 3A	(2) 4A	(3) 2 <i>A</i>	(4) A
75. Th	ne value of the det	erminant		(1) 11
		1-1	x 11+2	
		1	$\begin{vmatrix} x & y+z \\ y & z+x \\ z & x+y \end{vmatrix}$ is:	
(1)	x+y+z	(2) 0	The second secon	
	018/(SET - Y)/(D)	(-)	(3) 1	(4) $(1+x+y+z)$
G .				

76. If $\frac{1}{b+c}$, $\frac{1}{c+a}$ and $\frac{1}{a+b}$ are in A. P., then a^2 , b^2 and c^2 are in:

- (1) Geometric Progression
- (2) Arithmetic Progression
- (3) Harmonic Progression
- (4) None of these

The equation of the straight line passing through the point (2, 3) and making intercepts on axes equal in magnitude and sign is:

- (1) x + y = 3
- (2) x y = 5 (3) x + y = -5 (4) x + y = 5

The foci of an ellipse are $(\pm 4,0)$ and vertices at $(\pm 5,0)$. Then the equation of the ellipse is:

(1) $\frac{x^2}{25} + \frac{y^2}{9} = 1$

(2) $\frac{x^2}{9} + \frac{y^2}{16} = 1$

(3) $9x^2 + 25y^2 = 1$

(4) None of these

The point which divides the line joining the points (2, 4, 5) and (3,5,-4) in the ratio -2:3 lies on:

- (1) ZOX plane
- (2) XOY plane
- (3) YOZ plane (4) None of these

The value of $\lim_{x\to 0} \frac{x}{1-\sqrt{1-x}}$ is:

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

81. A random variable X has the following probability distribution values of X:

X:	1	2	3	4	5
P(X):	k	3k	2k	k	2k

Then the value of P(X < 3) is:

- (3) $\frac{4}{9}$
- (4) $\frac{7}{9}$

- A unit vector perpendicular to each of the vectors $-6\hat{i} + 8\hat{k}$ and $8\hat{i} + 6\hat{k}$ forming a right handed system is:
 - (1) \hat{i}

(2) $-\hat{i}$

(3) $\frac{1}{10}(6\hat{i} + 8\hat{k})$

- (4) $\frac{1}{10}(-6\hat{i} + 8\hat{k})$
- **83.** Which of the following is *not* associated with any LPP?
 - (1) Feasible Solution

(2) Optimum Solution

(3) Basic Solution

- (4) None of these
- The distance of the plane 2x-3y+6z+14=0 from the origin is:
 - (1) 14
- (2) 2
- (3) -2
- The direction cosines of the line joining the points (4, 3, -5) and (-2, 1, -8) are: (1) $\langle 2, 4, -13 \rangle$ (2) $\langle 6, 2, 3 \rangle$ (3) $\langle \frac{6}{7}, \frac{2}{7}, \frac{3}{7} \rangle$ (4) None of these

- Which is not correct? 86.
 - (1) Each of the two complex roots of unity is the square of the other.
 - (2) Sum of the three cube roots of unity is zero.
 - (3) Product of the three cube roots of unity is one.
 - (4) None of these
 - If (1+i) is a root of the equation $x^2 + ax + 2 = 0$. where $a \in R$, then the value of 'a' is:
 - (1) -2
- (3) 1

- Solution set of inequality $|3x-2| \le \frac{1}{2}$ is: 88.
 - (1) $\left[-\frac{1}{2}, \frac{1}{2} \right]$ (2) $\left[\frac{1}{2}, \frac{5}{6} \right]$ (3) $\left[-\frac{1}{2}, \frac{3}{2} \right]$ (4) $\left[\frac{3}{2}, \frac{5}{2} \right]$

7

- 89. Sum of all the odd divisors of 720 is:
 - (1) 78
- (2) 76
- (3) 84
- (4) 80
- **90.** The binomial co-efficient of the 4th term in the expansion of $(x-q)^5$ is:
 - (1) 5
- (2) 15
- (3) 10
- (4) 20

- **91.** Domain of the function $y = \sqrt{4 x^2}$ is:
 - (1) R [0, 2], where R is the set of real numbers
 - (2) [-2,2]
 - (3) [0, 2]
 - (4) $(-\infty, -2) \cup (2, \infty)$
- **92.** Let X be the universal set for sets A and B. If n(A) = 200, n(B) = 300 and $n(A \cap B) = 100$, $n(A^c \cap B^c) = 300$, then n(X) is equal to:
 - (1) 500
- (2) 600
- (3) 700
- (4) 400

- **93.** The value of $\tan \left[\cos^{-1}\left(\frac{4}{5}\right) + \tan^{-1}\left(\frac{2}{3}\right)\right]$ is:
 - (1) $\frac{17}{6}$
- (2) $\frac{16}{7}$
- (3) $\frac{6}{17}$
- (4) None of these

- **94.** If $\sec A + \tan A = \frac{3}{2}$, then:
 - (1) $\sin A = \frac{12}{13}$

(2) $\sin 2A = \frac{5}{13}$

(3) $\sin A = \frac{5}{13}$

- (4) $\sin 2A = \frac{12}{13}$
- **95.** If *n* is a positive integer, then $2.4^{2n+1} + 3^{3n+1}$ is divisible by :
 - (1) 27

(2) 11

(3) 2

(4) 9

).

96.	Ι	f a	c ^y	$=e^{x-y}$, then	$\frac{dy}{dx}$	is	:
						ax		

$$(1) \quad \frac{\log x}{(1+\log x)^2}$$

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

$$(3) \quad \frac{\log x}{(1 - \log x)}$$

(4) $\log x(\log ex)^{-1}$

97. If x be real, the minimum value of $x^2 - 8x + 17$ is:

$$(1)$$
 -1

98. The value of $\int \frac{2e^x}{e^{2x}+1} dx$ is equal to :

(1)
$$\log (e^x + e^{-x}) + c$$

(2)
$$2 \tan^{-1}(e^x) + c$$

(3)
$$\log (1+e^{2x})+c$$

(4)
$$\tan^{-1}(2e^x + 1) + c$$

99. The area bounded by the curve $y^2 = 4x$ and $x^2 = 4y$ is:

(1)
$$\frac{16}{3}$$
 sq. units

(2) $\frac{3}{16}$ sq. units

(3)
$$\frac{14}{3}$$
 sq. units

(4) $\frac{3}{14}$ sq. units

100. The solution of the differential equation $\frac{dy}{dx} + \frac{y}{x} = x^2$ is:

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

(2)
$$xy = \frac{1}{4}x^4 + c$$

(3)
$$x-y=\frac{1}{3}x^3+c$$

$$(4) \quad y - x = \frac{1}{4}x^4 + c$$

OPTIONAL

PART - C (ii)

(BIOLOGY)

101. Which one of the following taxonomic aids can give comprehensive account of complete compiled information of any one genus or family at a particular time?

(1) Taxonomic key

(2) Flora

(3) Herbarium

(4) Monograph

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102.	In five kingdom system, the main basis	of classification is:	
	(1) Structure of cell wall	(2) Nutrition	
	(3) Structure of nucleus	(4) Reproduction	
103.	Who proposed artificial system of class	ification?	
	(1) John Ray (2) Lamarck	(3) Linnaeus (4) Wallace	
104.	Flame cells present in Platyhelminthes,	are specialized in :	
	(1) Respiration and adsorption	(2) Respiration and excretion	
	(3) Osmoregulation and excretion	(4) Sosmoregulation and circulation	
105.	Vexillary aestivation is characteristic of	family:	
	(1) Fabaceae (2) Solanaceae	(3) Liliaceae (4) Brassicaceae	
106.		ystals which contain insecticidal protei	n. This
	protein:		
	(1) Binds with epithelial cells of midgu	it of the pest ultimately killing it.	
	(2) Does not kill the carrier bacterium	which is itself resistant to this toxin	
*.	(3) Is activated by acid pH of the foreg	ut of the insect pest	
	(4) Is coded by several genes including	the cry gene.	
107.	The common examples of temporary pa	arasites includes :	
	(1) epiphytes	(2) sucker fish	
	(3) bed bug, leech and mosquito	(4) rhizobium	
108.	The succession taking place on rock is k	known as	
	(1) Hydrach	(2) Xerach	
	(3) Monarch	(4) None of the above	
109.	The term Alpha diversity refers to:		
	(1) Genetic diversity	(2) Species diversity	
	(3) Ecosystem diversity	(4) None of the above	
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110.	Montreal protocol is related to the:	
	(1) Global warming	(2) Ozone layer depletion
	(3) Sustainable development	(4) Greenhouse gases
111.	Primary carboxylation occurs in C3 and	C4 plants with the help of :
	(1) PEP carboxylase and pyruvate carbo	oxylase
	(2) PEP carboxylase and RuBP carboxyl	asae
	(3) RuBP carboxylasae and PEP carboxy	ylase
	(4) RuBP carboxylasae and pyruvate ca	rboxylase
112.	As compared to anaerobic respiration, is:	the energy gained during aerobic respiration
	(1) 8 times (2) 12 times	(3) 19 times (4) 36 times
113.	Fruit and leaf drop at early stages can be	e prevented by the application of :
	(1) Cytokinins	(2) Ethylene
	(3) Auxins	(4) Gibberellic acid
114.	The dental formula for humans (as well	as apes and some monkeys) is:
	(1) 2-1-6-2 (2) 2-1-2-2	(3) 2-1-2-3 (4) 2-2-1-3
115.	Total oxygen that can be carried by bloc	od in:
	(1) 1000-1200 ml	(2) 2000-3000 ml
	(3) 200 ml	(4) 100 ml
116.	During DNA replication, Okazaki fragn (1) The lagging strand towards replicat (2) The leading strand away from repli (3) The lagging strand away from the r (4) The leading strand towards replicat	cation fork. replication fork.
117.	S STATE OF THE STA	5 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)
	(1) Contaminated food and water	(2) Mosquito bite
ppu	(3) Tse-tse fly EE-2018/(SET - Y)/(D)	(4) Sand fly
DI II-	EE-2010/(3E1 - 1)/(D)	

	19
118. Name the process by which the nutritional quality of food crops is improved through biological means such as conventional plant breeding.	gh
(1) Hybridization	N.
(3) Bioaccumulation (4) Biofestician	
119. In which of the following year the Yamuna Action Plan (YAP) was implemented? (1) 1987 (2) 1991 (3) 4991	
(3) 1993 (4) 1999	
120. To remove negatively charged molecules through matrix of agarose, nucleic acid molecules are separated by applying:	d
(1) Electrical field	
(3) Magnetic field	
(4) UV radiation	
the following is developed by parthenogenesis 2	
(1) Drones (2) Queen honey bee	*
(3) Worker honey bee (4) Both (2) and (3)	
 122. Apomixis is a type of reproduction that results in the development of a/an: (1) New organism without fusion of gametes. (2) New organisms from fusion products of gametes (3) Embryo from endosperm (4) Embryo from nucleus 	Э
	of n
123. Medical Termination of Pregnancy (MTP) is considered safe up to how many weeks of pregnancy?	
(1) Six weeks (2) The	h
(1) Elghieen wooks	ay.
and $2n \pm 2$ are called:	er
(1) Aneuploidy (2) Polyploidy	de
(3) Klinfelter's & Turner's syndrome (4) Monosomy	rk. be
125. The clouds of cosmic dust and gases from which the entire solar system is believed to be formed by condensation, is called:	ied be
(1) Ylem (2) Whey (3) Cosmos (4) Galaxy	
DII FF and the	

126.	Vessels and fibers occurs in:	
	(1) Xylem of angiosperms	(2) Xylem of gymnosperms
	(3) Xylem of pteridophytes	(4) All of the above
127.	Tendon and ligament are examples of :	
	(1) Loose connective tissues	(2) Special connective tissues
	(3) Dense irregular connective tissues	(4) Dense regular connective tissues
128.	Prokaryotic genetic system has:	
	(1) DNA but no histones	(2) Both DNA and histones
	(3) Neither DNA nor histones	(4) Either DNA or histone
129.	In order to enter the cell cycle of cell n	nust be stimulated from outside. What type of
	molecule provides this stimulation?	
	(1) Cyclins	(2) Cyclins-dependent kinases
	(3) Cytokines and growth factors	(4) Tyrosine
130.	The absorption of minerals due to diffe	erence in the electro potential gradient without
	use of energy is:	
	(1) Active absorption	(2) Passive absorption
	(3) Osmotic absorption	(4) None of the above

ANSWER KEY

	. /			
	A	В	С	D
1) Q1	4/	4	4	1
2) Q2	4	2	1	1
3) Q3	1	4	3	1
4) Q4	1	4	2	4
5) Q5	3	3	2	3
6) Q6	1	4	1	1
7) Q7	3	1	1	2
8) Q8	1/	3	1	3
9) Q9	4	2	4	2
10) Q10	3 ′	2	3	1
11) Q11	4	1	1	1
12) Q12	1	1	2	3
13) Q13	1	1	3	1
14) Q14	1	4	. 2	4
15) Q15	2	3	1	3
	1	4	1	4
16) Q16	2/	1	3	2
17) Q17	3/	1	1	4
18) Q18			4	4
19) Q19	2	1	3	3
20) Q20	1/	2	4	4
21) Q21	1/	1	_	
22) Q22	1/	3	4	1
23) Q23	1/	1	1	3
24) Q24	4	4	1	2
25) Q25	3 /	3	3	2
26) Q26	4	4	4	4
27) Q27	1	4	2	1
28) Q28	3/	1	4	1
29) Q29	2/	1	. 4	1
30) Q30	2 /	3	3	2
31) Q31	4	1	4	4
32) Q32	2.	2	1	4
33) Q33	. 4	3	1	1
34) Q34	4	2	1	1
35) Q35	3-	1	2	3
36) Q36	2	1	3	2
37) Q37	2	1	2	3
38) Q38	4	3	3	2
39) Q39	1	1	1	2
40) Q40	2-	3	2	3
41) Q41	2	3	2	2
42) Q42	2/	2	3	1
43) Q43	2	3	2	4
44) Q44	4-	1	2	1
45) Q45	2	2	- 3	1
46) Q46	3/	2	2	2
	175.00	1		

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47) Q47	1	3	1	2
48) Q48	1/	2	4	2
49) Q49	1	2	1	4
50) Q50	3	3	1	2
51) Q51	2/	3	2	1
52) Q52	1	1	2	1
53) Q53	4	1	2	3
54) Q54	1/	1	4	1
55) Q55	1	3	2	3
56) Q56	2/	2	2	3
57) Q57	3 -	2	2	2
58) Q58	2-	2	4	3
59) Q59	2	4	1	1
60) Q60	3 ′	2	2	2
61) Q61	3/	2	1	3
62) Q62	2	2	1	1
63) Q63	3	4	3	1
64) Q64	1/	1	1	1
65) Q65	2	2	3	3
66) Q66	1/	2	3	2
67) Q67	1	1	1	2
68) Q68	3	4	1	4
69) Q69	1	1	1	1
70) Q70	3	1	. 3	2
71) Q71	2-	3	1	4
72) Q72	3/	1	3	2
73) Q73	1/	4	2	3
74) Q74	. 3/	2	1	1
75) Q75	4/	3	2	2
76) Q76	4/	1	4	2
77) Q77	1/	3	2	4
78) Q78	2/	2	3	1
79) Q79	1′	1	1	3
80) Q80	3/	2	2	2
81) Q81	2/	2	4	3
82) Q82	4 /	3	1	1
83) Q83	1/	1	2	4
84) Q84	3/	3	1	2
85) Q85	2/	4	3	3
86) Q86	4	2	. 2	4
87) Q87	2	4	3	1
88) Q88	3/	1	1	2
89) Q89	1	3	3	1
90) Q90	2/	2	4	3
91) Q91	1-	4	3	2
92) Q92	3 /	1	1	3
93) Q93	2	2	4	1

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94) Q94	1	1	2	3
95) Q95	2/	3	3	4
96) Q96	3 /	4	2	1
97) Q97	1/	2	4	3
98) Q98	4/	3	1	2
99) Q99	2/	1	3	1
100) Q100	3	2	2	2
101) Q101	1/	3	1	4
102) Q102	1	3	4	2
103) Q103	3	3	1	3
104) Q104	1	3	3	3
105) Q105	1	1	2	1
106) Q106	3	1 .	4	1
107) Q107	1/	4	2	3
108) Q108	4/	1	3	2
109) Q109	3	3	3	3
110) Q110	2	2	1	2
111) Q111	1/	1	3	3
112) Q112	3_	1	1	3
113) Q113	2/	3	4	3
114) Q114	3~	1	3	3
115) Q115	2	1	2	1
116) Q116	4-	1	1	3
117) Q117	2/	3	1	1
118) Q118	3-	2	3	4
119) Q119	3/	3	1	3
120) Q120	1	2	1	2
121) Q121	1	3	3	1
122) Q122	4-	1	3	1
123) Q123	1	4	3	3
124) Q124	3	3	3	1
125) Q125	2	2	1	1
126) Q126	3	4	1	1
127) Q127		2	3	4
128) Q128	3	3	2	1
129) Q129	3	3	3	3
130) Q130	1/	1	2	2

Jan .