

**Time: 3Hours****AIPMT SAMPLE PAPER-1****CLASS:12<sup>th</sup> (PCB)****Maximum Marks: 720****Topics Covered:****Physics : Full Syllabus****Chemistry : Full Syllabus****Mathematics : Full Syllabus****Important Instruction:**

1. Attempting all the questions are compulsory.
2. Use **Blue / Black Ball** point pen only.
3. There are three sections of equal weightage in the question paper A, B, C (**Physics, Chemistry having 45 questions each and Biology**) Having 90 questions .
4. For marking scheme, +4 marks for each correct answer and -1 marks for each incorrect answer.
5. Use of calculator and other electronic devices is not allowed during the exam.
6. No extra sheets will be provided for any kind of work.

Name of the Student: ..... Class: .....

Father's Name: ..... Signature: .....

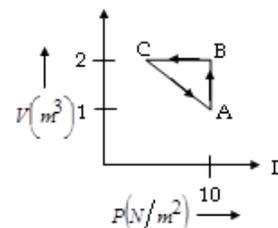
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**Rough Space**

**PART – A**  
**(PHYSICS)**

1. A car covers first half of the total distance with a speed of 20 kmph and the rest with a speed of 40 kmph. The average velocity during the journey is (in kmph):  
 (a) 20 (b) 40 (c) 40/3 (d) None of these
2. The tangential acceleration of a particle moving in a circular path of radius 2m starting from rest varies with time as  $a_t = 3t \text{ ms}^{-2}$ . The centripetal acceleration (in  $\text{ms}^{-2}$ ) of the particle at  $t = 2\text{s}$  is:  
 (a) 12 (b) 18 (c) 16 (d) none of these
3. A particle is projected from a horizontal plane (x-z plane) such that its velocity vector at time t is given by  $\vec{V} = a\hat{i} + (b - ct)\hat{j}$ . Its range on the horizontal plane is given by  
 (a)  $\frac{ba}{c}$  (b)  $\frac{2ba}{c}$  (c)  $\frac{3ba}{c}$  (d) None
4. A force  $\vec{F} = k[x\hat{i} + y\hat{j}]$ , where k is a positive constant, acts on a particle moving in x-y plane starting from the point (3,5), the particle is taken along a straight line to (5, 7). The work done by the force is :  
 (a) zero (b) 35k (c) 20k (d) 14k
5. Two metal spheres carrying charges of  $+8\mu\text{C}$  and  $-5\mu\text{C}$  attract each other with a force  $F$ . If a charge of  $-3\mu\text{C}$  is added to both, the force between the spheres will be  
 (a)  $2F$  (b)  $F$  (c)  $F/2$  (d) zero
6. A metal meter scale of breadth 2.5 cm has two holes, each of radius 1 cm, at the two ends. When it is heated, the distance between the holes  
 (a) decreases (b) increases (c) sometimes increases (d) sometimes decreases
7. An ideal gas is taken through cycle  $A \rightarrow B \rightarrow C \rightarrow A$ , as shown in figure. If the net heat supplied to the gas in the cycle is 5J, the work done by the gas in the process  $C \rightarrow A$  is  
 (a) -5J  
 (b) -10J  
 (c) -15J  
 (d) -20J

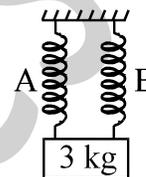


9. Two capacitors of capacitance  $C$  and  $2C$ , are charged to potential differences  $V$  and  $2V$  respectively. If the two positive plates are connected together and the two negative plates are connected together, then this system of capacitance

- (a) gains energy but loses charge  
 (b) gains charge but loses energy  
 (c) loses energy and charge  
 (d) loses energy but charge remains constant

10. Block of mass 3 kg is initially in equilibrium and is hanging by two identical springs A and B as shown in figures. If spring A is cut from lower point at  $t=0$  then, find acceleration of block in  $\text{ms}^{-2}$  at  $t = 0$ .

- (a) 5                      (b) 10                      (c) 15                      (d) 0



11. A particle of charge  $q$  and velocity  $v$  passes undeflected through a space with non-zero electric field  $E$  and magnetic field  $B$ . The undeflecting conditions will hold if

- (a) signs of both  $q$  and  $E$  are reversed  
 (b) signs of both  $q$  and  $B$  are reversed  
 (c) both  $B$  and  $E$  are doubled in magnitude  
 (d)  $v = E/B$

12. Point charges of  $+50\mu\text{C}$ ,  $-250\mu\text{C}$  and  $+200\mu\text{C}$  are placed on the circumference of a circle of radius  $0.5\text{m}$  to form the vertices of an equilateral triangle. The electric potential at the center of the circle is

- (a)  $4.5 \times 10^6\text{V}$                       (b)  $9 \times 10^6\text{V}$                       (c) zero                      (d) none of these

13. The P.E. of a certain spring when stretched from natural length through a distance  $0.3\text{m}$  is  $10\text{J}$ . The amount of work in joule that must be done on this spring to stretch it through an additional distance  $0.15\text{m}$  will be

- (a)  $10\text{J}$                       (b)  $20\text{J}$                       (c)  $7.5\text{J}$                       (d)  $12.5\text{J}$

14.  $200\text{gm}$  of a solid ball at  $20^\circ\text{C}$  is dropped in an equal amount of water at  $80^\circ\text{C}$ . The resulting temperature is  $60^\circ\text{C}$ . This means that specific heat of solid is

- (a) one-fourth of water                      (b) one-half of water  
 (c) twice of water                      (d) four times of water

15. For the stationary wave  $y = 4\sin(\pi x/15) \cos(96\pi t)$  the distance between a node and the next antinode is

- (a) 7.5                      (b) 15                      (c) 22.5                      (d) 30

16. Two balls A and B having masses  $1\text{kg}$  and  $2\text{kg}$ , moving with speeds  $21\text{m/s}$  and  $4\text{m/s}$  respectively in opposite directions, collide head on. After collision A moves with a speed of  $1\text{m/s}$  in the same direction, then the coefficient of restitution is

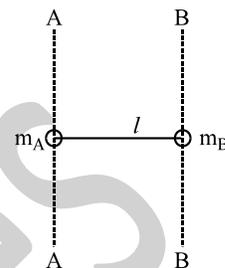
- (a) 0.1                      (b) 0.2                      (c) 0.4                      (d) None



24. A point mass  $m_A$  is connected to a point mass  $m_B$  by a massless rod of length  $l$  as shown in the figure. It is observed that the ratio of the moment of inertia of the system about the two axes BB and AA, which is parallel to each other and perpendicular to the rod is

$\frac{I_{BB}}{I_{AA}} = 3$ . The distance of the centre of mass of the system from the mass A is

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



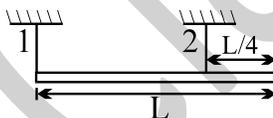
25. In a gas of diatomic molecules, the ratio of the two specific heats of gas  $\frac{C_p}{C_v}$  is

- (a) 1.66                      (b) 1.40                      (c) 1.33                      (d) 1.00

26. A uniform rod of length  $L$  and weight  $W$  is suspended horizontally by two vertical ropes as shown. The first rope is attached to the left end of the rod while the second rope is attached a distance from the right end.

The tension in the second rope is

- (a)  $\frac{W}{2}$                       (b)  $\frac{W}{3}$   
(c)  $\frac{W}{4}$                       (d)  $\frac{2W}{3}$



27. The permeability is maximum for

- (a) paramagnetic                      (b) ferromagnetic                      (c) diamagnetic                      (d) non-magnetic

28. Waves in a medium are represented by  $y = 0.2\sin\pi(x - 4t)$  where  $x$  and  $y$  are in metres and  $t$  is in seconds.

The displacement at a point  $x = 50\text{cm}$  and  $t = 2.5\text{s}$  is...

- (a) +0.2                      (b) -0.2                      (c) zero                      (d) +0.1

29. The ratio of the electric field at a point  $\frac{R}{2}$  inside a uniformly charged shell to a point  $\frac{R}{2}$  outside the same shell is

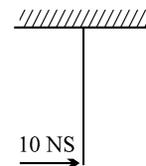
- (a) 0                      (b) 2                      (c)  $\frac{1}{4}$                       (d)  $\infty$

30. Two cells of emfs  $E_1$  and  $E_2$  and internal resistances  $r_1$  and  $r_2$  when connected in series and across an external resistance  $R$  give a current of  $2A$ . When the polarity of one of the cells is reversed, the current through  $R$  is  $1A$ . The ratio  $E_1/E_2 =$

- (a) 1                      (b) 3                      (c) 2                      (d)  $3/2$

31. A thin uniform straight rod of mass 2 kg and length 1 m is free to rotate about its upper end when at rest. It receives an impulsive blow of 10 Ns at its lowest point, normal to its length as shown in figure. The kinetic energy of rod just after impact is

- (a) 75 J                      (b) 100 J                      (c) 200 J                      (d) none



32. Velocity of sound in air is 320 m/s. A pipe closed at one end has a length of 1m. Neglecting end correction, the air column in the pipe can resonate for the sound of frequency ;

- (a) 100 Hz                      (b) 260 Hz                      (c) 320 Hz                      (d) 400 Hz

33. The masses of three wires of copper are in the ratio of 1 : 3 : 5 and their lengths are in the ratio 5 : 3 : 1. The ratio of their electrical resistance is :

- (a) 1 : 3 : 5                      (b) 5 : 3 : 1                      (c) 1 : 15 : 125                      (d) 125 : 15 : 1

34. A concave lens forms the image of an object such that the distance between the object and image is 10 cm and the magnification produced is  $1/4$ . The focal length of the lens will be

- (a) 8.6 cm                      (b) 6.2 cm                      (c) 10 cm                      (d) - 4.4 cm

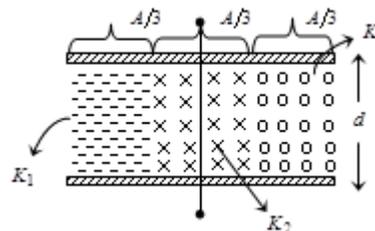
35. The electric potential at a point is given by  $V = -6x^2$ . The electric field strength at  $x = 2$  is

- (a)  $-24 \text{ V m}^{-1}$                       (b)  $12 \text{ V m}^{-1}$                       (c)  $24 \text{ V m}^{-1}$                       (d)  $4 \text{ V m}^{-1}$

36. The effective capacitance of the capacitor shown in the diagram is

( $K_1 = 2, K_2 = 4, K_3 = 6$ )

- (a)  $12\epsilon_0 A/d$   
 (b)  $2\epsilon_0 A/d$   
 (c)  $4\epsilon_0 A/d$   
 (d)  $\epsilon_0 A/12d$



37. Current flowing in a circuit having resistance of  $30\Omega$  and an inductance of  $\frac{0.4}{\pi} \text{ H}$  connected to an A.C. supply of 100 V and 50 Hz in series is

- (a) 2 A                      (b) 5 A                      (c) 7 A                      (d) none of these

38. If a current of 3 amperes flowing in the primary coil is reduced to zero in 0.001 second, then the induced e.m.f in the secondary coil is 15000 volts. The mutual inductance between the two coils is

- (a) 0.5 H                      (b) 5 H                      (c) 1.5 H                      (d) 10 H

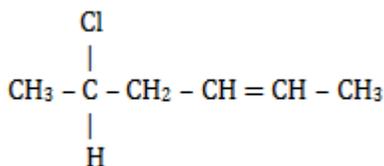
39. Emission of a positron

- (a) decreases the atomic number by one                      (b) increases the atomic number by one  
 (c) does not change the atomic number                      (d) increases the mass number by one

40. Interference fringes are obtained using 2 coherent sources whose intensities are in the ratio 9 : 4 . Then ratio of the intensities of the bright and dark bands is  
 (a) 5 : 1                      (b) 9 : 4                      (c) 25 : 1                      (d) 4 : 1
41. If the critical angle for total internal reflection from a medium to vacuum is  $30^\circ$  , the velocity of light in the medium is  
 (a)  $3 \times 10^8$  m/sec            (b)  $1.5 \times 10^8$  m/sec            (c)  $6 \times 10^8$  m/sec            (d)  $\sqrt{3} \times 10^8$  m/sec
42. Energy released in Sun and Stars is due to  
 (a) formation of heavy nuclei by fusion of light nuclei                      (b) fission of heavy nuclei into lighter nuclei  
 (c) combustion of gases                      (d) radioactive reactions
43. The mass numbers of helium and sulphur are 4 and 32 respectively. The ratio of the nuclear radii of sulphur and helium will be  
 (a) 32                      (b) 8                      (c) 2                      (d)  $\sqrt{2}$
44. The quantity of charge  $q$  coulomb passing through a conductor varies with time  $t$  second according to the relation  $q = 2t^2 + 8t + 1$  . The current through the conductor at  $t = 1s$  is  
 (a) 10A                      (b) 12A                      (c) 13A                      (d) 9A
45. When we apply reverse bias to a junction diode it :  
 (a) lowers the potential barrier only  
 (b) raises the potential barrier and increases minority carrier current  
 (c) increases the majority carrier current  
 (d) lowers potential barriers and increases the minority carrier current

**PART – B**  
**CHEMISTRY**

46. The IUPAC name of the following compound is:



- (a) 2-chlorohex-5-ene                      (b) 5-chlorohex-2-ene  
 (c) 1-chloro-1-methylpent-3-ene                      (d) 5-chloro-5-methylpent-2-ene
47. The olefin which on ozonolysis gives  $\text{CH}_3\text{CH}_2\text{CHO}$  and  $\text{CH}_3\text{CHO}$  is:  
 (a) 1-Butene                      (b) 1-Pentene                      (c) 2-Butene                      (d) 2-Pentene

Rough Space

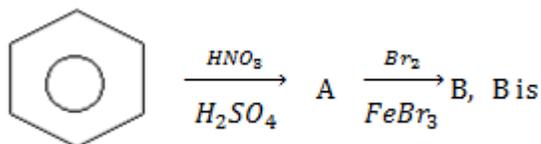
48. A solid organic compound x, on heating directly converted into vapour phase which on cooling solidifies. The best method for purifying 'x' is  
 (a) Distillation (b) sublimation (c) Distillation at reduced Pressure (d) Steam distillation

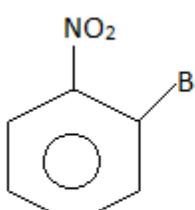
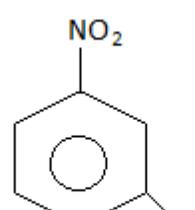
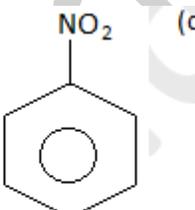
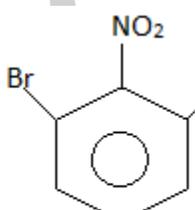
49. The method of converting high boiling hydrocarbon into low boiling hydrocarbon is known as  
 (a) Pyrolysis (b) Isomerisation (c) Cracking (d) Inversion

50. Basic strength of

- (i)  $\text{H}_3\text{C}\bar{\text{C}}\text{H}_2$  (ii)  $\text{H}_2\text{C}=\bar{\text{C}}\text{H}$  (iii)  $\text{CH}\equiv\bar{\text{C}}$  is in the order  
 (a)  $\text{iii} > \text{ii} > \text{i}$  (b)  $\text{i} > \text{iii} > \text{ii}$  (c)  $\text{i} > \text{ii} > \text{iii}$  (d)  $\text{ii} > \text{i} > \text{iii}$

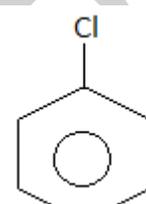
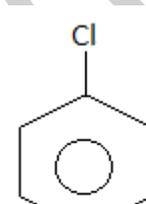
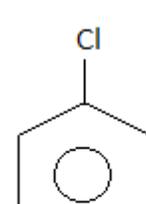
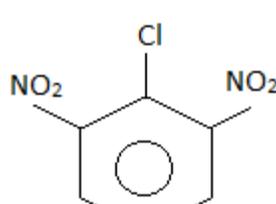
51.



- (a)  (b)  (c)  (d) 

52. The major product formed in the following reaction  $\text{CH}_3\text{CH}(\text{Cl})\text{CH}_2-\text{CH}_2\text{OH} \xrightarrow{\text{aq.KOH}}$   
 (a)  $\text{CH}_3\text{CH}=\text{CH}-\text{CH}_2\text{OH}$  (b)  $\text{CH}_2\text{CH}=\text{CH}-\text{CH}_2\text{CH}_2\text{OH}$   
 (c)  $\text{CH}_3-\underset{\text{O}}{\underset{|}{\text{C}}}-\underset{\text{O}}{\underset{|}{\text{C}}}-\text{CH}_2$  (d)  $\text{CH}_3-\underset{\text{OH}}{\underset{|}{\text{C}}}-\text{CH}-\text{CH}_2-\text{CH}_2\text{OH}$

53. Arrange the following compounds in order of increasing reactivity towards nucleophilic substitution.

- (i)  (ii)  (iii)  (iv) 

- (a)  $\text{i} < \text{ii} < \text{iii} < \text{iv}$  (b)  $\text{iv} > \text{iii} > \text{ii} > \text{i}$  (c)  $\text{ii} < \text{i} < \text{iii} < \text{iv}$  (d)  $\text{iv} < \text{iii} < \text{ii} < \text{i}$

54. Identify 'Z' in the following sequence of reactions  $\text{Ethanol} \xrightarrow{\text{PBr}_3} \text{X} \xrightarrow{\text{alc.KOH}} \text{Y} \xrightarrow[\text{ii) H}_2\text{O}, \Delta]{\text{i) conc.H}_2\text{SO}_4} \text{Z}$

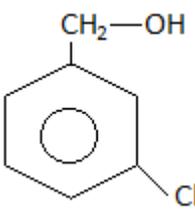
(a)  $\text{CH}_2 = \text{CH}_2$       (b)  $\text{CH}_3\text{CH}_2\text{OH}$       (c)  $\text{CH}_3\text{CH}_2 - \text{O} - \text{CH}_2\text{CH}_3$       (d)  $\text{CH}_3\text{CH}_2 - \text{OSO}_3\text{H}$

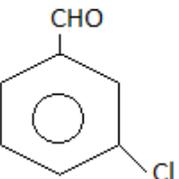
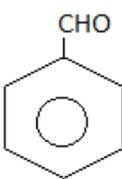
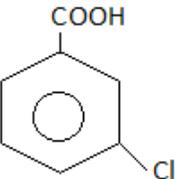
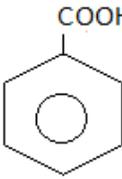
55. The reaction of ethyl magnesium iodide with acetaldehyde gives after acidification

- (a) 2-Butanol      (b) 3-phenylbutan-2-ol  
(c) butan-1-ol      (d) 2-phenylbutan-2-ol

56.  $\text{C}_6\text{H}_5\text{OH} + \text{CHCl}_3 + \text{NaOH} \rightarrow \text{Salicylaldehyde}$ . The electrophile involved in the above reaction is.

- (a) dichloromethyl cation ( $\text{H}\overset{+}{\text{C}}\text{Cl}_2$ )      (b) dichlorocarbene ( $:\text{CCl}_2$ )  
(c) trichloromethylation ( $\bar{\text{C}}\text{Cl}_3$ )      (d) formyl cation ( $\text{HO}-\overset{+}{\text{C}}$ )

57.   $\xrightarrow{\text{PCC}}$  Product is

- (a)       (b)       (c)       (d) 

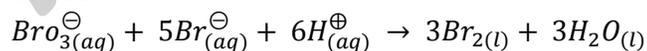
58. Benzene diazonium chloride on reaction with phenol in weakly basic medium gives

- (a) Diphenyl ether      (b) p-Hydroxyazobenzene      (c) chlorobenzene      (d) Benzene

59. The reduction of which of the following compounds would yield secondary amine?

- (a) Alkyl nitrile      (b) Carbylamine      (c)  $1^\circ$  amine      (d) Secondary nitro compound

60. In the following reaction, how is the rate of appearance of the product Bromine related to the rate of disappearance of the reactant Bromide?



(a)  $\frac{d}{dt}[\text{Br}_2] = \frac{-5}{3} \frac{d}{dt}[\text{Br}^{\ominus}]$

(b)  $\frac{d}{dt}[\text{Br}_2] = \frac{d}{dt}[\text{Br}^{\ominus}]$

(c)  $\frac{d}{dt}[\text{Br}_2] = \frac{-d}{dt}[\text{Br}^{\ominus}]$

(d)  $\frac{d}{dt}[\text{Br}_2] = \frac{-3}{5} \frac{d}{dt}[\text{Br}^{\ominus}]$

Rough Space

61. Consider a reaction  $A \rightarrow B + C$ . If the initial concentration was reduced from 2M to 1M in 1hr and from 1M to 0.25 M in 2hr, the order of the reaction is

- (a) 1 (b) 0 (c) 2 (d) 3

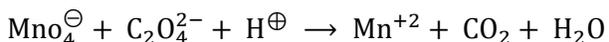
62. If R is the radius of the octahedral voids and 'r' is the radius of the atom in close packing, then r/R is equal to

- (a) 2.41 (b) 4.76 (c) 3.22 (d) 9.1

63. The enthalpy of Combustion of a substance

- (a) Is always positive (b) Is always negative  
(c) Can be either Zero or greater than Zero (d) Is Unpredictable till the calculations are done.

64. For the redox reaction



The correct coefficients of the reactions for the balanced reaction are

	$\text{MnO}_4^-$	$\text{C}_2\text{O}_4^{2-}$	$\text{H}^+$
(a)	2	5	16
(b)	16	5	2
(c)	5	16	2
(d)	2	16	5

65. 4.5g of Aluminium (at. mass 27amu) is deposited at cathode from  $\text{Al}^{+3}$  solutions by a certain quantity of Electric charge. The volume of hydrogen produced at STP from  $\text{H}^+$  ions in solution by the same quantity of Electric charge will be

- (a) 44.8L (b) 22.4L (c) 11.2L (d) 5.6L

66. In reaction  $\text{CH}_3\text{COCH}_3(\text{g}) \rightleftharpoons \text{CH}_3\text{C}(\text{CH}_3)=\text{CH}(\text{g}) + \text{CO}(\text{g})$  If the initial pressure of  $\text{CH}_3\text{COCH}_3(\text{g})$  is 150 mm and at Equilibrium the mole fraction of CO is  $\frac{1}{3}$  then the value of Kp is

- (a) 50mm (b) 100mm (c) 33.3mm (d) 75mm

67. An electron in an atom Undergoes transition in such a way that its kinetic energy changes from x to  $\frac{x}{4}$ , the change in potential energy will be

- (a)  $+\frac{3}{2}x$  (b)  $-\frac{3}{8}x$  (c)  $+\frac{3}{4}x$  (d)  $-\frac{3}{4}x$

68. The Number of waves made by a Bohr electron in an orbit of maximum magnetic quantum number "3" is

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

69. Equal Volumes of three acid solutions of pH 3, 4 and 5 are mixed in a vessel. What will be the  $\text{H}^+$  concentration in the mixture?

- (a)  $3.7 \times 10^{-3}\text{M}$  (b)  $1.11 \times 10^{-3}\text{M}$  (c)  $1.11 \times 10^{-4}\text{M}$  (d)  $3.7 \times 10^{-4}\text{M}$

70. Which of the following is most soluble?

- (a)  $\text{Bi}_2\text{S}_3$  ( $K_{sp} = 1 \times 10^{-70}$ )                      (b)  $\text{MnS}$  ( $K_{sp} = 7 \times 10^{-16}$ )  
 (c)  $\text{CuS}$  ( $K_{sp} = 8 \times 10^{-37}$ )                      (d)  $\text{Ag}_2\text{S}$  ( $K_{sp} = 6 \times 10^{-51}$ )

71. A balloon of diameter 20m Weighs 100kg. Calculate its payload if it is filled with helium at 1.0 atm and  $27^\circ$ . Density of air is  $1.2 \text{ Kg m}^{-3}$  ( $R = 0.082 \text{ dm}^3 \text{ atm K}^{-1} \text{ mole}^{-1}$ )

- (a) 4260                      (b) 4395                      (c) 4247                      (d) 4463

72. The translational kinetic energy of an ideal gas depends only on its

- (a) Pressure                      (b) force                      (c) temperature                      (d) molar mass.

73. Henry's law constant for the solubility of  $\text{N}_2$  gas in water at 298K is  $1.0 \times 10^5 \text{ atm}$ . The molefraction of  $\text{N}_2$  in air is 0.6. The number of moles of  $\text{N}_2$  from air dissolved in 10 moles of water at 298K and 5 atm pressure is

- (a)  $3.0 \times 10^{-4}$                       (b)  $4.0 \times 10^{-5}$                       (c)  $5.0 \times 10^{-4}$                       (d)  $6.0 \times 10^{-6}$

74. Which of the following is not a mineral of Fluorine?

- (a) Fluor spar                      (b) cryolite                      (c) Fluorapatite                      (d) Teflon

75. Which of the following is correct order regarding oxoacids of chlorine?

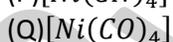
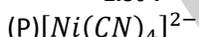
- (a)  $\text{HClO} > \text{HClO}_2 > \text{HClO}_3 > \text{HClO}_4$  : Stability order  
 (b)  $\text{HClO} > \text{HClO}_2 > \text{HClO}_3 > \text{HClO}_4$  : Oxidising nature  
 (c)  $\text{HClO} < \text{HClO}_2 < \text{HClO}_3 < \text{HClO}_4$  : Cl – O bound length order  
 (d)  $\text{HClO} > \text{HClO}_2 > \text{HClO}_3 > \text{HClO}_4$  : acidic nature order

76. The total number of electrons in the ground state of Chromium with magnetic quantum number,  $m=0$  is

- (a) 10                      (b) 12                      (c) 13                      (d) 11

77. Match the List-I with List-II by using the postulates of VBT of complexes

**List-I**



- (a) P-3,1 Q-1,4 R-2,3 S-1,4

- (c) p-2,4 Q-1,4 R-2,4 S-2

**List-II**

(1)  $sp^3$  hybridization

(2)  $dsp^2$  hybridization

(3)  $\mu = 0 \text{ BM}$

(4)  $\mu = 1.732 \text{ BM}$

- (b) P-2,3 Q-1,3 R-1,4 S-2,3

- (d) P-2,3 Q-1,3 R-2,4 S-2,3

78. The incorrect order regarding 15 th group hydrides is

(a) Reducing nature :  $\text{NH}_3 < \text{PH}_3 < \text{AsH}_3 < \text{SbH}_3 < \text{BiH}_3$

(b) Bond angle :  $\text{NH}_3 > \text{PH}_3 > \text{AsH}_3 > \text{SbH}_3 > \text{BiH}_3$

(c) Basic nature :  $\text{NH}_3 > \text{PH}_3 > \text{AsH}_3 > \text{SbH}_3 > \text{BiH}_3$

(d) Boiling point :  $\text{NH}_3 < \text{PH}_3 < \text{AsH}_3 < \text{SbH}_3 < \text{BiH}_3$

79. Which of the following does not give its oxoacid of central atom on hydrolysis?  
 (a)  $SCl_4$  (b)  $NCl_3$  (c)  $PCl_5$  (d)  $AsCl_3$
80. Which of the among the following is more acidic ?  
 (a)  $H_2O$  (b)  $H_2S$  (c)  $H_2Se$  (d)  $H_2Te$
81. The true statement for the acids of phosphorus :  $H_3PO_2$ ,  $H_3PO_3$  and  $H_3PO_4$  is  
 (a) The order of acidity is  $H_3PO_2 < H_3PO_3 < H_3PO_4$   
 (b) All of these are reducing in nature  
 (c) All are tribasic acids  
 (d) The geometry of phosphorus is tetrahedral in all the three
82. Volume strength of 1.5 N  $H_2O_2$  is :  
 (a) 4.8 (b) 8.4 (c) 3.0 (d) 8.0
83. The salt used for performing 'bead' test in qualitative inorganic analysis is :  
 (a)  $K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24H_2O$  (b)  $FeSO_4 \cdot (NH_4)_2SO_4 \cdot 6H_2O$   
 (c)  $Na(NH_4)HPO_4 \cdot 4H_2O$  (d)  $Na_2SO_4 \cdot Cr_2(SO_4)_3 \cdot 24H_2O$
84. Which are true statements among the following ?  
 (A)  $PH_5$  and  $BiCl_5$  do not exist  
 (B) Bond order of  $CO_3^{2-}$  is 1.33  
 (C)  $SeF_4$  and  $CH_4$  have same shape  
 (D)  $I_3^+$  has bent geometry  
 (E) The number of  $P_\pi - d_\pi$  bonds in  $SO_2$  &  $SO_3$  are same  
 (a) A&C (b) A,B&E (c) A,B&D (d) all the above
85. The increasing order of acidic nature of the following oxides is  
 (a)  $SiO_2 < P_2O_5 < Cl_2O_7 < SO_3$  (b)  $SiO_2 < P_2O_5 < SO_3 < Cl_2O_7$   
 (c)  $Cl_2O_7 < SO_3 < P_2O_5 < SiO_2$  (d)  $SO_3 < Cl_2O_7 < SiO_2 < P_2O_5$
86. The best electrolyte for coagulation of  $As_2S_3$  sol is  
 (a)  $NaCl$  (b)  $CuSO_4$  (c)  $Al(NO_3)_3$  (d)  $Th(SO_4)_2$
87. In an adsorption experiment, a graph between  $\log(x/m)$  versus  $\log p$  is found to be linear with a slope of  $45^\circ$ . The intercept on  $\log(x/m)$  axis was found to be 0.3010. The amount of the gas adsorbed per gram of charcoal under a pressure of 0.5 atm will be  
 (a) 1.0 (b) 2.0 (c) 0.5 (d) 0.25
88. Cupellation process is used in the metallurgy of  
 (a) Cu (b) Ag (c) Al (d) Fe

89. Milk contains vitamins  
(a) A, D, and E                      (b) A, B<sub>12</sub> and D                      (c) C, D and K                      (d) B<sub>1</sub>, B<sub>6</sub> and D.
90. A polymer of prop-2-enitrile is called  
(a) Saran                      (b) Orlon                      (c) Dacron                      (d) Teflon

**PART - C**  
**BIOLOGY**

91. About 98 percent of the mass of every living organism is composed of just six elements including carbon, hydrogen, nitrogen, oxygen and  
(a) calcium and phosphorous                      (b) phosphorus and sulphur  
(c) sulphur and magnesium                      (d) magnesium and sodium
92. Select the wrong statement from the following:  
(a) Chloroplasts are generally much larger than mitochondria.  
(b) Both chloroplasts and mitochondria have inner and outer membrane  
(c) Chloroplasts contain 70S ribosomes and mitochondria have 80S ribosomes.  
(d) Both chloroplasts and mitochondria contain DNA.
93. The overall goal of glycolysis, Krebs cycle and electron transport system is the formation of:  
(a) Nucleic acids                      (b) ATP in small stepwise units  
(c) ATP in one large oxidation reaction                      (d) Sugars
94. Which one of the following is a slime mold?  
(a) Anabaena                      (b) Rhizopus                      (c) Physarum                      (d) Thiobacillus
95. For critical study of secondary growth in plants, which one of the following pairs is suitable?  
(a) Wheat and maidenhair fern                      (b) Sugarcane and sunflower  
(c) Teak and pine                      (d) Deodar and fern
96. Which one of the following statements about Mycoplasma is wrong?  
(a) They cause diseases in plants                      (b) They are also called PPLO  
(c) They are pleomorphic                      (d) They are sensitive to penicillin
97. In the prothallus of vascular cryptogam, the antherozoids and eggs mature at different times. As a result:  
(a) self fertilization is prevented                      (b) there is no change in success rate of fertilization  
(c) there is high degree of sterility                      (d) one can conclude that the plant is apomictic
98. Two plants can be conclusively said to belong to the same species, if they:  
(a) have same number of chromosomes                      (b) can reproduce freely with each other and form seeds  
(c) have more than 90 per cent similar genes                      (d) look similar and possess identical secondary metabolites.

99. If you are asked to classify the various algae into distinct groups, which of the following characters should you choose?
- (a) Chemical composition of the cell wall  
(b) Types of pigments present in the cell  
(c) Nature of stored food materials in the cell  
(d) Structural organization of thallus.
100. Flagellated male gametes are present in all the three of which one of the following sets?
- (a) Riccia, Dryopteris and Cycas  
(b) Anthoceros, Funaria and Spirogyra  
(c) Zygnema, Saprolegnia and Hydrilla  
(d) Fucus, Marsilea and Calotropis
101. In gymnosperms, the pollen chamber represents:
- (a) the microsporangium in which pollen grains develop  
(b) a cell in the pollen grain in which the sperms are formed  
(c) a cavity in the ovule in which pollen grains are stored after pollination  
(d) an opening in the mega gametophyte through which the pollen tube approaches the egg.
102. Spore dissemination in some liverworts is aided by:
- (a) peristome teeth  
(b) elaters  
(c) indusium  
(d) calyptra
103. Which pair of the following belongs to Basidiomycetes?
- (a) Morchella and Mushrooms  
(b) Bird's nest fungi and Puffballs  
(c) Puffballs and Claviceps  
(d) Peziza and Stink horns
104. Ergot of rye is caused by a species of:
- (a) Claviceps  
(b) Phytophthora  
(c) Uncinula  
(d) Ustilago
105. One of the important consequences of geographical isolation is:
- (a) Random creation of new species  
(b) No change in the isolated fauna  
(c) Preventing Speciation  
(d) Speciation through reproductive isolation
106. Select the correct statement from the following:
- (a) Mutations are random and directional  
(b) Darwinian variations are large and directionless  
(c) Fitness is the end result of the ability to adapt and get selected by nature  
(d) All mammals except whales and camels have seven cervical vertebrae
107. "Foolish Seedling" disease of rice led to the discovery of:
- (a) IAA  
(b) GA  
(c) ABA  
(d) 2, 4 – D
108. Passage cells are thin-walled cells found in:
- (a) central region of style through which the pollen tube grows towards the ovary.  
(b) endodermis of roots facilitating rapid transport of water from cortex to pericycle.  
(c) phloem elements that serve as entry points for substances for transport to other plant parts.  
(d) testa of seed to enable emergence of growing embryonic axis during seed germination.

109. The first acceptor of electrons from an excited chlorophyll molecule of photosystem II is:  
(a) Quinone                      (b) Cytochrome                      (c) Iron-sulphur protein                      (d) Ferredoxin.
110. All enzymes of TCA cycle are located in the mitochondrial matrix except one which is located in inner mitochondrial membranes in eukaryotes and in cytosol in prokaryotes. This enzyme is:  
(a) succinate dehydrogenase                      (b) lactate dehydrogenase  
(c) isocitrate dehydrogenase                      (d) malate dehydrogenase
111. Which one of the following pairs, is not correctly matched?  
(a) IAA - Cell wall elongation                      (b) Abscissic Acid - Stomatal closure  
(c) Gibberellic Acid - Leaf fall                      (d) Cytokinin - Cell division
112. Male gametes in angiosperms are formed by the division of:  
(a) Microspore mother cell                      (b) Microspore                      (c) Generative cell                      (d) Vegetative cell
113. The minerals involved in water-splitting reaction during photosynthesis are  
(a) Magnesium and Chlorine                      (b) Potassium and Manganese  
(c) Manganese and Chlorine                      (d) Molybdenum and Manganese
114. Which one of the following ecosystem types has the highest annual net primary productivity?  
(a) Temperate deciduous forest                      (b) Tropical rain forest  
(c) Tropical deciduous forest                      (d) Temperate evergreen forest
115. Which one of the following is being utilized as a source of biodiesel in the Indian countryside?  
(a) Pongamia                      (b) Euphorbia                      (c) Beetroot                      (d) Sugarcane
116. A genetically engineered micro-organism used successfully in bioremediation of oil spills is a species of:  
(a) Bacillus                      (b) Pseudomonas                      (c) Trichoderma                      (d) Xanthomonas
117. A plant requires magnesium for:  
(a) Cell wall development                      (b) Holding cells together                      (c) Protein synthesis                      (d) Chlorophyll synthesis
118. Probiotics are:  
(a) Live microbial food supplement                      (b) Safe antibiotics  
(c) Cancer inducing microbes                      (d) New kind of food allergens
119. Lysozyme that is present in perspiration, saliva and tears, destroys:  
(a) most virus-infected cells                      (b) certain fungi                      (c) certain types of bacteria                      (d) all viruses

120. The scutellum observed in a grain of wheat or maize is comparable to which part of the seed in other monocotyledons ?

- (a) Aleurone layer                      (b) Plumule                      (c) Cotyledon                      (d) Endosperm

121. The technical term used for the androecium in a flower of China rose (*Hibiscus rosasinensis*) is:

- (a) Polyandrous                      (b) Polyadelphous                      (c) Monadelphous                      (d) Diadelphous

122. Which one of the following is an example of *ex-situ* conservation ?

- (a) Sacred grooves                      (b) National park                      (c) Wildlife sanctuary                      (d) Seed bank

123. Wind pollinated flowers are:

- (a) large producing abundant nectar and pollen  
(b) small, producing nectar and dry pollen  
(c) small, brightly coloured, producing large number of pollen grains  
(d) small, producing large number of dry pollen grains

124. Keel is characteristic of the flowers of:

- (a) Tulip                      (b) Indigofera                      (c) Aloe                      (d) Tomato

125. The two gases making highest relative contribution to the greenhouse gases are:

- (a) CFCs and  $N_2O$                       (b)  $CO_2$  and  $N_2O$                       (c)  $CO_2$  and  $CH_4$                       (d)  $CH_4$  and  $N_2O$

126. Transfer of pollen grains from the anther to the stigma of another flower of the same plant is called:

- (a) cleistogamy                      (b) Autogamy                      (c) Xenogamy                      (d) Geitonogamy

127. Select the correct statement from the following :

- (a) Biogas commonly called gobar gas, is pure methane  
(b) Activated sludge-sediment in settlement tanks of sewage treatment plant is a rich source of aerobic bacteria  
(c) Biogas is produced by the activity of aerobic bacteria on animal waste  
(d) Methanobacterium is aerobic bacterium found in rumen of cattle

128. Phototropic curvature is the result of uneven distribution of:

- (a) Cytokinins                      (b) Auxins                      (c) Gibberellins                      (d) Phytochrome

129. The genotype of a plant showing the dominant phenotype can be determined by:

- (a) Pedigree analysis                      (b) Back cross                      (c) Test cross                      (d) Dihybrid cross

130. Heartwood differs from sapwood in:

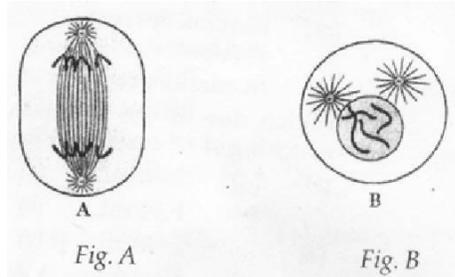
- (a) Having dead and non conducting elements  
(b) Being susceptible to pests and pathogens  
(c) Presence of rays and fibres  
(d) Absence of vessels and parenchyma

131. Single-celled eukaryotes are included in:

- (a) Archaea                      (b) Monera                      (c) Protista                      (d) Fungi

132. Which stages of cell division do the following figures A and B represent respectively?

- (a) Late anaphase – Prophase  
 (b) Prophase – Anaphase  
 (c) Metaphase – Telophase  
 (d) Telophase – Metaphase



133. Male and female gametophytes are independent and free-living in :

- (a) Pinus                      (b) Sphagnum                      (c) Mustard                      (d) Castor

134. Ovary is half-inferior in the flowers of :

- (a) Brinjal                      (b) Cucumber                      (c) Guava                      (d) Plum

135. Photoperiodism was first characterised in

- (a) Tomato                      (b) Cotton                      (c) Tobacco                      (d) Potato

136. How many sets of chromosomes are found in the sperm cell or egg cell?

- (a) one set                      (b) two sets                      (c) three sets                      (d) four sets

137. Vocal cords are found in \_\_\_\_\_.

- (a) oesophagus                      (b) trachea                      (c) larynx                      (d) lungs

138. Which one of the following series represents the correct path of blood circulation?

- (a) left atrium, left ventricle, lungs, right atrium, right ventricle, body  
 (b) right atrium, right ventricle, lungs, left atrium, left ventricle, body  
 (c) left atrium, left ventricle, right atrium, right ventricle, lungs, body  
 (d) right atrium, lungs, right ventricle, left atrium, body, left ventricle

139. Which part of the eye contains millions of nerve cells that are sensitive to light

- (a) cornea                      (b) retina                      (c) iris                      (d) lens

140. Which of the following hormones is not released by the anterior pituitary?

- (a) melanocyte-stimulating hormone                      (b) gonadotropin-releasing hormone  
 (c) thyroid-stimulating hormone                      (d) growth hormone

141. Two antagonistic hormones are  
(a) MSH and TSH (b) calcitonin and parathyroid hormone (c) ADH and GH (d) oxytocin and prolactin
142. Which hormone(s) is/are released by the posterior pituitary?  
(a) Oxytocin (b) Thyroid-stimulating hormone (c) Vasopressin (d) Both a and c.
143. Nerve cells were seen for the first time in  
(a) Leech (b) Hydra (c) Ascaris (d) Tape worm
144. Which among the following is a true fish?  
(a) Flying fish (b) Devil fish (c) Cuttle fish (d) silver fish
145. Which among the following is a pseudocoelomate?  
(a) Leech (b) Liver fluke (c) Hookworm (d) Jelly fish
146. Fertilization is internal in  
(a) Ascaris (b) Alligator (c) Neophron (d) All
147. What is common between Psittacula, Macropus and Ornithorhynchus?  
(a) Toothless jaws (b) Functional post-anal tail (c) Ovoparity (d) Homoeothermy
148. Which one of the following animals is correctly matched with its particular named taxonomic category?  
(a) Tiger – tigris, the genus (b) Cuttle fish – Mollusca, a phylum  
(c) Housefly – insecta, an order (d) Salpa – urochordata, a phylum
149. Heart of frog when removed from the body and placed in Ringer's solution (a solution that is isotonic with blood), goes on beating for a long time. This shows that frog's heart beat is  
(a) Rhythmic (b) Neurogenic (c) Myogenic (d) Spontaneous
150. In human eye, at the blind spot  
(a) Only rods are present (b) Only cones are present  
(c) Both rods and cones are present (d) Neither rods nor cones are present
151. A man of "A" blood group marries a woman of "AB" blood group. Which type of progeny would indicate that the man is heterozygous for A?  
(a) AB (b) A (c) O (d) B
152. Bt toxin is obtained from:  
(a) Prokaryotes (b) Eukaryotes (c) fungi (d) None of these

153. Statement 1: BT toxins are protein crystals containing insecticidal protein.

Statement 2: B.thuringiensis forms these protein crystals throughout continuously during their growth period.

- (a) Both statements 1 and 2 are correct and statement 2 is the correct explanation of statement 1.
- (b) Both statements 1 & 2 are correct and statement 2 is not the correct explanation of statement 1.
- (c) Statement 1 is correct and statement 2 is incorrect.
- (d) Both statements 1 and 2 are incorrect.

154. Oxygen and carbon dioxide are exchanged in the alveoli by:

- (a) filtration
- (b) osmosis
- (c) diffusion
- (d) active transport

155. Heterogeneity in our biosphere exists at:

- (a) Cellular level
- (b) Species level
- (c) Biome level
- (d) all levels of biological organization

156. Which of the following statements regarding hormonal control of the menstrual cycle is not correct?

- (a) In the absence of receptors for FSH and LH, preantral follicles undergo atresia
- (b) After ovulation, the ruptured follicle is converted into corpus albicans which secretes progesterone
- (c) Progesterone promotes full development of the endometrium
- (d) If no egg is fertilized, progesterone levels fall and this is the trigger for menstruation

157. Which of the following has the highest number of species in nature?

- (a) Amphibians
- (b) Insects
- (c) Birds
- (d) Angiosperms

158. The finches of Galapagos islands provide evidence in favour of:

- (a) Adaptive radiation
- (b) Retrogressive evolution
- (c) Bio-geographic evolution
- (d) Special creation

159. When people are born without T and B cells, they suffer from:

- (a) Auto-immune diseases
- (b) Immuno deficiency diseases
- (c) Both of these
- (d) None of these

160. Use of anti-histamines and steroids give quick relief from:

- (a) head ache
- (b) allergy
- (c) nausea
- (d) cough

161. How many sperms are formed from a primary spermatocyte?

- (a) 1
- (b) 2
- (c) 4
- (d) 8

162. The term 'evil quartet' is related with four major causes of:

- (a) green house effect
- (b) population explosion
- (c) air pollution
- (d) biodiversity losses

163. Which of the following is not an example of a vestigial structure in humans?

- (a) coccyx
- (b) pelvis
- (c) appendix
- (d) all of the above are vestigial

164. Ventral mouth is seen in:  
(a) Scoliodon (b) Labeo (c) Catla (d) Salamandra
165. Amphibian skin is externally covered by:  
(a) placoid scales (b) cycloid scales (c) ctenoid scales (d) no scales
166. Early detection of a disease is possible by:  
(a) PCR (b) gene therapy (c) rDNA technology and ELISA (d) both a and c
167. The first drug produced using recombinant DNA technology is used to treat  
(a) haemophilia (b) dwarfism. (c) heart attack (d) diabetes
168. Breeding crops with higher levels of minerals, vitamins or higher protein and healthier fats is called  
(a) Micropropagation (b) Somatic hybridization (c) Biofortification (d) Biomagnification
169. Somaclones are obtained by  
(a) Genetic engineering (b) Tissue culture (c) Plant breeding (d) Irradiation
170. Western ghats have a greater number of amphibian species than the Eastern ghats. What kind of diversity does it represent?  
(a) Species diversity (b) Genetic diversity (c) Ecological diversity (d) None
171. In India, Air (Prevention and Control of Pollution) Act came into force in the year 1981, but was amended in the year \_\_\_\_\_ to include \_\_\_\_\_ as an air pollutant.  
(a) 1990, noise (b) 1984, particulate matter (c) 1985, noise (d) 1987, noise
172. The gaseous mixture sealed by Miller in the spark chamber:  
(a)  $\text{CH}_4$ ,  $\text{NH}_3$ ,  $\text{H}_2$ , water vapour (b)  $\text{CH}_4$ ,  $\text{HNO}_3$ ,  $\text{H}_2$ , water vapour  
(c)  $\text{CH}_2$ ,  $\text{NH}_3$ ,  $\text{H}_2$ , water vapour (d)  $\text{CH}_4$ ,  $\text{NH}_3$ ,  $\text{CO}_2$ , water vapour
173. Among the human ancestors, the brain size was more than 1000 cc in:  
(a) Neanderthal man (b) Australopithecus (c) Ramapithecus (d) Homo habilis
174. Both corpus luteum and macula lutea are:  
(a) found in human ovaries (b) source of hormones  
(c) characterised by yellow colour (d) contributory in maintaining pregnancy
175. Chief function of crista and macula is:  
(a) to perceive pressure (b) to receive vibrations (c) to maintain equilibrium (d) to hear
176. *Fasciola hepatica* is found in  
(a) intestine of sheep (b) blood of sheep (c) liver of sheep (d) spleen of sheep

177. Which of the following groups of animals is bilaterally symmetrical and triploblastic?  
(a) Aschelminthes                      (b) ctenophores                      (c) sponges                      (d) coelenterates
178. Turbellarians are free living  
(a) nematodes                      (b) cestodes                      (c) flat worms                      (d) trematodes
179. Which of the following statements is true?  
(a) Invertebrates possess a dorsal nerve cord                      (b) Non chordates have vertebral column  
(c) All chordates are vertebrates                      (d) All vertebrates are chordates
180. Which of the following does not have alimentary canal?  
(a) Ascaris                      (b) Taenia                      (c) Frog                      (d) Earthworm