

# 8056206308

## 2026 - 2027 WHATSAPP TEST GROUPS

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- CHAPTER WISE STUDY MATERIALS UPLOAD
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### SUBJECTS COVERED

NEET - PHYSICS CHEMISTRY BIOLOGY  
JEE - MATHS PHYSICS CHEMISTRY



## FEES RS.4500 FOR 1 YEAR

(MARCH 2026 TO FEB 2027 WHENEVER YOU JOIN SAME FEES STRUCTURE ONLY. IF INTRESTED JOIN AS EARLY AS POSSIBLE)

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### Section - 1

## PHYSICS

1. A uniform cylinder of length  $L$  and mass  $M$  having cross-sectional area  $A$  is suspended, with its length vertical, from a fixed point by a massless spring such that it is half submerged in a liquid of density  $a$  at equilibrium position. The extension  $x_Q$  of the spring when it is in equilibrium is:

(a)  $\frac{Mg}{k}$                       (b)  $\frac{Mg}{k} \left(1 - \frac{LAG}{M}\right)$

(c)  $\frac{Mg}{k} \left(1 - \frac{LAG}{2M}\right)$                       (d)  $\frac{Mg}{k} \left(1 + \frac{LAG}{M}\right)$

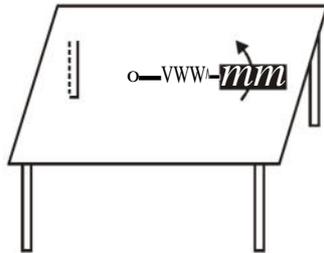
2. A metallic rod of length ' $l$ ' is tied to a string of length  $2l$  and made to rotate with angular speed  $\omega$  on a horizontal table with one end of the string fixed. If there is a vertical magnetic field ' $B$ ' in the region, the e.m.f. induced across the ends of the rod is

(a)  $\frac{2B\omega l^2}{2}$

(b)  $\frac{3B\omega l^2}{2}$

(c)  $\frac{4B\omega l^2}{2}$

(d)  $\frac{5B\omega l^2}{2}$



3. This question has statement I and statement II. Of the four choices given after the statements, choose the one that best describes the two statements.

**Statement - 1:** A point particle of mass  $m$  moving with speed  $o$  collides with stationary point particle of mass  $M$ . If the

maximum energy loss possible is given as  $\sqrt{\left(\frac{1}{2}mv^2\right)}$  then

$$f = \left(\frac{m}{M+m}\right).$$

**Statement - II:** Maximum energy loss occurs when the particles get stuck together as a result of the collision.

- (a) Statement - I is true, Statment - II is true, Statement - II is the correct explanation of Statement - I.  
(b) Statement-I is true, Statment - II is true, Statement - II is not the correct explanation of Statement - II.  
(c) Statement - I is true, Statment - II is false.  
(d) Statement - I is false, Statment - II is true.
4. Let  $[e_0]$  denote the dimensional formula of the permittivity of vacuum. If  $M =$  mass,  $L =$  length,  $T =$  time and  $A =$  electric current, then:
- (a)  $e_0 = [M^{-1} L^{-3} T^2 A]$       (b)  $e_0 = [M^1 L^3 T^5 A^2]$   
(c)  $e_0 = [M^1 L^2 T^1 A^2]$       (d)  $e_0 = [M^1 L^2 T^1 A]$

5. A projectile is given an initial velocity of  $(\hat{i} + 2\hat{j})$  m/s, where  $\hat{i}$  is along the ground and  $\hat{j}$  is along the vertical. If  $g = 10$  m/s<sup>2</sup>, the equation of its trajectory is :

(a)  $y = x - 5x^2$                       (b)  $y = 2x - 5x^2$   
(c)  $4y = 2x - 5x^2$                       (d)  $4y = 2x - 25x^2$

6. The amplitude of a damped oscillator decreases to 0.9 times its original magnitude in 5s. In another 10s it will decrease to a times its original magnitude, where a equals

(a) 0.7                                      (b) 0.81  
(c) 0.729                                      (d) 0.6

7. Two capacitors  $C_1$  and  $C_2$  are charged to 120 V and 200 V respectively. It is found that connecting them together the potential on each one can be made zero. Then

# NEET / JEE 2026

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- (a)  $5C_1 = 3C_2$  (b)  $3C_1 = 5C_2$   
(c)  $3C_j + 5C_2 = 0$  (d)  $9Q = 4C_2$

8. A sonometer wire of length 1.5 m is made of steel. The tension in it produces an elastic strain of 1%. What is the fundamental frequency of steel if density and elasticity of steel are  $7.7 \times 10^3 \text{ kg/m}^3$  and  $2.2 \times 10^{11} \text{ N/m}^2$  respectively?

- (a) 188.5 Hz (b) 178.2 Hz  
(c) 200.5 Hz (d) 770 Hz

9. A circular loop of radius 0.3 cm lies parallel to a much bigger circular loop of radius 20 cm. The centre of the small loop is on the axis of the bigger loop. The distance between their centres is 15 cm. If a current of 2.0 A flows through the smaller loop, then the flux linked with bigger loop is

- (a)  $9.1 \times 10^{-11}$  weber (b)  $6 \times 10^{-11}$  weber  
(c)  $3.3 \times 10^{-11}$  weber (d)  $6.6 \times 10^{-9}$  weber

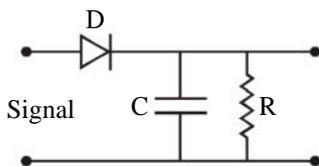
10. Diameter of a plano-convex lens is 6 cm and thickness at the centre is 3 mm. If speed of light in material of lens is  $2 \times 10^8 \text{ m/s}$ , the focal length of the lens is

- (a) 15 cm (b) 20 cm (c) 30 cm (d) 10 cm

11. What is the minimum energy required to launch a satellite of mass  $m$  from the surface of a planet of mass  $M$  and radius  $R$  in a circular orbit at an altitude of  $2R$ ?

- (a)  $\frac{5GmM}{6R}$  (b)  $\frac{2GmM}{3R}$   
(c)  $\frac{GmM}{2R}$  (d)  $\frac{GmM}{2R}$

12. A diode detector is used to detect an amplitude modulated wave of 60% modulation by using a condenser of capacity 250 picofarad in parallel with a load resistance 100 kilo ohm. Find the maximum modulated frequency which could be detected by it.



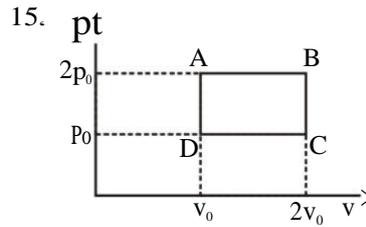
- (a) 10.62 MHz (b) 10.62 kHz  
(c) 5.31 MHz (d) 5.31 kHz

13. A beam of unpolarised light of intensity  $I_0$  is passed through a polaroid A and then through another polaroid B which is oriented so that its principal plane makes an angle of  $45^\circ$  relative to that of A. The intensity of the emergent light is

- (a)  $I_0$  (b)  $I_0/2$   
(c)  $I_0/4$  (d)  $I_0/8$

14. The supply voltage to room is 120V. The resistance of the lead wires is  $6\Omega$ . A 60 W bulb is already switched on. What is the decrease of voltage across the bulb, when a 240 W heater is switched on in parallel to the bulb?

- (a) zero (b) 2.9 Volt  
(c) 13.3 Volt (d) 10.04 Volt



The above p-v diagram represents the thermodynamic cycle of an engine, operating with an ideal monatomic gas. The amount of heat, extracted from the source in a single cycle is

- (a)  $P_0V_0$  (b)  $\left(\frac{13}{2}\right)P_0V_0$   
(c)  $\left(\frac{n}{\gamma-1}\right)P_0V_0$  (d)  $4P_0V_0$

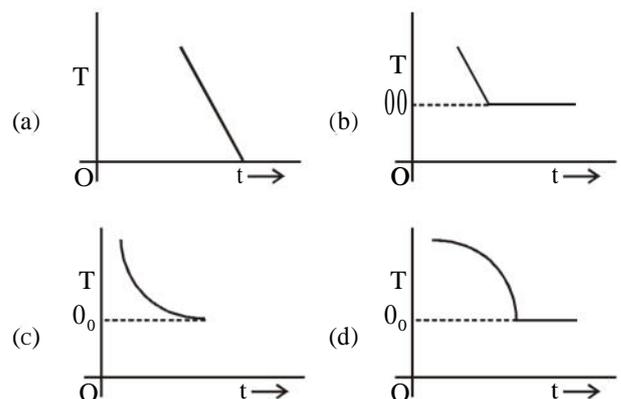
16. A hoop of radius  $r$  and mass  $m$  rotating with an angular velocity  $\omega_0$  is placed on a rough horizontal surface. The initial velocity of the centre of the hoop is zero. What will be the velocity of the centre of the hoop when it ceases to slip?

- (a)  $\frac{r\omega_0}{4}$  (b)  $\frac{r\omega_0}{3}$   
(c)  $\frac{r\omega_0}{2}$  (d)  $r\omega_0$

17. An ideal gas enclosed in a vertical cylindrical container supports a freely moving piston of mass  $M$ . The piston and the cylinder have equal cross sectional area  $A$ . When the piston is in equilibrium, the volume of the gas is  $V_0$  and its pressure is  $P_0$ . The piston is slightly displaced from the equilibrium position and released. Assuming that the system is completely isolated from its surrounding, the piston executes a simple harmonic motion with frequency

- (a)  $\frac{1}{2\pi} \frac{A\gamma P_0}{V_0 M}$  (b)  $\frac{1}{2\pi} \frac{V_0 M P_0}{A^2 \gamma}$   
(c)  $\frac{1}{2\pi} \sqrt{\frac{A^2 \gamma P_0}{M V_0}}$  (d)  $\frac{1}{2\pi} \sqrt{\frac{M V_0}{A \gamma P_0}}$

18. If a piece of metal is heated to temperature  $\theta$  and then allowed to cool in a room which is at temperature  $\theta_0$ , the graph between the temperature  $T$  of the metal and time  $t$  will be closest to

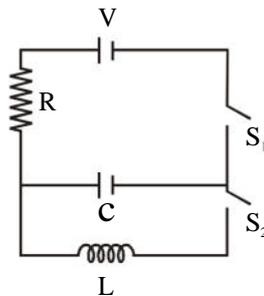


19. This questions has Statement I and Statement II. Of the four choices given after the Statements, choose the one that best describes into two Statements.

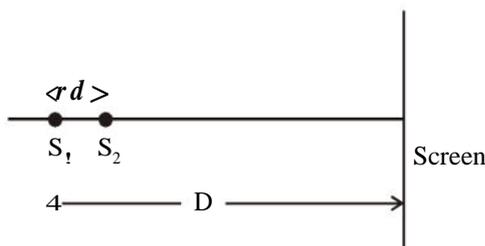
**Statement-I :** Higher the range, greater is the resistance of ammeter.

**Statement-II :** To increase the range of ammeter, additional shunt needs to be used across it.

- (a) Statement-I is true, Statement-II is true, Statement-II is the correct explanation of Statement-I.  
 (b) Statement-I is true, Statement-II is true, Statement-II is not the correct explanation of Statement-I.  
 (c) Statement-I is true, Statement-II is false.  
 (d) Statement-I is false, Statement-II is true.
20. In an LCR circuit as shown below both switches are open initially. Now switch  $S_1$  is closed,  $S_2$  kept open. ( $q$  is charge on the capacitor and  $\tau = RC$  is Capacitive time constant). Which of the following statement is correct ?

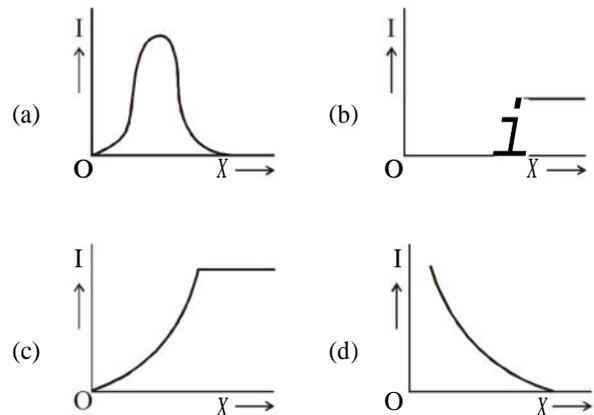


- (a) Work done by the battery is half of the energy dissipated in the resistor  
 (b)  $Att = x, q = CV/2$   
 (c) At  $t = 2x, q = CV(1 - e^{-2})$   
 (d) At  $t = 2i, q = CV(1 - e^{-1})$
21. Two coherent point sources  $S_1$  and  $S_2$  are separated by a small distance 'd' as shown. The fringes obtained on the screen will be

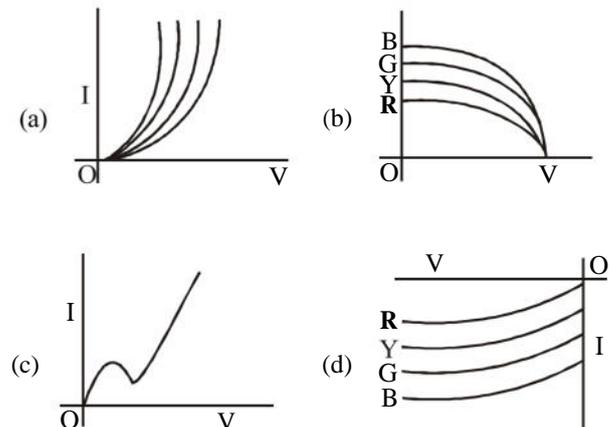


- (a) points (b) straight lines  
 (c) semi-circles (d) concentric circles
22. The magnetic field in a travelling electromagnetic wave has a peak value of 20 nT. The peak value of electric field strength is:
- (a) 3 V/m (b) 6 V/m  
 (c) 9 V/m (d) 12 V/m

23. The anode voltage of a photocell is kept fixed. The wavelength  $\lambda$  of the light falling on the cathode is gradually changed. The plate current  $I$  of the photocell varies as follows :



24. The I-V characteristic of an LED is



25. Assume that a drop of liquid evaporates by decrease in its surface energy, so that its temperature remains unchanged. What should be the minimum radius of the drop for this to be possible? The surface tension is  $T$ , density of liquid is  $\rho$  and  $L$  is its latent heat of vaporization.

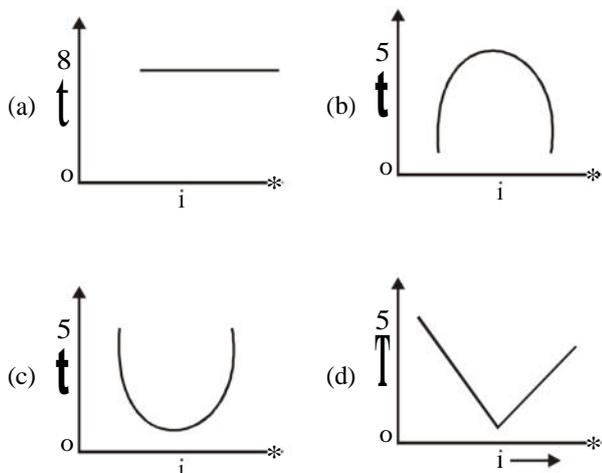
- (a)  $\rho LT$  (b)  $\sqrt{rTpL}$   
 (c)  $T/\rho L$  (d)  $2T/\rho L$

26. In a hydrogen like atom electron make transition from an energy level with quantum number  $n$  to another with quantum number  $(n - 1)$ . If  $n \gg 1$ , the frequency of radiation emitted is proportional to :

- (a)  $\frac{1}{n}$  (b)  $\frac{1}{n^2}$   
 (c)  $\frac{1}{n^3/2}$  (d)  $\frac{1}{n^3}$

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27. The graph between angle of deviation ( $\delta$ ) and angle of incidence ( $i$ ) for a triangular prism is represented by



28. Two charges, each equal to  $q$ , are kept at  $x = -a$  and  $x = a$  on

the  $x$ -axis. A particle of mass  $m$  and charge  $q_0 = \Delta$  is placed at the origin. If charge  $q_0$  is given a small displacement ( $y \ll a$ ) along the  $y$ -axis, the net force acting on the particle is proportional to

- (a)  $y$  (b)  $-y$   
 (c)  $\frac{1}{y}$  (d)  $-\frac{1}{y}$
29. Two short bar magnets of length 1 cm each have magnetic moments  $1.20 \text{ Am}^2$  and  $1.00 \text{ Am}^2$  respectively. They are placed on a horizontal table parallel to each other with their N poles pointing towards the South. They have a common magnetic equator and are separated by a distance of 20.0 cm. The value of the resultant horizontal magnetic induction at the mid-point O of the line joining their centres is close to (Horizontal component of earth's magnetic induction is  $3.6 \times 10.5 \text{ Wb/m}^2$ )
- (a)  $3.6 \times 10.5 \text{ Wb/m}^2$  (b)  $2.56 \times 10.4 \text{ Wb/m}^2$   
 (c)  $3.50 \times 10.4 \text{ Wb/m}^2$  (d)  $5.80 \times 10.4 \text{ Wb/m}^2$
30. A charge  $Q$  is uniformly distributed over a long rod AB of length  $L$  as shown in the figure. The electric potential at the point O lying at distance  $L$  from the end A is



- (a)  $\frac{Q}{8\pi\epsilon_0 L}$  (b)  $\frac{3Q}{4\pi\epsilon_0 L}$   
 (c)  $\frac{Q}{4\pi\epsilon_0 L \ln 2}$  (d)  $\frac{Q \ln 2}{4\pi\epsilon_0 Q L}$

## Section - 2

# CHEMISTRY

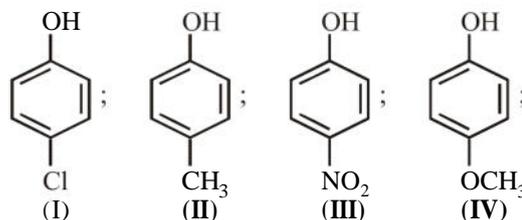
31. Which of the following complex species is not expected to exhibit optical isomerism ?  
 (a)  $[\text{Co}(\text{en})_3]^{3+}$  (b)  $[\text{Co}(\text{en})_2 \text{Cl}_2]^+$   
 (c)  $[\text{Co}(\text{NH}_3)_3 \text{Cl}_3]$  (d)  $[\text{Co}(\text{en})(\text{NH}_3)_2 \text{Cl}_2]^+$
32. Which one of the following molecules is expected to exhibit diamagnetic behaviour ?  
 (a)  $\text{C}_2$  (b)  $\text{N}_2$   
 (c)  $\text{O}_2$  (d)  $\text{S}_2$
33. A solution of (–)-1-chloro-1-phenylethane in toluene racemises slowly in the presence of a small amount of  $\text{SbCl}_5$ , due to the formation of :  
 (a) carbanion (b) carbene  
 (c) carbocation (d) free radical

34. Given :  $E_{\text{Cr}^{3+}/\text{Cr}}^0 = -0.74 \text{ V}$ ;  $E_{\text{MnO}_4^-/\text{Mn}^{2+}}^0 = 1.51 \text{ V}$

$$E_{\text{Cr}_2\text{O}_7^{2-}/\text{Cr}^{3+}}^0 = 1.33 \text{ V}; E_{\text{Cl}^-/\text{Cl}_2}^0 = 1.36 \text{ V}$$

Based on the data given above, strongest oxidising agent will be :

- (a)  $\text{Cl}$  (b)  $\text{Cr}^{3+}$   
 (c)  $\text{Mn}^{2+}$  (d)  $\text{MnO}_4^-$
35. A piston filled with 0.04 mol of an ideal gas expands reversibly from 50.0 mL to 375 mL at a constant temperature of  $37.0^\circ\text{C}$ . As it does so, it absorbs 208 J of heat. The values of  $q$  and  $w$  for the process will be : ( $R = 8.314 \text{ J/mol K}$ ) ( $\ln 7.5 = 2.01$ )  
 (a)  $q = +208 \text{ J}$ ,  $w = -208 \text{ J}$  (b)  $q = -208 \text{ J}$ ,  $w = -208 \text{ J}$   
 (c)  $q = -208 \text{ J}$ ,  $w = +208 \text{ J}$  (d)  $q = +208 \text{ J}$ ,  $w = +208 \text{ J}$
36. The molarity of a solution obtained by mixing 750 mL of 0.5(M) HCl with 250 mL of 2(M) HCl will be :  
 (a) 0.875 M (b) 1.00 M  
 (c) 1.75 M (d) 0.975 M
37. Arrange the following compounds in order of decreasing acidity :



- (a)  $\text{III} > \text{IV} > \text{I} > \text{II}$  (b)  $\text{I} > \text{II} > \text{III} > \text{IV}$   
 (c)  $\text{III} > \text{I} > \text{II} > \text{IV}$  (d)  $\text{IV} > \text{III} > \text{I} > \text{II}$
38. For gaseous state, if most probable speed is denoted by  $C^*$ , average speed by  $\bar{C}$  and mean square speed by  $C$ , then for a large number of molecules the ratios of these speeds are :  
 (a)  $C^* : \bar{C} : C = 1.225 : 1.128 : 1$   
 (b)  $C^* : \bar{C} : C = 1.128 : 1.225 : 1$   
 (c)  $C^* : \bar{C} : C = 1 : 1.128 : 1.225$   
 (d)  $C^* : \bar{C} : C = 1 : 1.225 : 1.128$



57. Stability of the species  $Li_2$ ,  $Li_2^-$  and  $Li_2^+$  increases in the order of :
- (a)  $Li_2 \wedge Li_2^+ \wedge Li_2^-$  (b)  $Li_2^- < Li_2^+ < Li_2$   
(c)  $Li_2 \wedge Li_2^- \wedge Li_2^+$  (d)  $Li_2^- < Li_2 < Li_2^+$
58. An unknown alcohol is treated with the "Lucas reagent" to determine whether the alcohol is primary, secondary or tertiary. Which alcohol reacts fastest and by what mechanism :
- (a) secondary alcohol by  $SN1$   
(b) tertiary alcohol by  $SN1$   
(c) secondary alcohol by  $SN2$   
(d) tertiary alcohol by  $SN2$
59. The gas leaked from a storage tank of the Union Carbide plant in Bhopal gas tragedy was :
- (a) Methyl isocyanate (b) Methylamine  
(c) Ammonia (d) Phosgene
60. Experimentally it was found that a metal oxide has formula  $MO_2$ . Metal M, present as  $M^{2+}$  and  $M^{3+}$  in its oxide. Fraction of the metal which exists as  $M^{3+}$  would be :
- (a) 7.01% (b) 4.08%  
(c) 6.05% (d) 5.08%

**Section - 3**

**MATHEMATICS**

61. Distance between two parallel planes  $2x + y + 2z = 8$  and  $4x + 2y + 4z + 5 = 0$  is
- (a)  $\frac{3}{2}$  (b)  $\frac{5}{2}$   
(c)  $\frac{7}{2}$  (d)  $\frac{9}{2}$
62. At present, a firm is manufacturing 2000 items. It is estimated that the rate of change of production P w.r.t. additional number of workers x is given by  $\frac{dP}{dx} = 100 - 12\sqrt{x}$ . If the firm employs 25 more workers, then the new level of production of items is
- (a) 2500 (b) 3000  
(c) 3500 (d) 4500
63. Let A and B two sets containing 2 elements and 4 elements respectively. The number of subsets of  $A \times B$  having 3 or more elements is
- (a) 256 (b) 220  
(c) 219 (d) 211
64. If the lines  $\frac{x-2}{1} = \frac{y-3}{1} = \frac{z-4}{-k}$  and  $\frac{x-1}{k} = \frac{y-4}{2}$  are coplanar, then k can have
- (a) any value (b) exactly one value  
(c) exactly two values (d) exactly three values
65. If the vectors  $\overline{AB} = 3\hat{i} + 4\hat{k}$  and  $\overline{AC} = 5\hat{i} - 2\hat{j} + 4\hat{k}$  are the sides of a triangle ABC, then the length of the median through A is
- (a)  $7\sqrt{18}$  (b) 772  
(c) 733 (d) 745

66. The real number k for which the equation,  $2x^3 + 3x + k = 0$  has two distinct real roots in  $[0, 1]$
- (a) lies between 1 and 2  
(b) lies between 2 and 3  
(c) lies between .1 and 0  
(d) does not exist.
67. The sum of first 20 terms of the sequence 0.7, 0.77, 0.777,....., is
- (a)  $\frac{7}{81}(179 - 10^{-20})$  (b)  $\frac{7}{9}(99 - 10^{-20})$   
(c)  $\frac{7}{81}(179 + 10^{-20})$  (d)  $\frac{7}{9}(99 + 10^{-20})$
68. A ray of light along  $x + \sqrt{3}y = 73$  gets reflected upon reaching x-axis, the equation of the reflected ray is
- (a)  $y = x + \sqrt{3}$  (b)  $73y = x - 73$   
(c)  $y = 73x - 73$  (d)  $73y = x - 1$
69. The number of values of k, for which the system of equations:  
 $(k + 1)x + 8y = 4k$   
 $kx + (k + 3)y = 2k - 1$  has no solution, is
- (a) infinite (b) 1  
(c) 2 (d) 3
70. If the equations  $x^2 + 2x + 3 = 0$  and  $ax^2 + bx + c = 0$ ,  $a, b, c \in \mathbb{R}$ , have a common root, then  $a : b : c$  is
- (a) 1 : 2 : 3 (b) 3 : 2 : 1  
(c) 1 : 3 : 2 (d) 3 : 1 : 2
71. The circle passing through (1, -2) and touching the axis of x at (3, 0) also passes through the point
- (a) (-5, 2) (b) (2, -5)  
(c) (5, -2) (d) (-2, 5)
72. If x, y, z are in A.P. and  $\tan^{-1}x$ ,  $\tan^{-1}y$  and  $\tan^{-1}z$  are also in A.P., then
- (a)  $x = y = z$  (b)  $2x = 3y = 6z$   
(c)  $6x = 3y = 2z$  (d)  $6x = 4y = 3z$
73. Consider  
**Statement-1** :  $(p \wedge q) \wedge (\sim p \wedge q)$  is a fallacy.  
**Statement-2** :  $(p \rightarrow q) \leftrightarrow (\sim q \wedge \sim p)$  is a tautology.
- (a) Statement-1 is true; Statement-2 is true; Statement-2 is a correct explanation for Statement-1.  
(b) Statement-1 is true; Statement-2 is true; Statement-2 is not a correct explanation for Statement-1.  
(c) Statement-1 is true; Statement-2 is false.  
(d) Statement-1 is false; Statement-2 is true.
74. If  $\int f(x)dx = \psi(x)$ , then  $\int x^5 f(x^3)dx$  is equal to
- (a)  $\int x^3 \psi(x^3) - \int x^2 \psi(x^3) dx + C$   
(b)  $\int x^3 \psi(x^3) - 3 \int x^3 \psi(x^3) 7x + C$   
(c)  $\frac{1}{3} x^3 \psi(x^3) - \int x^2 \psi(x^3) dx + C$   
(d)  $\frac{1}{3} \left[ x^3 \psi(x^3) - \int x^3 \psi(x^3) 7x \right] + C$

75.  $\lim_{x \rightarrow 0} \frac{(1 - \cos 2x)(3 + \cos x)}{x \tan 4x}$  is equal to

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

76. **Statement-1** : The value of the integral

$$\int_{\pi/6}^{\pi/3} \frac{dx}{1 + \sqrt{\tan x}}$$
 is equal to  $n/6$

**Statement-2** :  $\int_a^b f(x)dx = \int_a^b f(a+b-x)dx$ .

- (a) Statement-1 is true; Statement-2 is true; Statement-2 is a correct explanation for Statement-1.  
(b) Statement-1 is true; Statement-2 is true; Statement-2 is not a correct explanation for Statement-1.  
(c) Statement-1 is true; Statement-2 is false.  
(d) Statement-1 is false; Statement-2 is true.

77. The equation of the circle passing through the foci of the ellipse  $\frac{x^2}{16} + \frac{y^2}{9} = 1$ , and having centre at (0, 3) is

- (a)  $x^2 + y^2 - 6y - 7 = 0$   
(b)  $x^2 + y^2 - 6y + 7 = 0$   
(c)  $x^2 + y^2 - 6y - 5 = 0$   
(d)  $x^2 + y^2 - 6y + 5 = 0$

78. A multiple choice examination has 5 questions. Each question has three alternative answers of which exactly one is correct. The probability that a student will get 4 or more correct answers just by guessing is:

- (a)  $\frac{17}{35}$  (b)  $\frac{13}{3^5}$   
(c)  $\frac{11}{7}$  (d)  $\frac{10}{?}$

79. The x-coordinate of the incentre of the triangle that has the coordinates of mid points of its sides as (0, 1) (1, 1) and (1, 0) is:

- (a)  $2 + \sqrt{2}$  (b)  $2 - \sqrt{2}$   
(c)  $1 + \sqrt{2}$  (d)  $1 - \sqrt{2}$

80. The term independent of x in expansion of

$$\left( \frac{x+1}{x^{2/3} - x^{1/3} + 1} - \frac{x-1}{x - x^{1/2}} \right)^{10}$$
 is

- (a) 4 (b) 120  
(c) 210 (d) 310

81. The area (in square units) bounded by the curves  $y = \sqrt{x}$ ,  $2y - x + 3 = 0$ , x-axis, and lying in the first quadrant is:

- (a) 9 (b) 36  
(c) 18 (d)  $\frac{27}{4}$

82. Let  $T_n$  be the number of all possible triangles formed by joining vertices of an n-sided regular polygon. If  $T_{n+1} - T_n = 10$ , then the value of n is:

- (a) 7 (b) 5  
(c) 10 (d) 8

83. If z is a complex number of unit modulus and argument  $\theta$ , then  $\arg \left( \frac{1+z}{1+\bar{z}} \right)$  equals:

- (a)  $-\theta$  (b)  $\frac{7\theta}{2} - \theta$   
(c) 0 (d)  $\pi - \theta$

84. ABCD is a trapezium such that AB and CD are parallel and  $BC \perp CD$ . If  $\angle ADB = \theta$ ,  $BC = p$  and  $CD = q$ , then AB is equal to:

- (a)  $\frac{(p^2 + q^2) \sin \theta}{p \cos \theta + q \sin \theta}$  (b)  $\frac{p^2 + q^2 \cos \theta}{p \cos \theta + q \sin \theta}$   
(c)  $\frac{p^2 + q^2}{p^2 \cos \theta + q^2 \sin \theta}$  (d)  $\frac{(p^2 + q^2) \sin \theta}{(p \cos \theta + q \sin \theta)^2}$

85. If  $P = \begin{bmatrix} 1 & a & 3 \\ 1 & 3 & 3 \\ 2 & 4 & 4 \end{bmatrix}$  is the adjoint of a  $3 \times 3$  matrix A and  $|A| = 4$ , then a is equal to:

- (a) 4 (b) 11  
(c) 5 (d) 0

86. The intercepts on x-axis made by tangents to the curve,

$$y = \int_0^x |t| dt, x \in \mathbb{R},$$
 which are parallel to the line  $y = 2x$ , are

equal to:

- (a)  $\pm 1$  (b)  $\pm 2$   
(c)  $\pm 3$  (d)  $\pm 4$

87. **Given** : A circle,  $2x^2 + 2y^2 = 5$  and a parabola,  $y^2 = 4\sqrt{5}x$ .

**Statement-1** : An equation of a common tangent to these curves is  $y = x + \sqrt{5}$ .

**Statement-2** : If the line,  $y = mx + \frac{\sqrt{5}}{m}$  ( $m \neq 0$ ) is their common tangent, then m satisfies  $m^4 - 3m^2 + 2 = 0$ .

- (a) Statement-1 is true; Statement-2 is true; Statement-2 is a correct explanation for Statement-1.  
(b) Statement-1 is true; Statement-2 is true; Statement-2 is not a correct explanation for Statement-1.  
(c) Statement-1 is true; Statement-2 is false.  
(d) Statement-1 is false; Statement-2 is true.

88. If  $y = \sec(\tan^{-1}x)$ , then  $\frac{dy}{dx}$  at  $x = 1$  is equal to:

- (a)  $\frac{1}{\sqrt{2}}$  (b)  $\frac{1}{j}$   
(c) 1 (d)  $\sqrt{2}$

89. The expression  $\frac{\tan A}{1 - \cot A} + \frac{\cot A}{1 - \tan A}$  can be written as:

- (a)  $\sin A \cos A + 1$  (b)  $\sec A \operatorname{cosec} A + 1$   
(c)  $\tan A + \cot A$  (d)  $\sec A + \operatorname{cosec} A$

90. All the students of a class performed poorly in Mathematics. The teacher decided to give grace marks of 10 to each of the students. Which of the following statistical measures will not change even after the grace marks were given?

- (a) mean (b) median  
(c) mode (d) variance