
All The Best

Part - A Physics

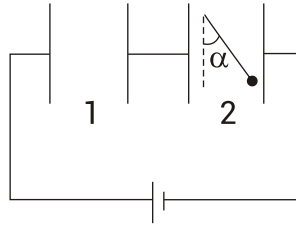
Section - I: Single Correct

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All questions in this section are mandatory.
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For every incorrect response -1 marks shall be deducted.
For more details refer the first page of this booklet.*

1. A tuning fork A of frequency 512 Hz produces 5 beats per second when sounded with a tuning fork B. If B is loaded with wax, the number of beats is again 5 per second. What is the frequency of the tuning fork B when not loaded?
- (a) 517 Hz
 - (b) 507 Hz
 - (c) 510 Hz
 - (d) 512 Hz

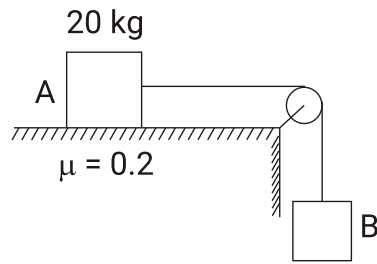
2. A potentiometer wire is 100 cm long and a constant potential difference is maintained across it. Two cells are connected in series first to support one another and then in opposite direction. The balance points are obtained at 50 cm and 10 cm from the positive end of the wire in the two cases. The ratio of emf's is:
- (a) 5:4
 - (b) 3:4
 - (c) 3:2
 - (d) 5:1

3. Two identical parallel plate capacitors 1 and 2 are placed vertically and connected in series to a battery. In capacitor-2 there is a charged small particle attached by a thin wire to a fixed point, as shown. Ignore the effect of the charge particle on the charge distribution of the capacitor plates. At equilibrium, the angle between the wire and the vertical direction is α . Now slowly pull a plate of capacitor-1 until the distance between its two plates is doubled. After equilibrium, angle between the wire and the vertical direction is.



- (a) $\tan^{-1}\left(\frac{2}{3}\tan\alpha\right)$
 (b) $\tan^{-1}\left(\frac{1}{3}\tan\alpha\right)$
 (c) $\tan^{-1}\left(\frac{1}{2}\tan\alpha\right)$
 (d) $\tan^{-1}\left(\frac{3}{2}\tan\alpha\right)$

4. In the figure shown, the coefficient of static friction between the block A of mass 20 kg and the horizontal table is 0.2. What should be the minimum mass of the hanging block for which the blocks start moving?



- (a) 2 kg
- (b) 3 kg
- (c) 4 kg
- (d) 5 kg

5. The potential energy of a bar magnet of magnetic moment M placed in a magnetic field of induction B such that it makes an angle θ with the direction of B is (take $\theta = 90^\circ$ as the datum)
- (a) $-MB \sin \theta$
 - (b) $-MB \cos \theta$
 - (c) $MB(1 - \cos \theta)$
 - (d) $MB(1 + \cos \theta)$

6. A boy is sitting on the horizontal platform of a joy wheel at a distance of 5 m from the center. The wheel begins to rotate and when the angular speed exceeds 1 rad/s, the boy just slips. The coefficient of friction between the boy and the wheel is ($g = 10 \text{ m/s}^2$)
- (a) 0.5
 - (b) 0.32
 - (c) 0.71
 - (d) 0.2

7. An inductor 20 mH , a capacitor $100\ \mu\text{F}$ and a resistor $50\ \Omega$ are connected in series across a source of emf, $V = 10 \sin(314t)$. The power loss in the circuit is
- (a) 2.74 W
 - (b) 0.43 W
 - (c) 0.79 W
 - (d) 1.13 W

8. The relation between the stopping potential V_0 of a metal and the maximum velocity v of the photoelectrons is

(a) $V_0 \propto \frac{1}{v^2}$

(b) $V_0 \propto v^2$

(c) $V_0 \propto v$

(d) $V_0 \propto \frac{1}{v}$

9. A sample of an ideal gas undergoes an isothermal expansion. If Q , ΔU and W represent the amount of heat supplied, the change in internal energy, and the work done by the gas respectively, then
- (a) Q is positive, ΔU is negative, W is positive
 - (b) Q is positive, ΔU is zero, W is positive
 - (c) Q is positive, ΔU is positive, W is zero
 - (d) All three are negative

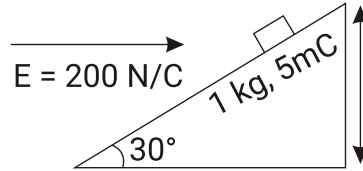
10. An electromagnetic wave is represented by, $E = 20 \sin(\omega t - kx)$ V/m. The amplitude of the oscillating magnetic field will be
- (a) 6.67×10^{-6} T
 - (b) 6.67×10^{-9} T
 - (c) 6.67×10^{-7} T
 - (d) 6.67×10^{-8} T

11. The atmospheric pressure at a place is 10^5 Pa. If tribromomethane (specific gravity = 2.9) be employed as the barometric liquid, the barometric height is
- (a) 3.52 m
 - (b) 1.52 m
 - (c) 4.52 m
 - (d) 2.52 m

12. If a wax-coated capillary tube is dipped in water, then the water will
- (a) Rise up the tube
 - (b) Fall down the tube
 - (c) Sometimes rise up and sometimes fall down the tube
 - (d) Rise up the tube and overflow

13. Consider a circular coil of wire carrying constant current I , forming a magnetic dipole. The magnetic flux through an infinite plane that contains the circular coil and excluding the circular coil area is given by ϕ_i . The magnetic flux through the area of the circular coil area is given by ϕ_0 . Which of the following option is correct ?
- (a) $\phi_i > \phi_0$
 - (b) $\phi_i < \phi_0$
 - (c) $\phi_i = -\phi_0$
 - (d) $\phi_i = \phi_0$

14. An inclined plane making an angle of 30° with the horizontal is placed in a uniform horizontal electric field 200 N/C as shown in the figure. A body of mass 1 kg and charge 5 mC is allowed to slide down from rest at a height of 1 m . If the coefficient of friction is 0.2 , find the time taken by the body to reach the bottom? [$g = 9.8 \text{ m/s}^2$, $\sin 30^\circ = \frac{1}{2}$, $\cos 30^\circ = \frac{\sqrt{3}}{2}$]



- (a) 0.92 s
- (b) 0.46 s
- (c) 2.3 s
- (d) 1.3 s

15. Three discs A, B and C having radii 2 m, 4 m and 6 m respectively are coated with carbon black. The discs have negligible thickness. The wavelengths corresponding to maximum intensity are 300 nm, 400 nm and 500 nm, respectively. The powers radiated by them are Q_a , Q_b and Q_c respectively.
- (a) Q_a is maximum
 - (b) Q_b is maximum
 - (c) Q_c is maximum
 - (d) $Q_a = Q_b = Q_c$

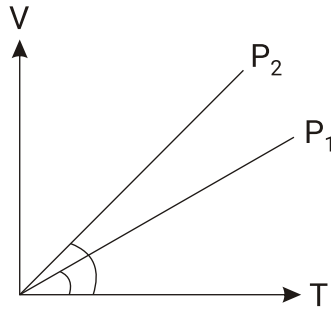
16. A projectile is projected with speed u at an angle θ with the horizontal. The average velocity of the projectile between the instants it cross the same level is
- (a) $u \cos \theta$
 - (b) $u \sin \theta$
 - (c) $u \cot \theta$
 - (d) $u \tan \theta$

17. If a thermometer reads the freezing point of water as 20°C and the boiling point as 150°C , how much would the thermometer read when the actual temperature is 60°C .
- (a) 98°C
 - (b) 110°C
 - (c) 40°C
 - (d) 60°C

18. The linear momentum of a moving particle is given by, $p = t \ln t$. The net force acting on this particle is defined by the equation, $F = \frac{dp}{dt}$. The net force acting on the particle is zero at time
- (a) $t = 0$
 - (b) $t = \frac{1}{e}$
 - (c) $t = \frac{1}{e^2}$
 - (d) None of these

19. A force given by the relation $F = 8t$ acts on a body of mass 2 kg initially at rest. The work done by this force on the body during first 2 s of its motion is :-
- (a) 64 J
 - (b) Zero
 - (c) 32 J
 - (d) None of these

20. In the following $V - T$ diagram what is the relation between P_1 and P_2 ?

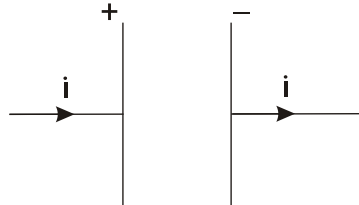


- (a) $P_2 = P_1$
- (b) $P_2 > P_1$
- (c) $P_2 < P_1$
- (d) cannot be predicted

Section - II: Numerical

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21. A parallel plate capacitor with circular plates of radius R is being charged as shown. At the instant shown, the displacement current in the region between the plates enclosed between $\frac{R}{2}$ and R is given by ni . Find value of n ?



22. An electron moves in a circular path perpendicular to a constant magnetic field with a magnitude of 1.0 mT. If the angular momentum of the electron about the centre of the circle is 8.1×10^{-38} J.s, determine the speed of the electron (in m/s). (Take $m_e = 9 \times 10^{-31}$ kg)

23. For the circuit shown, the value of current at time $t = 3.2$ s will be _____ A.

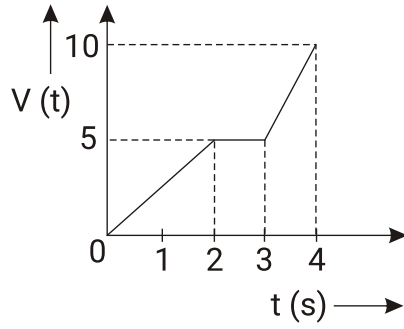


Figure 1

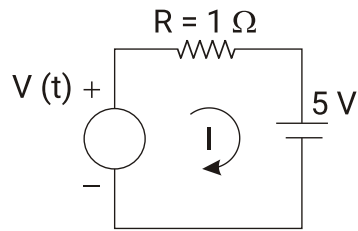
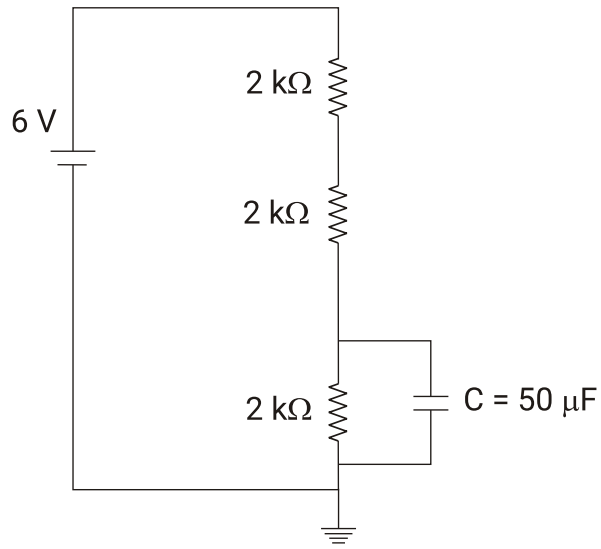


Figure 2

[Voltage distribution $V(t)$ is shown by Fig.(1) and the circuit is shown in Fig.(2)]

24. A capacitor of $50 \mu\text{F}$ is connected in a circuit as shown in figure. The charge on the upper plate of the capacitor is _____ μC .



25. A small wooden ball of density ρ is immersed in water of density σ to depth h is released. The height H above the surface of water up to which the ball jumps out of water is $\left(\frac{\sigma}{\rho} - \frac{n}{2}\right)h$. Find value of n (Neglect the effect of viscosity, surface tension and assume all quantities in SI unit)

26. A particle is dropped from point A at a certain height from ground. It falls freely and passes through three points B, C and D with $BC = CD$. The time taken by the particle to move from B to C is 2 seconds and from C to D is 1 second. The time taken to move from A to B is t . The value of $\frac{1}{t}$ is

27. For a paramagnetic material, magnetic susceptibility changes with temperature of the material. Suppose for a paramagnetic material susceptibility at 100°C is 3.53×10^{-4} . Find its susceptibility (in 10^{-4}) at 80°C ?

28. If the highest frequency modulating a carrier is 5 kHz, then the number of AM broadcast stations accommodated in a 90 kHz bandwidth is

29. $\vec{A} = 2\hat{i} + \hat{j} + \hat{k}$ and $\vec{B} = 10\hat{i} + 5\hat{j} + 5\hat{k}$. If the magnitude of the component of $\vec{B} - \vec{A}$ along \vec{A} is $4\sqrt{x}$, then find the value of x .

30. White light is passed through a double slit and interference is observed on a screen 1.5 m away. The separation between the slits is 0.3 mm. The first violet and red fringes are formed 2.0 mm and 3.5 mm away from the central white fringes. The difference in wavelengths of red and violet light is nm.

Part - B Chemistry

Section - I: Single Correct

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31. Which one of the following octahedral complexes will not show geometrical isomerism (A and B are monodentate ligands) –
- (a) $[MA_5B]$
 - (b) $[MA_2B_4]$
 - (c) $[MA_3B_3]$
 - (d) $[MA_4B_2]$

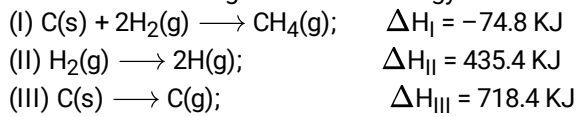
32. High melting point of boron is due to its existence as
- (a) Small covalent molecule
 - (b) Giant covalent molecule
 - (c) Giant covalent solid
 - (d) Giant ionic molecule

33. Which of the following 0.1 m aqueous solutions will have the lowest freezing point-
- (a) Potassium sulphate
 - (b) Sodium chloride
 - (c) Urea
 - (d) Glucose

34. Fe^{2+} does not give prussian blue colour with $\text{K}_4[\text{Fe}(\text{CN})_6]$, but on its reaction with (X), prussian blue colour appears. (X) can be:
- (a) $\text{MnO}_4^-/\text{H}^+$
 - (b) H_2SO_4
 - (c) NH_3
 - (d) All true

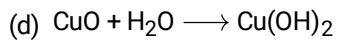
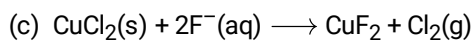
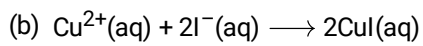
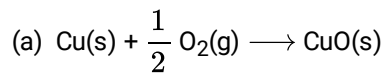
35. Which of the following forms cationic micelles above certain concentration?
- (a) Sodium dodecyl sulphate
 - (b) Sodium acetate
 - (c) Urea
 - (d) Cetyltrimethylammonium bromide

36. Calculate the average C–H bond energy from the following data :

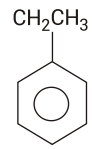


- (a) 316 KJ/mol
- (b) 416 KJ/mol
- (c) 516 KJ/mol
- (d) 616 KJ/mol

37. Which of the following involves the reduction of copper?



38.



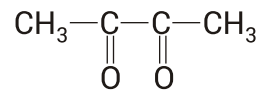
can be prepared by

- (a) Wurtz reaction
- (b) Fittig reaction
- (c) Wurtz Fittig reaction
- (d) Frankland reaction

39. The chair form is _____ stable than boat form by potential energy _____ kJ/mol.
- (a) More, 44 kJ/mol
 - (b) Less, 44 kJ/mol
 - (c) More, 12.55 kJ/mol
 - (d) Less, 4 kJ/mol

40. Solution of MnO_4^- is purple - coloured due to-
- (a) d-d- transition
 - (b) Charge transfer from O to Mn
 - (c) Due to both d-d-transition and charge transfer
 - (d) None of these

41. The IUPAC name of the following compound is

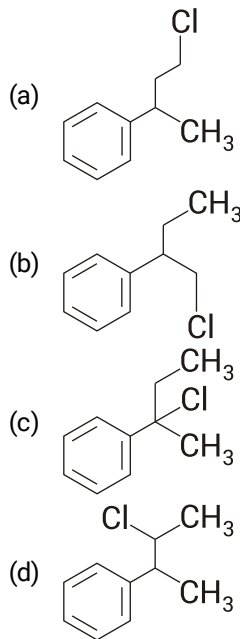


- (a) Butandione
- (b) 2,3-Butandiketone
- (c) Butane-2,3-dione
- (d) None of these

42. One atom of an element weighs 3.32×10^{-23} g. How many number of gram atoms are there in 20 kg of the element?
- (a) 2000
 - (b) 20
 - (c) 200
 - (d) 1000

43. Reaction of Grignard reagent, C_2H_5MgBr with C_6H_5COCl followed by hydrolysis gives compound "P" which reacts instantly with Lucas reagent to give compound Q, $C_{10}H_{13}Cl$.

The Compound Q is:



44. Which of the following regarding nucleophile is incorrect ?
- (a) Nucleophile may have (-)ve charge
 - (b) Nucleophile cannot be neutral
 - (c) Benzene can act as a nucleophile
 - (d) A Bronsted base can act as a nucleophile

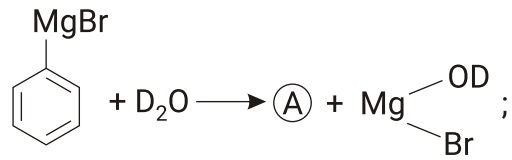
45.



The incorrect statement for C is

- (a) Compound (C) is $\text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_3$
- (b) (C) gives positive Tollen's test
- (c) In compound (C) all four carbon are linearly present
- (d) Compound (C) on ozonolysis gives diketone

46.



The compound

(A)

is

- (a) Benzene
- (b) Deutero benzene
- (c) Duetero toluene
- (d) Both (B) & (C)

47. In solid state PBr_5 exist as

- (a) $[\text{PBr}_4]^+ [\text{PBr}_6]^-$
- (b) $[\text{PBr}_5]^+ [\text{PBr}_5]^-$
- (c) $[\text{PBr}_4]^+ [\text{Br}^-]$
- (d) PBr_5

48. The mixture of urea and naphthalene can be separated by
- (a) Filtration
 - (b) Sublimation
 - (c) Chromatographic
 - (d) Distillation

49. The reaction $A \longrightarrow B$ follows first order kinetics. The time taken for 0.80 mole of A to produce 0.60 mole of B is 1 hour. What is the time taken for conversion of 0.90 mole of A to produce 0.675 mole of B?
- (a) 1 hour
 - (b) 30 min
 - (c) 15 min
 - (d) 5 min

50. During the electrolysis of water 4 mol of electrons were transferred from anode to cathode. The total volume of gases produced at STP will be approximately
- (a) 67.2 L
 - (b) 22.4 L
 - (c) 44.8 L
 - (d) 89.4 L

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51. How many cyclic (including stereoisomers) alcohols are possible for the compound with the molecular formula C_4H_7OH

52. Consider the reaction $\text{CH}_3\text{OH} + \text{CO} \xrightarrow[210^\circ\text{C}]{\text{Cobalt Carbonyl}} \text{Carbonyl Product (A)}$
Find the total number of π bonds and lone pair of electrons present in A

53. A first order reaction completes 20% in 20 min. The percentage of reactant left unreacted at the end of 60 min is

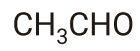
54. In Duma's method for estimation of nitrogen, 0.6 gm of an organic compound gave 50 ml of nitrogen collected at 300K temperature and 715 mm pressure. Calculate the percentage composition of nitrogen in the compound (Aqueous tension at 300K = 15 mm of Hg).

55. One commercial system removes SO_2 emission from smoke at 95°C by the following set of reaction
- $$\text{SO}_2(\text{g}) + \text{Cl}_2(\text{g}) \rightarrow \text{SO}_2\text{Cl}_2(\text{g})$$
- $$\text{SO}_2\text{Cl}_2(\text{g}) + \text{H}_2\text{O}(\text{l}) \rightarrow \text{H}_2\text{SO}_4 + \text{HCl}$$
- $$\text{H}_2\text{SO}_4 + \text{Ca}(\text{OH})_2 \rightarrow \text{CaSO}_4 + \text{H}_2\text{O}$$
- How many grams of CaSO_4 may be produced from 3.78 g of SO_2 ?

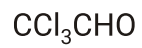
56. How many metals are extracted by the carbon reduction method
Fe, Zn, Mg, Na, Pb, Sn, Ag, Au

57. How many of the following will form stable hydrate:

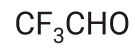
(1)



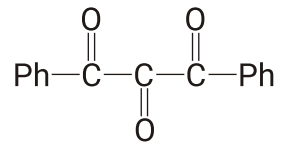
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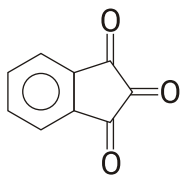
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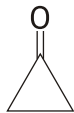
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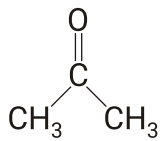
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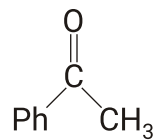
(6)



(7)



(8)



58. When 10 mL of an aqueous solution of Fe^{2+} ions was titrated in the presence of dil. H_2SO_4 using diphenylamine indicator, 15 mL of 0.02 M solution of $\text{K}_2\text{Cr}_2\text{O}_7$ was required to get the endpoint. The molarity of the solution containing Fe^{2+} ions is $Z \times 10^{-2}$ M. The value of Z is _____. (Nearest integer)

59. How many sigma bond(s) is/are formed by silicon in silica (SiO_2) ?

60. How many of the following electrolytes will bring about the coagulation of a ferric hydroxide sol quickly and of least concentration?
- (I) NaCl
 - (II) MgSO_4
 - (III) $\text{Al}_2(\text{SO}_4)_3$
 - (IV) MgCl_2

Part - C Mathematics

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61. If $f(x) = \cot^{-1}\left(\frac{x^x - x^{-x}}{2}\right)$, then $f'(1)$ is equal to
- (a) -1
 - (b) 1
 - (c) $\log_e 2$
 - (d) $-\log_e 2$

62. The solution of $\frac{dy}{dx} = \sin(x + y) + \cos(x + y)$ is

(a) $\log_e \left[1 + \tan \left(\frac{x + y}{2} \right) \right] + c = 0$

(b) $\log_e \left[1 + \tan \left(\frac{x + y}{2} \right) \right] = x + c$

(c) $\log_e \left[1 - \tan \left(\frac{x + y}{2} \right) \right] = x + c$

(d) None of these

63. The number of solutions of the given equation $\tan \theta + \sec \theta = \sqrt{3}$, where $0 \leq \theta \leq 3\pi$ is
- (a) 0
 - (b) 1
 - (c) 2
 - (d) 3

64. The equation of the ellipse with $e = \frac{3}{4}$, foci on y -axis, centre on the origin and passing through the point $(6, 4)$ is
- (a) $x^2 + 2y^2 = 16$
 - (b) $16x^2 + 7y^2 = 688$
 - (c) $16x^2 + 7y^2 = 344$
 - (d) $7x^2 + 16y^2 = 688$

65. If $(\sin^{-1} x)^2 - (\cos^{-1} x)^2 = a$; $0 < x < 1$, $a \neq 0$, then the value of $2x^2 - 1$ is:

(a) $\cos\left(\frac{4a}{\pi}\right)$

(b) $\sin\left(\frac{2a}{\pi}\right)$

(c) $\cos\left(\frac{2a}{\pi}\right)$

(d) $\sin\left(\frac{4a}{\pi}\right)$

66. If $A^2 - A + I = 0$, then the inverse of A is:
- (a) $A + I$
 - (b) A
 - (c) $A - I$
 - (d) $I - A$

67. If $f(x) = x^3 - x$ and $g(x) = \sin 2x$, then-

(a) $g(f(1)) = 1$

(b) $f\left(g\left(\frac{\pi}{12}\right)\right) = -\frac{3}{8}$

(c) $g(f(2)) = \sin 2$

(d) None of these

68. $\int \frac{x^2}{x^2 + 4} dx =$

(a) $x - 2 \tan^{-1}\left(\frac{x}{2}\right) + c$

(b) $x + 2 \tan^{-1}\left(\frac{x}{2}\right) + c$

(c) $x - 4 \tan^{-1}\left(\frac{x}{2}\right) + c$

(d) $x + 4 \tan^{-1}\left(\frac{x}{2}\right) + c$

69. If a, b, c are consecutive positive integers and $\log(1 + ac) = 2K$. then the value of K is
- (a) $\log b$
 - (b) $\log a$
 - (c) 2
 - (d) 1

70. The equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents a rectangular hyperbola if -
- (a) $\Delta \neq 0, h^2 > ab, a + b = 0$
 - (b) $\Delta \neq 0, h^2 < ab, a + b = 0$
 - (c) $\Delta \neq 0, h^2 = ab, a + b = 0$
 - (d) None of these

71. In the set $A = \{1, 2, 3, 4, 5\}$, a relation R is defined by $R = \{(x, y) | x, y, \in A \text{ and } x < y\}$. Then R is -
- (a) Reflexive
 - (b) Symmetric
 - (c) Transitive
 - (d) None of these

72. The equation whose roots are $\frac{q}{p+q}$, $\frac{-p}{p+q}$ is -

(a) $(p+q)^2x^2 + (p^2 - q^2)x + pq = 0$

(b) $x^2 - \left(\frac{q-p}{q+p}\right)x - \frac{pq}{(q+p)^2} = 0$

(c) $(p+q)x^2 + (p^2 - q^2)x - pq = 0$

(d) None of these

73. $\int_0^{2\pi} \frac{dx}{1 + e^{\sin x}}$ is equal to:

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

74. Consider the frequency distribution of the given numbers

| | | | | |
|------------|---|---|---|-----|
| Value: | 1 | 2 | 3 | 4 |
| Frequency: | 5 | 4 | 6 | f |

If the mean is known to be 3, then the value of f is

- (a) 3
- (b) 7
- (c) 10
- (d) 14

75. The determinant $\begin{vmatrix} b_1 + c_1 & c_1 + a_1 & a_1 + b_1 \\ b_2 + c_2 & c_2 + a_2 & a_2 + b_2 \\ b_3 + c_3 & c_3 + a_3 & a_3 + b_3 \end{vmatrix}$

(a) $\begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$

(b) $2 \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$

(c) $3 \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$

(d) None of these

76. If the length of a rectangle is decreased by 40% and the breadth is increased by 30%, then find the percentage change in the area of the rectangle.
- (a) +26%
 - (b) -12%
 - (c) -22%
 - (d) -40%

77. If $(1 + by)^n = (1 + 8y + 24y^2 + \dots)$ then the value of b and n are respectively -
- (a) $-4, -2$
 - (b) $2, -4$
 - (c) $2, 4$
 - (d) $-2, 4$

78.
$$\frac{2 \sin \theta \tan \theta (1 - \tan \theta) + 2 \sin \theta \sec^2 \theta}{(1 + \tan \theta)^2} =$$

- (a) $\frac{\sin \theta}{1 + \tan \theta}$
- (b) $\frac{2 \sin \theta}{1 + \tan \theta}$
- (c) $\frac{2 \sin \theta}{(1 + \tan \theta)^2}$
- (d) None of these

79. The area of the figure bounded by the parabola $y = x^2 + 1$ and the straight line $x + y = 3$ is

- (a) $\frac{3}{2}$
- (b) $\frac{5}{2}$
- (c) $\frac{7}{2}$
- (d) $\frac{9}{2}$

80. Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be a function defined as

$$f(x) = \begin{cases} \frac{\sin(a+1)x + \sin 2x}{2x} & , \text{if } x < 0 \\ b & \text{if } x = 0 \\ \frac{\sqrt{x+bx^3} - \sqrt{x}}{bx^{\frac{5}{2}}} & \text{if } x > 0 \end{cases}$$

If f is continuous at $x = 0$, then the value of $a + b$ is equal to :

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

Section - II: Numerical

*This section contains a total of 10 questions.
Out of the 10 questions, 5 questions are mandatory.
For every correct response you shall be awarded 4 marks.
For every incorrect response -1 marks shall be deducted.
For more details refer the first page of this booklet.*

81. Let $X = \{n \in N : 1 \leq n \leq 50\}$. If $A = \{n \in X : n \text{ is a multiple of } 2\}$; $B = \{n \in X : n \text{ is a multiple of } 7\}$, then the number of elements in the smallest subset of X containing both A and B is _____

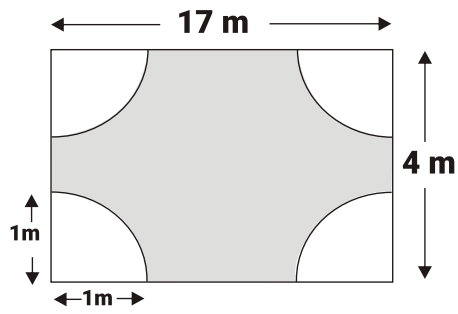
82. If the lengths of the chords intercepted by the circle $x^2 + y^2 + 2gx + 2fy = 0$ from the coordinate axes be 10 and 24 respectively, then the radius of the circle is equal to

83. If the line $y = 3x + \lambda$ touches the curve $9x^2 - 5y^2 = 45$, then $|\lambda|$ is

84. Suppose the line $\frac{x-2}{\alpha} = \frac{y-2}{-5} = \frac{z+2}{2}$ lies on the plane $x + 3y - 2z + \beta = 0$. Then $(\alpha + \beta)$ is equal to
.....

85. If $0 \leq x \leq 3\pi$, $0 \leq y \leq 3\pi$ and $\cos x \sin y = 1$, then the possible number of ordered pair (x, y) is

86. The perimeter of the shaded portion of the following figure is ____ m. (Use $\pi = 3.14$)



87. If the mean and variance of eight numbers 3, 7, 9, 12, 13, 20, x and y be 10 and 25 respectively, then xy is equal to _____

88. Sides of a triangle are the characteristic of the logarithm of 325, 1603 and 10,000 to the base 3, 11 and p respectively. Find the area of the triangle.

89. The maximum value of the expression $\frac{12}{9 + 3 \cos x + 4 \sin x}$ is equal to

90. If $\sin^{-1}(\sin(5)) > x^2 - 4x$, then the number of the possible integral value of x is