

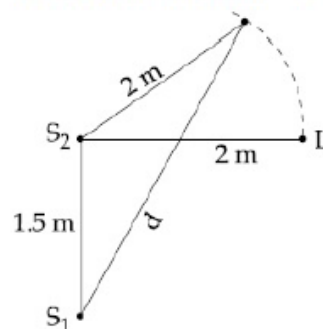
FITJEE

Solutions to JEE (Main)-2020

JEE–Main–2020 –Sept–5–Second–Shift
PHYSICS, CHEMISTRY & MATHEMATICS

PART – A (PHYSICS)

1. Two coherent sources of sound, S_1 and S_2 produce source waves of the same wavelength, $\lambda = 1$ m, in phase. S_1 and S_2 are placed 1.5 m apart (see fig). A listener located at L, directly in front of S_2 finds that the intensity is at a minimum when he is 2 m away from S_2 . The listener moves away from S_1 , keeping his distance from S_2 fixed. The adjacent maximum of intensity is observed when the listener is at a distance d from S_1 . Then, d is:

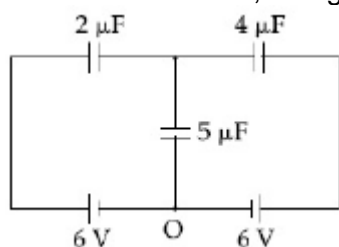


- (A) 12 m
(B) 3 m
(C) 5 m
(D) 2 m

2. Two different wires having lengths L_1 and L_2 , and respective temperature coefficient of linear expansion α_1 and α_2 , are joined end-to-end. Then the effective temperature coefficient of linear expansion is:

- (A) $\frac{\alpha_1 + \alpha_2}{2}$
(B) $2\sqrt{\alpha_1\alpha_2}$
(C) $\frac{\alpha_1 L_1 + \alpha_2 L_2}{L_1 + L_2}$
(D) $4 \frac{\alpha_1 \alpha_2}{\alpha_1 + \alpha_2} \frac{L_1 L_2}{(L_2 + L_1)^2}$

3. In the circuit shown, charge on the $5 \mu\text{F}$ capacitor is:

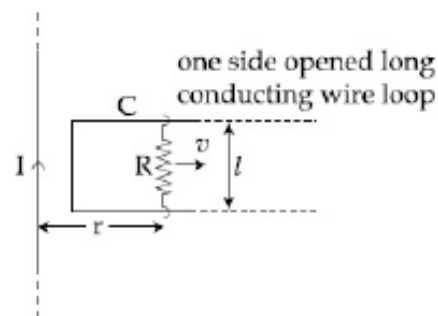


- (A) $16.36 \mu\text{C}$
(B) $5.45 \mu\text{C}$
(C) $10.90 \mu\text{C}$
(D) $18.00 \mu\text{C}$

4. In adiabatic process, the density of a diatomic gas becomes 32 times its initial value. The final pressure of the gas is found to be n times the initial pressure. The value of n is:

- (A) 128
(B) $\frac{1}{32}$
(C) 32
(D) 326

5. An infinitely long straight wire carrying current I , one side opened rectangular loop and a conductor C with a sliding connector are located in the same plane, as shown in the figure. The connector has length l and resistance R . It slides to the right with a velocity v . The resistance of the conductor and the self inductance of the loop are negligible. The induced current in the loop, as a function of separation r , between the connector and the straight wire is:



- (A) $\frac{\mu_0 Ivl}{2\pi Rr}$ (B) $\frac{\mu_0 Ivl}{\pi Rr}$
 (C) $\frac{2\mu_0 Ivl}{2\pi Rr}$ (D) $\frac{\mu_0 Ivl}{4\pi Rr}$

6. An iron rod of volume $10^{-3}m^3$ and relative permeability 1000 is placed as core in a solenoid with 10 turns/cm. If a current of 0.5 A is passed through the solenoid, then the magnetic moment of the rod will be:

- (A) $0.5 \times 10^2 Am^2$ (B) $50 \times 10^2 Am^2$
 (C) $500 \times 10^2 Am^2$ (D) $5 \times 10^2 Am^2$

7. The correct match between the entries in column I and column II are:

	I	II
	Radiation	Wavelength
(a)	Microwave	(i) 100 m
(b)	Gamma rays	(ii) 10^{-15} m
(c)	A.M. radio waves	(iii) 10^{-10} m
(d)	X-rays	(iv) 10^{-3} m

- (A) (a)-(iv), (b)-(ii), (c)-(i), (d)-(iii) (B) (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)
 (C) (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv) (D) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

8. A radioactive nucleus decays by two different processes. The half life for the first process is 10 s and that for the second is 100 s. The effective half life of the nucleus is closest to:

- (A) 6 sec. (B) 9 sec.
 (C) 12 sec. (D) 55 sec.

9. Ten charges are placed on the circumference of a circle of radius R with constant angular separation between successive charges. Alternate charges 1, 3, 5, 7, 9 have charge $(+q)$ each, while 2, 4, 6, 8, 10 have charge $(-q)$ each. The potential V and the electric field E at the centre of the circle are respectively:

(Take $V = 0$ at infinity)

- (A) $V = \frac{10q}{4\pi\epsilon_0 R}$; $E = \frac{10q}{4\pi\epsilon_0 R^2}$ (B) $V = 0$; $E = \frac{10q}{4\pi\epsilon_0 R^2}$
 (C) $V = 0$; $E = 0$ (D) $V = \frac{10q}{4\pi\epsilon_0 R}$; $E = 0$

10. A driver in a car, approaching a vertical wall notices that the frequency of his car horn, has changed from 440 Hz to 480 Hz, when it gets reflected from the wall. If the speed of sound in air is 345 m/s, then the speed of the car is:

- (A) 24 km/hr (B) 36 km/hr
 (C) 18 km/hr (D) 54 km/hr

11. A parallel plate capacitor has plate of length ' ℓ ', width ' w ' and separation of plates is ' d '. It is connected to a battery of emf V . A dielectric slab of the same thickness ' d ' and of dielectric constant $k = 4$ is being, inserted between the plates of the capacitor. At what length of the slab inside plates, will be energy stored in the capacitor be two times the initial energy stored?

- (A) $2\ell/3$ (B) $\ell/2$
 (C) $\ell/4$ (d) $\ell/3$

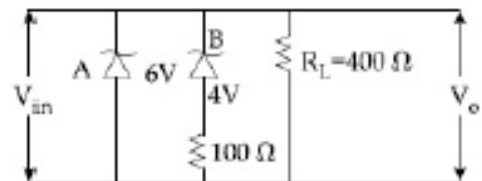
12. A spaceship in space sweeps stationary interplanetary dust. As a result, its mass increases at a rate $\frac{dM(t)}{dt} = bv^2(t)$, where $v(t)$ its instantaneous velocity. The instantaneous acceleration of the satellite is:

- (A) $-\frac{2bv^3}{M(t)}$ (B) $-\frac{bv^3}{M(t)}$
 (C) $-bv(t)$ (D) $-\frac{bv^3}{2M(t)}$

13. The acceleration due to gravity on the earth's surface at the poles is g and angular velocity of the earth about the axis passing through the pole is ω . An object is weight at the equator and at a height h above the poles by using a spring balance. If the weights are found to be same, then h is : ($h \ll R$, where R is the radius of the earth)

- (A) $\frac{R^2\omega^2}{2g}$ (B) $\frac{R^2\omega^2}{g}$
 (C) $\frac{R^2\omega^2}{8g}$ (D) $\frac{R^2\omega^2}{4g}$

14. Two Zener diodes (A and B) having breakdown voltages of 6 V and 4 V respectively, are connected as shown in the circuit below. The output voltage V_o variation with input voltage linearly increasing with time, is given by: ($V_{input} = 0$ V at $t = 0$)



(figures are qualitative)

- (A) (B)
 (C) (D)

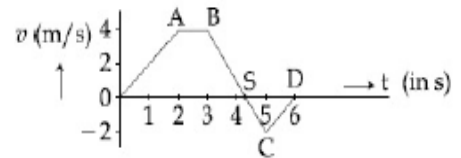
15. In an experiment to verify Stokes law, a small spherical ball of radius r and density ρ falls under gravity through a distance h in air before entering a tank of water. If the terminal velocity of the ball inside water is same as its velocity just before entering the water surface, then the value of h is proportional to: (ignore viscosity of air)

- (A) r^3 (B) r^4
 (C) r^2 (D) r

16. A ring is hung on a nail. It can oscillate, without slipping or sliding (i) in its plane with a time period T_1 and, T(ii) back and forth in a direction perpendicular to its plane, with a period T_2 . The ratio $\frac{T_1}{T_2}$ will be:

- (A) $\frac{2}{\sqrt{3}}$ (B) $\frac{3}{\sqrt{3}}$
 (C) $\frac{\sqrt{2}}{3}$ (D) $\frac{2}{3}$

17. The velocity (v) and time (t) graph of a body in a straight line motion is shown in the figure. The point S is at 4.333 seconds. The total distance covered by the body in 6 s is:



- (A) 11 m (B) $\frac{37}{3}$ m
 (C) 12 m (D) $\frac{49}{4}$ m

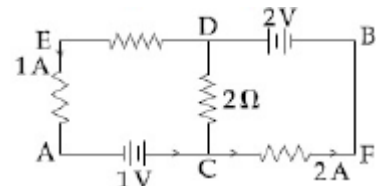
18. The quantities $x = \frac{1}{\sqrt{\mu_0 \epsilon_0}}$, $y = \frac{E}{B}$ and $z = \frac{1}{CR}$ are defined where C-capacitance, R-Resistance, l-length, E-Electric field, B-magnetic field and ϵ_0 , μ_0 , - free space permittivity and permeability respectively. Then:

- (A) x, y and z have the same dimension. (B) Only y and z have the same dimension.
 (C) Only x and z have the same dimension (D) Only x and y have the same dimension.

19. A galvanometer is used in laboratory for detecting the null point in electrical experiments. If, on passing a current of 6 mA it produces a deflection of 2° , its figure of merit is close to:

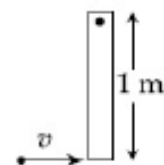
- (A) 666° A/div . (B) $6 \times 10^{-3} \text{ A/div}$.
 (C) 333° A/div . (D) $3 \times 10^{-3} \text{ A/div}$.

20. In the circuit, given in the figure currents in different branches and value of one resistor are shown. Then potential at point B with respect to the point A is:



- (A) + 1 V (B) - 1 V
 (C) + 2 V (D) - 2 V

21. A thin rod of mass 0.9 kg and length 1 m is suspended, at rest, from one end so that it can freely oscillate in the vertical plane. A particle of mass 0.1 kg moving in a straight line with velocity 80 m/s hits the rod at its bottom most point and sticks to it (see figure). The angular speed (in rad/s) of the rod immediately after the collision will be _____.



22. The surface of a metal is illuminated alternately with photons of energies $E_1 = 4 \text{ eV}$ and $E_2 = 2.5 \text{ eV}$ respectively. The ratio of maximum speeds of the photoelectrons emitted in the two cases is 2. The work function of the metal in (eV) is _____.

23. A prism of angle $A = 1^\circ$ has a refractive index $\mu = 1.5$. A good estimate for the minimum angle of deviation (in degrees) is close to $N/10$. Value of N is _____.

24. Nitrogen gas is at 300° K temperature. The temperature (in K) at which the rms speed of a H_2 molecule would be equal to the rms speed of a nitrogen molecule, is _____. (Molar mass of N_2 gas 28 g).

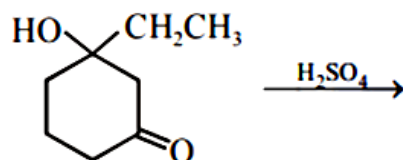
25. A body of mass 2 kg, is driven by an engine delivering, a constant power 1 J/s. the body starts from rest and moves in a straight line. After 9 seconds, the body has moved a distance (in m) _____.

PART –B (CHEMISTRY)

26. An element crystallises in a face-centred cubic (fcc) unit cell with cell edge a . The distance between the centres of two nearest octahedral voids in the crystal lattice is:

- (A) $\frac{a}{2}$ (B) $\sqrt{2}a$
 (C) a (D) $\frac{a}{\sqrt{2}}$

27. The major product of the following reaction is:

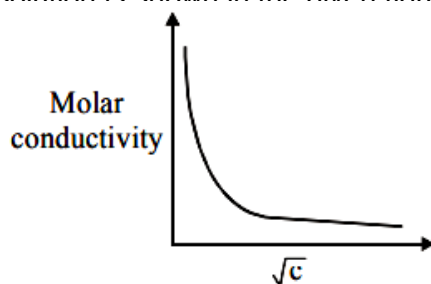


- (A) (B)
 (C) (D)

28. Adsorption of a gas follows Freundlich adsorption isotherm. If x is the mass of the gas adsorbed on mass m of the adsorbent, the correct plot of $\frac{x}{m}$ versus p is:

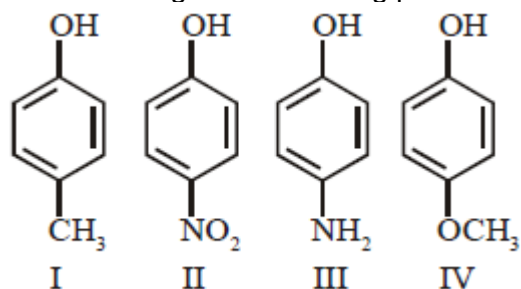
- (A) (B)
 (C) (D)

29. The variation of molar conductivity with concentration of an electrolyte (X) in aqueous solution is shown in the given figure.



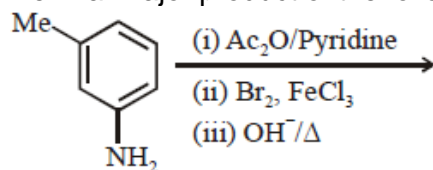
- (A) KNO_3 (B) CH_3COOH
 (C) HCl (D) NaCl

30. The compound that has the largest H – M – H bond angle (M = N, O, S, C), is
 (A) H₂O (B) CH₄
 (C) H₂S (D) NH₃
31. The correct order of the ionic radii of O²⁻, N³⁻, F⁻, Mg²⁺, Na⁺ and Al³⁺ is:
 (A) N³⁻ < O²⁻ < F⁻ < Na⁺ < Mg²⁺ < Al³⁺ (B) Al³⁺ < Mg²⁺ < Na⁺ < F⁻ < O²⁻ < N³⁻
 (C) Al³⁺ < Na⁺ < Mg²⁺ < O²⁻ < F⁻ < N³⁻ (D) N³⁻ < F⁻ < O²⁻ < Mg²⁺ < Na⁺ < Al³⁺
32. Lattice enthalpy and enthalpy of solution of NaCl are 788 kJ mol⁻¹ and 4 kJ mol⁻¹, respectively. The hydration enthalpy of NaCl is:
 (A) 784 kJ mol⁻¹ (B) -784 kJ mol⁻¹
 (C) 780 kJ mol⁻¹ (D) -780 kJ mol⁻¹
33. The correct statement about probability density (except at infinite distance from nucleus) is:
 (A) It can be zero for 3p orbital (B) It can be zero for 1s orbital
 (C) It can be zero for 2p orbital (D) It can be zero for 2s orbital
34. The increasing order of boiling points of the following compounds is:



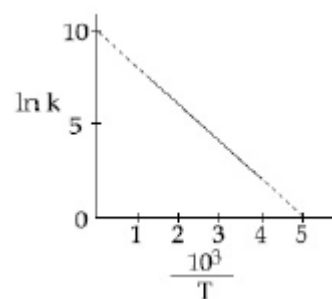
- (A) I < IV < III < II (B) IV < I < II < III
 (C) III < I < II < IV (D) I < III < IV < II

35. The final major product of the following reaction is:

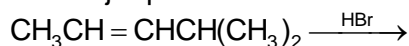


- (A) (B)
- (C) (D)

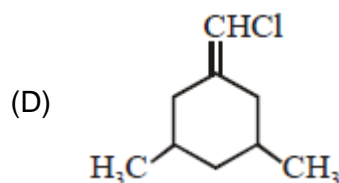
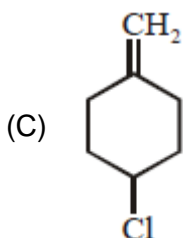
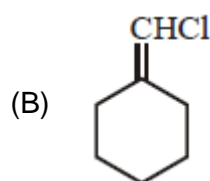
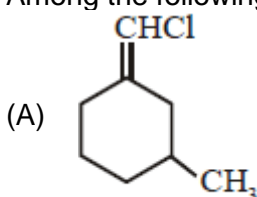
36. The rate constant (k) of a reaction is measured at different temperatures (T), and the data are plotted in the given figure. The activation energy of the reaction in kJ mol^{-1} is: (R is gas constant)
- (A) $2R$
 (B) $2/R$
 (C) R
 (D) $1/R$



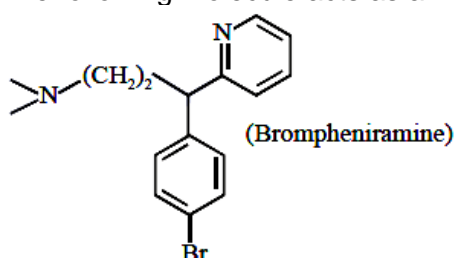
37. The major product formed in the following reaction is:



- (A) $\text{CH}_3\text{CH}_2\text{CH}(\text{Br})\text{CH}(\text{CH}_3)_2$ (B) $\text{CH}_3\text{CH}_2\text{CH}_2\text{C}(\text{Br})(\text{CH}_3)_2$
 (C) $\text{Br}(\text{CH}_2)_3\text{CH}(\text{CH}_3)_2$ (D) $\text{CH}_3\text{CH}(\text{Br})\text{CH}_2\text{CH}(\text{CH}_3)_2$
38. Among the following compounds, geometrical isomerism is exhibited by:



39. Boron and silicon of very high purity can be obtained through:
- (A) zone refining (B) electrolytic refining
 (C) liquation (D) vapour phase refining
40. The following molecule acts as an:



- (A) Antiseptic (B) Anti-depressant
 (C) Anti-histamine (D) Anti-bacterial
41. Which one of the following polymers is not obtained by condensation polymerisation?
- (A) Buna - N (B) Nylon 6
 (C) Nylon 6, 6 (D) Bakelite
42. Hydrogen peroxide, in the pure state, is:
- (A) non-planar and blue in color (B) planar and blue in color
 (C) linear and blue in color (D) linear and almost colorless

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43. Reaction of ammonia with excess Cl_2 gives:
(A) NCl_3 and HCl (B) NCl_3 and NH_4Cl
(C) NH_4Cl and N_2 (D) NH_4Cl and HCl
44. The one that is NOT suitable for the removal of permanent hardness of water is:
(A) Calgon's method (B) Clark's method
(C) Treatment with sodium carbonate (D) Ion-exchange method
45. Consider the complex ions,
 $\text{trans} - [\text{Co}(\text{en})_2 \text{Cl}_2]^+$ (A) and
 $\text{cis} - [\text{Co}(\text{en})_2 \text{Cl}_2]^+$ (B). The correct statement regarding them is:
(A) both (A) and (B) cannot be optically active.
(B) (A) cannot be optically active, but (B) can be optically active.
(C) both (A) and (B) can be optically active.
(D) (A) can be optically active, but (B) cannot be optically active.
46. The number of chiral carbons present in sucrose is _____.
47. Considering that $\Delta_0 > P$, the magnetic moment (in BM) of $[\text{Ru}(\text{H}_2\text{O})_6]^{2+}$ would be _____.
48. For a dimerization reaction,
 $2 \text{A}(\text{g}) \rightarrow \text{A}_2(\text{g})$,
at 298 K, $\Delta U^\ominus = -20 \text{ kJ mol}^{-1}$, $\Delta S^\ominus = -30 \text{ JK}^{-1} \text{ mol}^{-1}$, then the ΔG^\ominus will be _____ J.
49. The volume, in mL, of 0.02 M $\text{K}_2\text{Cr}_2\text{O}_7$ solution required to react with 0.288 g of ferrous oxalate in acidic medium is _____.
(Molar mass of Fe = 56 mol^{-1})
50. For a reaction $\text{X} + \text{Y} = 2\text{Z}$, 1.0 mol of X, 1.5 mol of Y and 0.5 mol of Z were taken in a 1 L vessel and allowed to react. At equilibrium, the concentration of Z was 1.0 mol L^{-1} . The equilibrium constant of the reaction is _____ $\frac{x}{15}$. The value of x is _____.

PART-C (MATHEMATICS)

51. The value of $\left(\frac{-1+i\sqrt{3}}{1-i}\right)^{30}$ is:
- (A) $2^{15}i$ (B) -2^{15}
 (C) 6^5 (D) $-2^{15}i$
52. If the system of linear equations
 $x + y + 3z = 0$
 $x + 3y + k^2z = 0$
 $3x + y + 3z = 0$
 has a non-zero solution (x, y, z) for some $k \in \mathbb{R}$, then $x + \left(\frac{y}{z}\right)$ is equal to:
- (A) 3 (B) 9
 (C) -3 (D) -9
53. $\lim_{x \rightarrow 0} \frac{x(e^{\frac{\sqrt{1+x^2+x^4-1}}{x}} - 1)}{\sqrt{1+x^2+x^4} - 1}$
- (A) does not exist (B) is equal to 1
 (C) is equal to \sqrt{e} (D) is equal to 0
54. If for some $\alpha \in \mathbb{R}$, the lines $L_1: \frac{x+1}{2} = \frac{y-2}{-1} = \frac{z-1}{1}$ and $L_2: \frac{x+2}{\alpha} = \frac{y+1}{5-\alpha} = \frac{z+1}{1}$ are coplanar, then the line L_2 passes through the point:
- (A) $(2, -10, -2)$ (B) $(10, -2, -2)$
 (C) $(10, 2, 2)$ (D) $(-2, 10, 2)$
55. Let $y = y(x)$ be the solution of the differential equation
 $\cos x \frac{dy}{dx} + 2y \sin x = \sin 2x, x \in \left(0, \frac{\pi}{2}\right)$.
 If $y(\pi/3) = 0$, then $y(\pi/4)$ is equal to:
- (A) $2 + \sqrt{2}$ (B) $\frac{1}{\sqrt{2}} - 1$
 (C) $2 - \sqrt{2}$ (D) $\sqrt{2} - 2$
56. If $L = \sin^2\left(\frac{\pi}{16}\right) - \sin^2\left(\frac{\pi}{8}\right)$ and $M = \cos^2\left(\frac{\pi}{16}\right) - \sin^2\left(\frac{\pi}{8}\right)$, then:
- (A) $M = \frac{1}{4\sqrt{2}} + \frac{1}{4} \cos \frac{\pi}{8}$ (B) $L = -\frac{1}{2\sqrt{2}} + \frac{1}{2} \cos \frac{\pi}{8}$
 (C) $M = \frac{1}{2\sqrt{2}} + \frac{1}{2} \cos \frac{\pi}{8}$ (D) $L = \frac{1}{4\sqrt{2}} - \frac{1}{4} \cos \frac{\pi}{8}$
57. Which of the following point lies on the tangent to the curve $x^4e^y + 2\sqrt{y+1} = 3$ at the point $(1, 0)$?
- (A) $(2, 2)$ (B) $(-2, 6)$
 (C) $(-2, 4)$ (D) $(2, 6)$

58. The derivation of $\tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right)$ with respect to $\tan^{-1}\left(\frac{2x\sqrt{1-x^2}}{1-2x^2}\right)$ at $x = \frac{1}{2}$ is:
- (A) $\frac{2\sqrt{3}}{3}$ (B) $\frac{\sqrt{3}}{10}$
 (C) $\frac{\sqrt{3}}{12}$ (D) $\frac{2\sqrt{3}}{5}$
59. If the sum of the second, third and fourth terms of a positive term G.P. is 3 and the sum of its sixth, seventh and eighth terms is 243, then the sum of the first 50 terms of this G.P. is:
- (A) $\frac{1}{26}(3^{50}-1)$ (B) $\frac{1}{13}(3^{50}-1)$
 (C) $\frac{2}{13}(3^{50}-1)$ (D) $\frac{1}{26}(3^{49}-1)$
60. The area (in sq. units) of the region $A = \{(x, y) : (x-1)[x] \leq y \leq 2\sqrt{x}, 0 \leq x \leq 2\}$, where $[t]$ denotes the greatest integer function, is:
- (A) $\frac{8}{3}\sqrt{2}-1$ (B) $\frac{4}{3}\sqrt{2}-\frac{1}{2}$
 (C) $\frac{8}{3}\sqrt{2}-\frac{1}{2}$ (D) $\frac{4}{3}\sqrt{2}+1$
61. If $\int \frac{\cos \theta}{5+7 \sin \theta-2 \cos ^2 \theta} d \theta = A \log _e |B(\theta)| + C$, where C is a constant of integration, then $\frac{B(\theta)}{A}$ can be:
- (A) $\frac{5(\sin \theta+3)}{2 \sin \theta+1}$ (B) $\frac{5(2 \sin \theta+1)}{\sin \theta+3}$
 (C) $\frac{2 \sin \theta+1}{5(\sin \theta+3)}$ (D) $\frac{2 \sin \theta+1}{\sin \theta+3}$
62. If α and β are the roots of the equation, $7x^2-3x-2=0$, then the value of $\frac{\alpha}{1-\alpha^2} + \frac{\beta}{1-\beta^2}$ is equal to:
- (A) $\frac{27}{32}$ (B) $\frac{27}{16}$
 (C) $\frac{3}{8}$ (D) $\frac{1}{24}$
63. If the length of the chord of the circle, $x^2+y^2=r^2$ ($r > 0$) along the line $y-2x=3$ is r , the r^2 is equal to:
- (A) 12 (B) $\frac{12}{5}$
 (C) $\frac{9}{5}$ (D) $\frac{24}{5}$
64. The statement $(P \rightarrow (q \rightarrow p)) \rightarrow (p \rightarrow (p \vee q))$ is:
- (A) a tautology (B) equivalent to $(p \wedge q) \vee (\sim q)$
 (C) equivalent to $(p \vee q) \wedge (\sim p)$ (D) a contradiction

65. There are 3 sections in a question paper and each section contains 5 questions. A candidate has to answer a total of 5 questions, choosing at least one question from each section. Then the number of ways, in which the candidate can choose the questions, is:
 (A) 2255 (B) 3000 (C) 2250 (D) 1500
66. If $a + x = b + y = c + z + 1$, where a, b, c, x, y, z are non-zero distinct real numbers then $\begin{vmatrix} x & a+y & x+a \\ y & b+y & y+b \\ z & c+y & z+c \end{vmatrix}$ is equal to:
 (A) $y(a - b)$ (B) $y(b - a)$
 (C) 0 (D) $y(a - c)$
67. If the sum of the first 20 terms of the series $\log_{(7^{1/2})} x + \log_{(7^{1/3})} x + \log_{(7^{1/4})} x + \dots$ is 460, then x is equal to:
 (A) 7^2 (B) $7^{46/21}$
 (C) $7^{1/2}$ (D) e^2
68. If the line $y = mx + c$ is a common tangent to the hyperbola $\frac{x^2}{100} - \frac{y^2}{64} = 1$ and the circle $x^2 + y^2 = 36$, then which one of the following is true?
 (A) $4c^2 = 369$ (B) $c^2 = 369$
 (C) $5m = 4$ (D) $8m + 5 = 0$
69. If the mean and standard deviation of the data 3, 5, 7, a, b are 5 and 2 respectively, then a and b are the roots of the equation:
 (A) $x^2 - 10x + 19 = 0$ (B) $x^2 - 20x + 18 = 0$
 (C) $x^2 - 10x + 18 = 0$ (D) $2x^2 - 20x + 19 = 0$
70. If $x = 1$ is a critical point of the function $f(x) = (3x^2 + ax - 2 - a)e^x$, then
 (A) $x = 1$ is a local minima and $x = -\frac{2}{3}$.
 (B) $x = 1$ and $x = -\frac{2}{3}$ are local minima of f .
 (C) $x = 1$ is a local maxima and $x = -\frac{2}{3}$ is a local minima of f .
 (D) $x = 1$ and $x = -\frac{2}{3}$ are local maxima of f .
71. Let $A = (a, b, c)$ and $B = (1, 2, 3, 4)$. Then the number of elements in the set $C = \{f : A \rightarrow B \mid 2 \in f(A) \text{ and } f \text{ is not one - one}\}$ is _____.
72. The coefficient of x^4 in the expansion of $(1 + x + x^2 + x^3)^6$ in powers of x , is _____.
73. If the lines $x + y = a$ and $x - y = b$ touch the curve $y = x^2 - 3x + 2$ at the points where the curve intersects the x -axis, then $\frac{a}{b}$ is equal to _____.
74. Let the vectors $\vec{a}, \vec{b}, \vec{c}$ be such that $|\vec{a}| = 2, |\vec{b}| = 4$ and $|\vec{c}| = 4$. If the projection of \vec{b} on \vec{a} is equal to the projection of \vec{c} on \vec{a} and \vec{b} is perpendicular to \vec{c} , then the value of $|\vec{a} + \vec{b} - \vec{c}|$ is _____.
75. In a bombing attack, there is 50% chance that a bomb will hit the target. At least two independent hits are required to destroy the target completely. Then the minimum number of bombs, that must be dropped to ensure that there is at least 99% chance of completely destroying the target, is _____.