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TEST ID : 511447

IIT JEE 2013 – Full Length Test 8

PHYSICS , CHEMISTRY & MATHEMATICS

[Syllabus : Unit & dimension, Errors, Significant Digits, Vectors, Calculus, Kinematics, Constraints, NLM & Friction, Circular Motion, W.E.P., Collision & Momentum, Statics, Rotational Mechanics, Thermal physics – I & II, Electrostatics, Capacitors, Gravitation, SHM, Elasticity, Electric Current, **Magnetism and Sound & Waves.** Redox Reaction, Stoichiometry, Gas Laws, Atomic structure, Chemical Equilibrium, Ionic Equilibrium, Energetics and Thermodynamics, Thermochemistry, Solutions & Colligative Properties, Volumetric Titration, Electrochemistry, Periodic properties, Chemical Bonding, Nomenclature, Isomerism, Reaction mechanism, Hydrocarbon, Aromatic Compounds, Halogen Derivatives, Alcohols, Ethers & Phenols, Chemical Kinetics, Nuclear Chemistry, Solid State, Hydrogen, s – block elements, **p-block elements and Surface Chemistry.** Logarithms, Trigonometric Identities, Functions, Trigonometric Equations and Inverse Trigonometry, Straight Line, Basic Co-ordinate Geometry, Properties of Triangles, Quadratic Equations & Expressions, Complex Number – I & II, Sequences & Series, Determinants & Matrices, Permutation & Combinations, Binomial theorem, Probability, Limits, Continuity & Differentiability, Derivatives & Pair of Lines, **Circles and Application of Derivatives.]**

PAPER - I

Time : 3 hours ***Maximum Marks : 210***

Instructions to Test Takers :

1) The question paper consists of **3** parts (Physics, Chemistry & Mathematics). Each part has **3** sections.

2) This Question Paper has **60** questions comprising of **Physics (Q. 1 to 20), Chemistry (Q. 21 to 40)** and **Mathematics(Q. 41 to 60).**

3) **Section I** contains **10** multiple choice questions. Each question has 4 choices (A), (B), (C) and (D), out of which **only one is correct.** For each question you will be awarded **3 marks** if you have darkened only the bubble corresponding to the correct answer and **zero mark** if no bubble is darkened. In all other cases, **minus one (−1) mark** will be awarded.

4) **Section II** contains **5** multiple choice questions. Each question has 4 choices (A), (B), (C) and (D), out of which **one or more than one answer is correct.** For each question you will be awarded **4 marks** if you have darkened only the bubble corresponding to the correct answer and **zero mark** if no bubble is darkened. **No negative marking** in this section.

5) **Section III** contains **5** integer type questions. Answers are to be given in between 0 to 9 in the form of nearest integer. Each question carries **4 marks** if you darken the correct answer and **no negative mark** will be awarded for an incorrectly bubbled answer.

6) Use of calculators, log tables, cellular phones & electronic instruments in any form are **not permitted**.

7) Questions are to be answered by darkening the appropriate bubble(s) with a **blue/black pen only.**

Name : …… Reg. No.: ……

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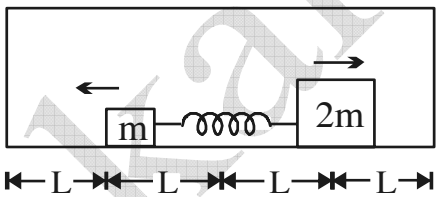
PART I : PHYSICS

SECTION I
Single Correct Answer Type

This section contains **10 multiple choice questions**. Each question has four choices (A) , (B), (C) and (D) out of which **ONLY ONE** is correct.

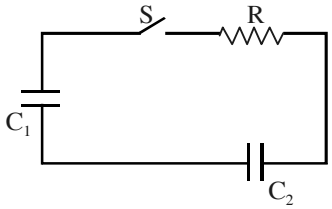
1. Two small blocks of mass m and 2m are held against a massless compressed spring within a box of mass 3m and length 4L whose centre is at x = 0 (see fig.). All the surfaces are frictionless. After the blocks are released they are each at a distance L from the ends of the box when they lose contact with the spring.



What is the shift in position of centre of mass of the box after both blocks collide with and stick to it?

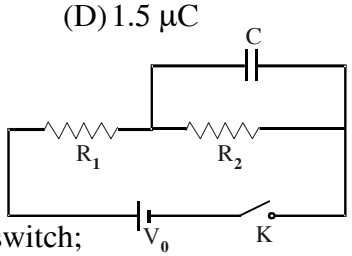
(A) $\frac{L}{3}$ (B) $\frac{L}{6}$ (C) $\frac{L}{12}$ (D) $\frac{L}{4}$

2. Consider the shown network, the capacitor C_1 (= 6μF) has an initial charge $q_0 = \frac{30e}{e-1}\mu C$, C_2 = 4 μF and R = 80Ω. Initially C_2 is uncharged. At t = 0, the switch S is closed. Then the charge on C_2 at t = 192 μs is



(A) 12 μC (B) 6 μC (C) 3 μC (D) 1.5 μC

3. In the connection shown in the *figure* the switch K is open and the capacitor is uncharged. Then we close the switch and let the capacitor charge up to the maximum and open the switch again. Then



(a) the current through R_1 be I_1 immediately after closing the switch;

(b) the current through R_2 be I_2 a long time after the switch was closed;

(c) the current through R_2 be I_3 immediately after reopening the switch; then $\frac{I_1}{I_2 I_3}$ is

(Use the following data : V_0=30 V, R_1=10 kΩ, R_2=5 kΩ.)

(A) 250 A^{-1} (B) 500 A^{-1} (C) 750 A^{-1} (D) 1000 A^{-1}

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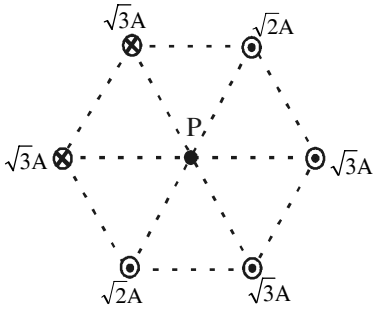
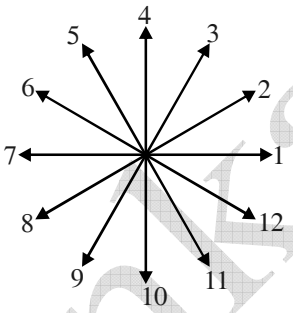
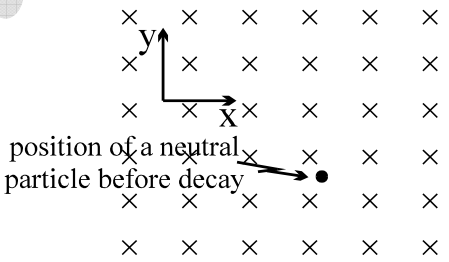
4. Consider a set of six infinite long straight parallel wires arranged perpendicular to the plane of paper in a hexagon as shown. The length of the each side of the hexagon is 3cm. What is the magnitude and direction of the magnetic field at point P? (Twelve direction at consecutive equal angles have been shown, give your answer in forms of their respective numbers)





(A) 70 T along 12 (B) 40 T along 6 (C) 40 T along 9 (D) 60 T along 9

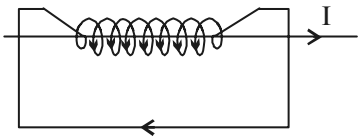
5. A neutral particle is initially at rest in a uniform magnetic field B as shown in the diagram. The particle then spontaneously decays into two fragments, one with a positive charge +q and mass 3m and the other with a negative charge –q and mass m. Neglecting the interaction between the two charged particles and assuming that the speeds are much less than speed of light, the time after the decay at which the two fragments first meet is



[Data : $q = 1\mu C$, $B = 2\pi\mu T$, $m = 10^{-15}$ kg
Both the charges have initial velocities in x-y plane]

(A) 250 μS (B) 500 μS (C) 750 μS (D) 1000 μS

6. In the diagram shown, a wire carries current I. What is the value of the $\oint \vec{B}\cdot d\vec{s}$ (as in Ampere's law) on the helical loop shown in the figure? The integration in done in the sense shown. The loop has N turns and part of helical loop on which arrows are drawn is outside the plane of paper.



(A) $-\mu_0(NI)$ (B) $\mu_0(I)$ (C) $\mu_0(NI)$ (D) $\frac{\mu_0 I}{N}$

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7. A projectile is thrown with velocity U = 20m/s ± 5% at an angle 60°. If the projectile falls back on the ground at the same level then which of following can not be a possible answer for range. Consider g = 10m/s^2.

(A) 39.0 m (B) 37.5 m (C) 34.6 m (D) 32.0 m

8. When a basketball bounces against the ground and gets deformed and then recovers its shape, the air inside that ball is temporarily compressed. The compression ends when the ball recovers during the rebound. The temperature of air inside the ball

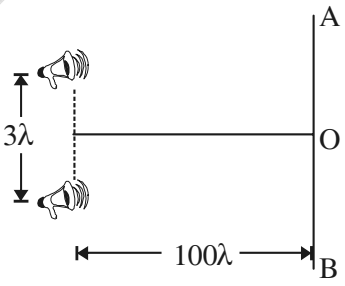
(A) remains constant throughout the bounce, because thermal energy is conserved.

(B) decreases during the deformation process and increases during the recovery processes.

(C) increases during the deformation process and decreases during the recovery process.

(D) increases during both the deformation and recovery processes.

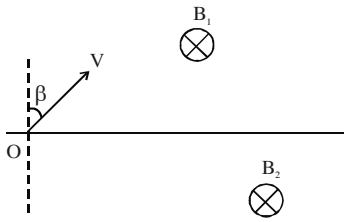
9. 2 loudspeakers are emitting sound waves of wavelength λ with an initial phase difference of $\frac{\pi}{2}$. At what minimum distance from O on line AB will one hear a maxima ?

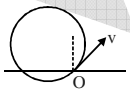


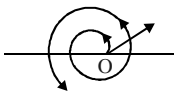
(A) 25 λ (B) $\frac{100\lambda}{\sqrt{15}}$

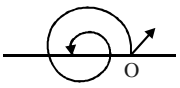
(C) $\frac{25\lambda}{3}$ (D) 50 λ

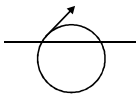
10. In the diagram shown, a particle of charge +Q and mass M is projected making an angle β with the vertical line. Draw the possible path on which the charge will move. Above the dark line magnetic field is B_1 and below it is B_2. (Consider all possible cases for values of B_1 and B_2)



(A) 

(B) 

(C) 

(D) 

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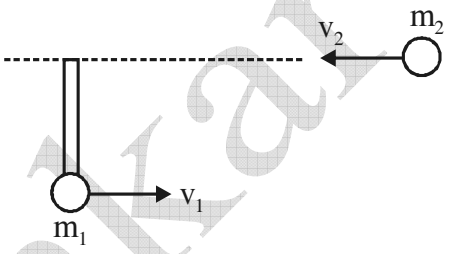
SECTION II

Multiple Correct Answers Type

This section contains **5 multiple choice questions.** Each question has four choices (A) , (B) , (C) and (D) out of which **ONE or MORE** are correct.

11. Two girls Sita and Gita are skating towards each other on smooth ice along parallel lines as shown in figure. The distance between the lines is ℓ. The mass of two girls are m_1 and m_2 ($m_1 < m_2$) and their respective velocity are v_1 and v_2 ($v_2 > v_1$) . One of the girls holds a stick of length ℓ and negligible mass.



When the girls pass each other, second girl grasps the stick and the girls move together, each of them on either side of the stick. Mark the correct statements -

(A) In the centre of mass reference frame of system both the girls have momentum of equal magnitude.

(B) Due to torque of normal reaction between hands of girl grasping rod angular momentum of system about centre of mass increases.

(C) The girls start moving towards each other by pulling the stick, angular velocity of system will increase.

(D) After the girl has grabbed the rod system rotates in anticlockwise sense while centre of mass translates towards lest.

12. The electric field in a region of space varies as $E = (3\,v/m)x\,\hat{i} + (4\,v/m)y\,\hat{j} + (5\,v/m)z\,\hat{k}$. Consider a differential cube whose one vertex is (x, y, z) and the three sides are dx, dy, dz, sides being parallel to the three coordinate axes.

(A) The flux of electric field through the differential cube is zero.

(B) The flux of electric field through the cube = 12 dx dy dz.

(C) The charge enclosed by the cube is zero.

(D) The charge enclosed by a spherical surface of radius r, centered at origin is $16\pi\varepsilon_0 r^3$

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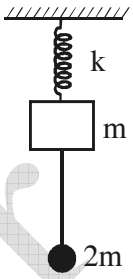
13. A bob of mass 2m hangs by a string attached to the block of mass m of a spring blocks system. The whole arrangement is in a state of equilibrium. The bob of mass 2m is pulled down slowly by a distance x_0 and released.



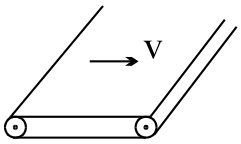
(A) For $x_0 = \frac{3mg}{k}$ maximum tension in string is 4mg

(B) For $x_0 > \frac{3mg}{k}$, minimum tension in string is mg

(C) Frequency of oscillation of system is $\frac{1}{2\pi}\sqrt{\frac{k}{3m}}$, for all non-zero values of x_0

(D) The motion will remain simple harmonic for $x_0 \leq \frac{3mg}{k}$

14. Charge is sprayed onto a large non conducting belt above the left hand roller. The belt carries charge with a uniform surface charge density σ, as it moves with a speed v between the rollers as shown. The charge is removed by a wiper at right hand roller. For a point just above the sheet mark the correct option.



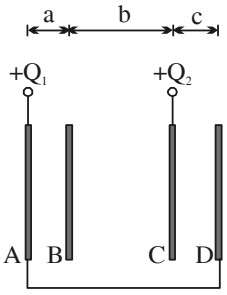
(A) magnetic field is $\frac{\mu_0 \sigma v}{2}$, out of the plane of the page, parallel to axis of roller.

(B) magnetic field is $\mu_0\sigma$, out of the plane of the page, perpendicular to axis

(C) electric field is $\frac{\varepsilon_0\sigma}{2}$ perpendicular to the plane of sheet

(D) If an electron moves parallel to V just above the sheet it will experience an upward magnetic force.

15. Figure shows an arrangement of four identical rectangular plates A, B, C and D each of area S. Find the charges appearing on each face (from left to right) of the plates. Ignore the separation between the plates in comparison to the plate dimensions.



(A) Potential difference between plates A & B is independent of Q_1.

(B) Potential difference between plates C & D is independent of Q_1.

(C) Potential difference between plates A & B is independent of Q_2.

(D) Potential difference between plates C & D is independent of Q_2.

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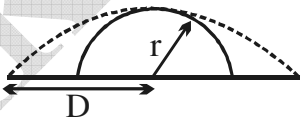
SECTION III
Integer Answer Type

This section contains **5 questions**. The answer to each question is a **single digit integer**, ranging from 0 to 9 (both inclusive).

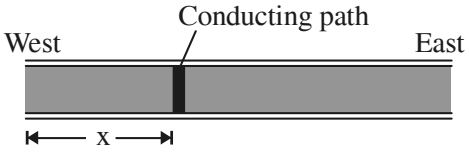
16. A huge Diwali rocket is projected vertically upward so as to attain a maximum height of 160m. The rocket explodes just as it reaches the top of its trajectory sending out luminous particles in all possible directions all with same speed v. The display, consisting of the luminous particles, spreads out as an expanding, brilliant sphere. The bottom of this sphere just touches the ground when its radius is 80m. The speed (in m/s) with which are the luminous particles are ejected by the explosion is 10n, then n is

17. A projectile is to be launched so as to pass over a hemispherical mountain. This can be accomplished if the projectile is launched at a certain minimum distance D from the centre of the mountain. What is minimum required D for r = $\sqrt{2}$ m ?



18. A particle is moving anticlockwise in a circle under influence of a force $\vec{F} = \left[(2x - y + 3z)\hat{i} + (x + y - z)\hat{j} + (5x - 2y - z)\hat{k} \right]$ N . Where x, y and z are in meter. The circle lies in the xy plane with its centre at the origin and has a radius of 4 m. The work done by the force as the particle completes one revolution in hectajoule is (up to nearest integer)

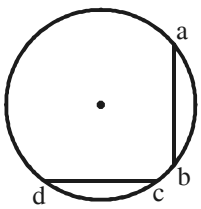
19. A 10-km-long underground cable extends east to west and consists of two parallel wires, each of which has resistance 13Ω/km. A short develops at distance x from the west end when a conducting path of resistance R connects the wires (figure).



The resistance of the wires and the short is then 100Ω when the measurement is made from the east end, 200Ω when it is made from the west end. What is value of R (in deca ohm).

20. The two ends of a uniform thin rod of length $\sqrt{2}$ R and of mass $2\sqrt{2}$ kg can move without friction along a vertical circular path of radius R. The rod is released from the vertical position (ab).

The force (in N) exerted by an end of the rod on the path when the rod passes the horizontal position (cd) is 10x. Then x is



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PART II : CHEMISTRY

SECTION I
Single Correct Answer Type

This section contains **10 multiple choice questions**. Each question has four choices (A) , (B), (C) and (D) out of which **ONLY ONE** is correct.

21. The number of moles of $BaCO_3$ which contains 1.5 moles of oxygen atoms is
(A) 0.5 (B) 1 (C) 3 (D) 6.02×10^{23}

22. The critical temperature of water is higher than that of O_2 because the H_2O molecule has
(A) fewer electrons than O_2 (B) two covalent bonds
(C) V−shape (D) dipole moment

23. If the de−Broglie wavelength of a particle of mass m is 100 times its velocity, then its value in terms of its mass (m) and Planck's constant (h) is
(A) $\frac{1}{10}\sqrt{\frac{m}{h}}$ (B) $10\sqrt{\frac{h}{m}}$ (C) $\frac{1}{10}\sqrt{\frac{h}{m}}$ (D) $10\sqrt{\frac{m}{h}}$

24. The oxidation of XO_2 by O_2 to XO_3 is an exothermic reaction. The yield of XO_3 will be maximum if
(A) Temperature is increased and pressure is kept constant
(B) Temperature is reduced and pressure are increased
(C) Both temperature and pressure are increased
(D) Both temperature and pressure are decreased

25. In a saturated solution of the sparingly soluble strong electrolyte $AgIO_3$ (Molecular mass = 283), the equilibrium which sets in is

$$AgIO_3(s) \rightleftharpoons Ag^+(aq) + IO_3^-(aq)$$

If the solubility product constant K_{sp} of $AgIO_3$ at a given temperature is 1.0×10^{-8}, what is the mass of $AgIO_3$ contained in 100 ml of its saturated solution?
(A) 1.0×10^{-4} g (B) 28.3×10^{-2} g (C) 2.83×10^{-3} g (D) 1.0×10^{-7} g

26. The entropy change in the fusion of one mole of a solid melting at 27°C is (latent heat of fusion = 2930 J mol^{-1})
(A) 9.77 J K^{-1} mol^{-1} (B) 10.73 J K^{-1} mol^{-1}
(C) 2930 J K^{-1} mol^{-1} (D) 108.5 J K^{-1} mol^{-1}

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CHEMISTRY

27. Which of the following is not paramagnetic?

(A) S^{2-} (B) N_2^- (C) O_2^- (D) NO

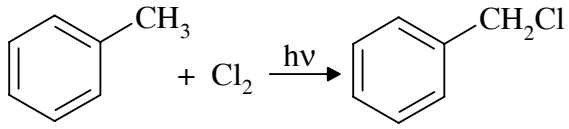
28. How many sp^2 hybridized boron atoms are present in structure of borax?

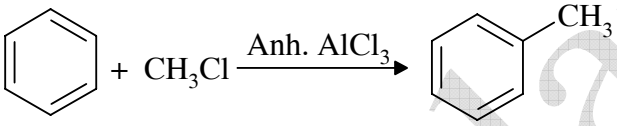
(A) 2 (B) 4 (C) 6 (D) 8

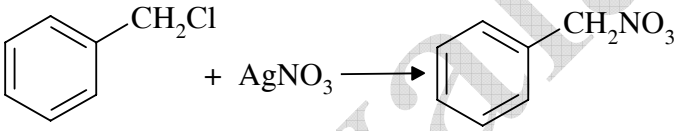
29. Which of the following is least reactive in a nucleophilic substitution reaction?

(A) $(CH_3)_3CCl$ (B) $CH_2{=}{=}CHCl$ (C) CH_3CH_2Cl (D) $CH_2{=}{=}CHCH_2Cl$

30. Which of the following is a free radical substitution reaction?

(A) 

(B) 

(C) 

(D) $CH_3CHO + HCN \rightarrow CH_3CH(OH)CN$

SECTION II
Multiple Correct Answers Type

This section contains **5 multiple choice questions.** Each question has four choices (A) , (B) , (C) and (D) out of which **ONE or MORE** are correct.

31. An isotones of Ge_{32}^{76} is :

(A) Ge_{32}^{77} (B) As_{33}^{77} (C) Se_{34}^{78} (D) Se_{34}^{78}

32. Select the correct statements

(A) Zinc blende has 4 : 4 co–ordination (B) Rock salt has 6 : 6 co–ordination

(C) Fluorite has 8 : 4 co–ordination (D) Na_2O has 4 : 8 co–ordination

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33. Which of the following is/are correct statements
(A) Hardy Schulz rule is related to coagulation
(B) Brownian movement and Tyndall effect are shown by colloids
(C) When liquid is dispersed in liquid, it is called gel
(D) Gold number is a measure of protective power of lyophilic colloid

34. Anhydrous barium nitrate and magnesium nitrate both decompose on heating, evolving nitrogen dioxide and oxygen and forming an oxide.
Choose the correct statement about this decomposition.
(A) Nitrogen dioxide is evolved at a lower temperature from magnesium nitrate than from barium nitrate.
(B) Nitrogen dioxide is evolved at a lower temperature from barium nitrate than from magnesium nitrate.
(C) For both nitrates the volume of nitrogen dioxide evolved is four times greater than the volume of oxygen.
(D) The numerical value of the lattice energy of magnesium nitrate is greater than that of barium nitrate.

35. Which of the following is correct about interhalogens :
(A) F_2 is more reactive than Cl_2, Br_2 or I_2
(B) BrF_5 hydrolyses to give HF and $HBrO_3$
(C) Liquid I_2Cl_6 self ionizes as $I_2Cl_6 \rightleftharpoons ICl_2^+ + ICl_4^-$
(D) The bond lengths of all the Cl – F bonds in ClF_3 are equal

SECTION III
Integer Answer Type

This section contains **5 questions**. The answer to each question is a **single digit integer**, ranging from 0 to 9 (both inclusive).

36. How many isomers of $C_5H_{11}OH$ will be primary alcohols (including optical)?

37. On monochlorination of 2–methylbutane, the total number of chiral compounds are

38. Number of resonance structures possible for cyclo propenyl carbocation.

39. The coordination number of octahedral void is

40. How many types of hybridized carbons are present in butyne–1?

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PART III : MATHEMATICS

SECTION I

Single Correct Answer Type

This section contains **10 multiple choice questions**. Each question has four choices (A) , (B), (C) and (D) out of which **ONLY ONE** is correct.

41. z_1 and z_2 are any two distinct complex numbers in an argand plane. If $\alpha\beta\,|z_1| = \gamma\delta\,|z_2|$, then the complex number $\frac{\alpha\beta z_1}{\gamma\delta z_2} + \frac{\gamma\delta z_2}{\alpha\beta z_1}$ lies on the ($\alpha, \beta \in R$)

(A) line segment [−2, 2] on the real axis
(B) line segment [−2, 2] on the imaginary axis
(C) unit circle $|z| = 1$
(D) None of these

42. The range of values of real λ such that the angle θ between the pair of tangents drawn from $(\lambda, 0)$ to the circle $x^2 + y^2 = 4$ lies in $\left(\frac{\pi}{2}, \frac{2\pi}{3}\right)$ is

(A) $\left(\frac{4}{\sqrt{3}}, 2\sqrt{2}\right)$ (B) $\left(0, \sqrt{2}\right)$ (C) (1, 2) (D) None of these

43. The number of times the function $f(x) = \sum_{r=1}^{2009} \frac{r}{x - r}$ vanishes is

(A) 0 (B) 2008 (C) 2010 (D) 1

44. In the quadratic equation $ax^2 + bx + c = 0$ the coefficients a, b, c take values from the set {1, 2, 3}. The probability that roots of equation are real is

(A) $\frac{2}{3}$ (B) $\frac{1}{3}$ (C) $\frac{1}{4}$ (D) None of these

45. If two squares are chosen at random on a chess board, the probability that they have a side in common is

(A) $\frac{1}{9}$ (B) $\frac{4}{9}$ (C) $\frac{3}{7}$ (D) $\frac{1}{18}$

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46. The domain of the function $\cos^{-1}(\log_3 (x^2 + 17x + 75))$ is

(A) $(-\infty, \infty)$ (B) $\{-8, -9\}$ (C) $[-9, -8]$ (D) $[-9, -7]$

47. Let a_n be the n^{th} term of an A. P. If $\sum_{r=1}^{10^{99}} a_{2r} = 10^{100}$ and $\sum_{r=1}^{10^{99}} a_{2r-1} = 10^{99}$, then the common difference of the A.P. is

(A) 1 (B) 9 (C) 10 (D) 10^{99}

48. The solution set of the inequality $\log_{0.09} (x^2 + 2x) \geq \log_{0.3} \sqrt{x+2}$ is

(A) $[-2, 1]$ (B) $(-2, 0)$ (C) $(0, 1]$ (D) None of these

49. If $\alpha + i\beta = \left(\frac{-1+i\sqrt{3}}{2}\right)^{3n_1/4} (1-i)^{-2n_2}$ (where n_1 and n_2 are positive integers), then which of the following is false?

(A) $\alpha = 0$ if only one of n_1 and n_2 is odd (B) $\beta = 0$ if both n_1 and n_2 are odd

(C) $\alpha = 0$ if both n_1 and n_2 are even (D) $\beta = 0$ if both n_1 and n_2 are even

50. If the normal to $y = f(x)$ at $(0, 0)$ is given by $y - x = 0$,

then $\lim_{x\to 0} \frac{x^2}{f\left(x^2\right) - 20f\left(9x^2\right) + 2f\left(99x^2\right)}$ is equal to

(A) $\frac{1}{19}$ (B) $-\frac{1}{19}$ (C) $\frac{1}{2}$ (D) does not exist

SECTION II
Multiple Correct Answers Type

This section contains **5 multiple choice questions.** Each question has four choices (A) , (B) , (C) and (D) out of which **ONE or MORE** are correct.

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51. If the function f satisfies $f(x + y) + f(x - y) = 2 (f(x) f(y)) \ \forall\ x, y \in R$ and $f(0) \neq 0$ then

(A) f (x) is even function (B) if f (2) = a, then f (−2) = a

(C) f (x) is odd function (D) if f (4) = b, then f (−4) ≠ b

52. If $^{100}C_{50}$ can be prime factorized as $2^{\alpha}, 3^{\beta}, 5^{\gamma}, 7^{\delta}, \ldots\ldots\ldots$ where $\alpha, \beta, \gamma, \delta\ldots\ldots\ldots$ are non−negative integers, then correct relation is/are :

(A) $\alpha < \beta$ (B) $\gamma < \delta$

(C) $\alpha + \delta = \beta + \gamma - 1$ (D) $\gamma + \delta = 0$

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53. The points of discontinuity of f (x) = $\left[\frac{6x}{\pi}\right]\cos\left[\frac{3x}{\pi}\right]\text{in}\left[\frac{\pi}{6},\pi\right]$ are (where [·] is greatest integer function).

(A) $\frac{\pi}{6}$ (B) $\frac{\pi}{3}$ (C) $\frac{\pi}{2}$ (D) π

54. The solution of $x^{1/3} + (2x - 3)^{1/3} = (3(x - 1))^{1/3}$ is

(A) 0 (B) $\frac{3}{2}$ (C) 1 (D) None of these

55. ABCD is a square side of side length 1 unit. P and Q lie on the side AB and R lies on the side CD. The possible values for the circumradius of triangle PQR is

(A) 0.5 (B) 0.6 (C) 0.7 (D) 0.8

SECTION III
Integer Answer Type

This section contains **5 questions**. The answer to each question is a **single digit integer**, ranging from 0 to 9 (both inclusive).

56. The value of $x^{1/3}$ satisfying the equations $\log_3(\log_2 x) + \log_{1/3}(\log_{1/2} y) = 1$; $xy^2 = 9$ is ____.

57. The line L has intercepts 1 and 1/2 on the co–ordinate axes. Keeping the origin fixed, the co–ordinate axis are rotated through a fixed angle. If the same line has intercepts p and q on the rotated axes, then $\frac{1}{p^2}+\frac{1}{q^2}$ is _____.

58. $\text{cosec}^2 A \cdot \cot^2 A - \sec^2 A \cdot \tan^2 A - (\cot^2 A - \tan^2 A)(\sec^2 A \,\text{cosec}^2 A - 1)$ is _____.

59. If $a \neq p, b \neq q, c \neq r$, $\begin{vmatrix} p & b & c \\ a & q & c \\ a & b & r \end{vmatrix} = 0$, then $\frac{p}{p-a}+\frac{q}{q-b}+\frac{r}{r-c}$ is equal to _____.

60. Suppose that f is differentiable for all x and that $f'(x) \leq 2$ for all x. If f (1) = 2 and f (4) = 8, then f (2) has the value equal to_____.

❑ ❑ ❑ ❑ ❑ ❑

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