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Time : 3 hrs.

Max. Marks: 360

JEE MAIN FULL SYLLABUS TEST (CLASS XI AND XII)

Instructions:

- (i) Duration of Test is 3 hrs.
- (ii) The Test booklet consists of 90 questions. The maximum marks are 360.
- (iii) There are **three** parts in the question paper. Distribution of marks subjectwise in each part is as under for each correct response.
 - Part A – PHYSICS (120 marks)** – Questions No.1 to 30 consist **FOUR (4)** marks each for each correct response.
 - Part B – CHEMISTRY (120 marks)** – Questions No.31 to 60 consist **FOUR (4)** marks each for each correct response.
 - Part C – MATHEMATICS (120 marks)** – Questions No.61 to 90 consist **FOUR (4)** marks each for each correct response.
- (iv) One fourth ($\frac{1}{4}$) marks will be deducted for indicating incorrect response of each question. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.
- (v) **Pattern of the Question: Section – I : Multiple Type Objective Questions** (Straight Single Choice Multiple Type Questions); **Section – II: Assertion – Reason Type Questions**; **Section – III: Comprehension Type Questions** : (One Comprehension Type Question should have 3 questions - Multiple Concept Questions); **Section – IV: Straight Objective Questions**: (Straight Single Choice - Multiple Concept Questions and/or Difficulty/Lengthy calculations & Application based questions)

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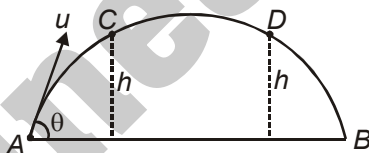
Discuss among yourself or with your teachers in case of doubts. You can post your doubts on website comment section too and We will try to answer as early as possible.

PHYSICS**SECTION - I****Straight Single Choice Multiple Type Questions /
Application Based Single Choice Questions**

This section contains 16 multiple choice questions numbered 1 to 16. Each question has 4 choices (1), (2), (3) and (4), out of which **ONLY ONE** is correct.

Choose the correct answer :

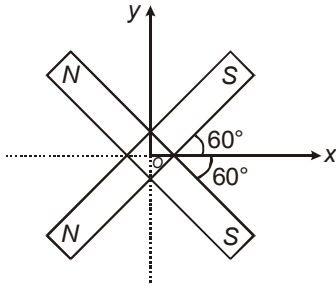
- If an electron is accelerated through a potential difference 100 V, then what will be de-Broglie wavelength associated with it?
(1) 1.101 Å (2) 1.37 Å
(3) 1.47 Å (4) 1.227 Å
- A radioactive substance will disintegrate in one mean life
(1) 37% (2) 63%
(3) 44% (4) 69.3%
- If both radius of earth and mass is increased by 2%, then what will percentage change in the value of acceleration due to gravity on the surface of earth?
(1) 6% (2) -2%
(3) -4% (4) -6%
- A body projected vertically upwards travel x distance during second last second of its upward journey. The distance travelled by it during third second of its downward journey is
(1) $5x$ (2) $3x$
(3) $\frac{5x}{3}$ (4) $\frac{3x}{2}$
- If v_1 is the average velocity of a body projected with speed u at angle θ with horizontal between points A and B and v_2 is its average velocity between C and D, then $\frac{v_1}{v_2}$ equal to (where $R \rightarrow$ range of projectile)



- (1) 0
(2) 1 : 1
(3) $h : R$
(4) $R : h$
- For a projectile, time of flight is 10 s when projected with some speed at an angle θ with horizontal from level ground and 20 s when projected with same speed at same angle with vertical. The horizontal range of

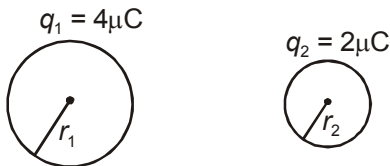
projectile is

- (1) 400 m
(2) 200 m
(3) 500 m
(4) 1000 m
- A man of mass 60 kg standing on a uniform plank of mass 40 kg placed on a smooth horizontal surface starts moving with constant speed. If man travels distance 10 m on it, the distance travelled by plank w.r.t. ground is
(1) Zero
(2) 6 m
(3) 4 m
(4) 10 m
- The speed of a planet moving around sun is 3×10^4 m/s at distance r . Its speed at point where distance is double of first will be (both positions refer to perigee and apogee respectively)
(1) 4.5×10^4 m/s
(2) 2×10^4 m/s
(3) 1.5×10^4 m/s
(4) 2.7×10^4 m/s
- For an ideal monatomic gas at temperature 500 K, the coefficient of volume expansion at constant pressure is
(1) $1.01 \times 10^5 / K$
(2) $2 \times 10^{-4} / K$
(3) $1.01 \times 10^{-5} / K$
(4) $2 \times 10^{-3} / K$
- If 1 cm of ice grow on the surface of a lake in 4 days, then how much time further required to thickness will become twice?
(1) 4 days (2) 12 days
(3) 16 days (4) 20 days
- If K is the maximum kinetic energy gained by a charged particle of mass m in a cyclotron, then
(1) $K \propto \frac{1}{m}$ (2) $K \propto m$
(3) $K \propto m^2$ (4) $K \propto m^0$
- Two identical short bar magnets having magnetic moment M are placed in x - y plane as shown in figure. The magnetic field at point $(a, 0, 0)$ will be

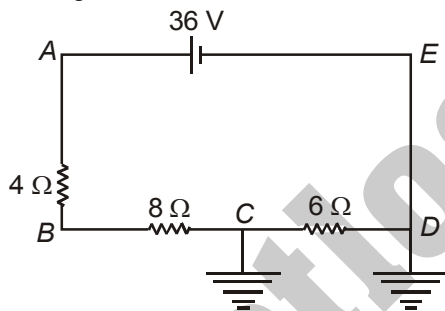


- (1) $\frac{\mu_0}{4\pi} \frac{2M}{a^3} \hat{k}$ (2) $\frac{\mu_0}{4\pi} \frac{\sqrt{3}M}{a^3} (\hat{i} - 2\hat{j})$
 (3) $\frac{\mu_0}{4\pi} \frac{2M}{a^3} (-\hat{i})$ (4) $\frac{\mu_0}{4\pi} \frac{\sqrt{3}M}{2a^3} (\hat{i} + \hat{j})$

13. The time required for 100 Hz sinusoidal alternating current to reach its value from zero to root mean square value
 (1) 3.25 ms (2) 2.5 ms
 (3) 3.75 ms (4) 1.25 ms
14. If two metallic spheres having radii $r_1 = 20$ cm and $r_2 = 10$ cm are placed at large distance as shown in figure are connected by a conducting wire, the loss in energy in wire in the form of heat will be



- (1) Zero (2) 20 μ J
 (3) 10 μ J (4) 7.5 μ J
15. What is the potential of point B w.r.t. C in the circuit shown in figure?



- (1) 12 V (2) 24 V
 (3) 8 V (4) 16 V
16. In order to take a safe turn on a circular turning of radius 10 m a cyclist bend inward at angle 37° with vertical. The maximum speed with which he can take the circular turn is
 (1) $10\sqrt{3}$ m/s (2) $\frac{20}{\sqrt{3}}$ m/s
 (3) $2\sqrt{3}$ m/s (4) $5\sqrt{3}$ m/s

SECTION - II

Assertion – Reason Type Questions

Directions : Questions number 17 to 21 are Assertion-Reason type questions. Each of these questions contains two statements. Statement-1 (Assertion) and Statement-2

(Reason). Each of these questions also has four alternative choices, only one of which is the correct answer. You have to select the correct choice.

17. Statement-1 : When static friction is involved mechanical energy is conserved.

and

Statement-2 : Friction is non-conservative force

- (1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1

- (2) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1

- (3) Statement-1 is True, Statement-2 is False

- (4) Statement-1 is False, Statement-2 is True

18. Statement-1 : The ratio of the first three harmonics in a closed pipes have a ratio 1 : 3 : 5.

and

Statement-2 : In case of closed pipes only odd multiples of fundamental frequency exist.

- (1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1

- (2) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1

- (3) Statement-1 is True, Statement-2 is False

- (4) Statement-1 is False, Statement-2 is True

19. Statement-1 : Rise of water level in capillary tube depends upon the radius of capillary

and

Statement-2 : More the radius, the rise will decrease for different liquids tested.

- (1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1

- (2) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1

- (3) Statement-1 is True, Statement-2 is False

- (4) Statement-1 is False, Statement-2 is True

20. Statement-1 : A hypermetropic person needs no lens for driving a vehicle.

and

Statement-2 : Focal length of the eye-lens of the hypermetropic person decreases.

- (1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1

Class (XII)

- (2) Statement-1 is True, Statement-2 is True; Statement-2 is **NOT** a correct explanation for Statement-1
- (3) Statement-1 is True, Statement-2 is False
- (4) Statement-1 is False, Statement-2 is True
21. Statement-1 : Alpha decay and beta decay are generally accompanied by gamma decay.

and

Statement-2 : In alpha and beta decay the daughter nucleus is in excited state. It returns to ground state by gamma emission.

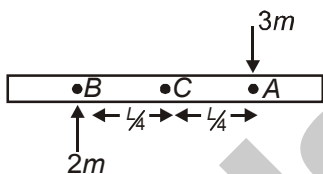
- (1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1
- (2) Statement-1 is True, Statement-2 is True; Statement-2 is **NOT** a correct explanation for Statement-1
- (3) Statement-1 is True, Statement-2 is False
- (4) Statement-1 is False, Statement-2 is True

SECTION - III

Comprehension Type Questions

Directions : Question No. 22 to 24 are based on the following paragraph.

A uniform light bar of length L lies on a horizontal table. Two point masses $2m$ and $3m$ moving in the same horizontal plane with speed $3v$ and $2v$ respectively strike the bar as shown and stick to the bar after collision



22. The velocity of centre of mass just after collision is
- (1) 0 (2) $\frac{5v}{2}$
- (3) $\frac{v}{2}$ (4) v
23. Angular velocity of rod just after collision is
- (1) 0 (2) $\frac{5v}{2L}$
- (3) $\frac{5v}{L}$ (4) $\frac{10v}{L}$
24. Which of the following statement is correct?
- (1) Angular Momentum of the system is conserved only about A on the rod
- (2) Angular Momentum of the system is conserved only about B on the rod
- (3) Angular Momentum of the system is conserved about centre of mass of the system of rod and the

two masses

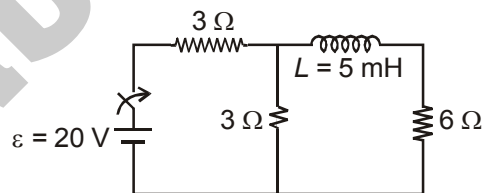
- (4) Angular Momentum of the system is conserved about all the three points A, B and C lying on the rod

SECTION - IV

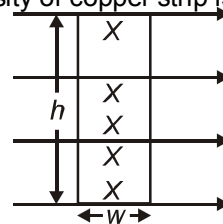
Straight Objective Questions

Directions : Question No. 25 to 30 are based on (Straight Single Choice - Multiple Concept Questions and/or Difficulty/Lengthy calculations & Application based questions)

25. In the displacement method to find focal length of a given lens, if α be the separation between the positions of the lens of focal length f for real images and D be the separation between object and screen, the magnification produced when the lens is nearer to the object is
- (1) $\frac{D+d}{D-d}$ (2) $\frac{D-d}{D+d}$
- (3) $\frac{D}{d}$ (4) 1
26. In the given circuit, let i_1 be the current drawn from battery at time $t = 0$ (i.e., at the moment just after closing the switch) and i_2 be steady state current at $t = \infty$, then the ratio $\frac{i_1}{i_2}$ is

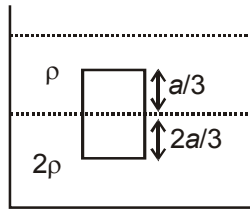


- (1) $\frac{2}{3}$ (2) $\frac{5}{6}$
- (3) $\frac{3}{5}$ (4) $\frac{2}{5}$
27. A current i , indicated by the crosses in fig. is established in a strip of copper of height h and width w . A uniform magnetic induction B is applied at right angles to the strip. Magnitude of magnetic force F acting on the electron is (electron density of copper strip is η)
- (1) $\frac{iB}{\eta hw}$
- (2) $\frac{\eta iB}{hw}$
- (3) $\frac{\eta^2 iB}{hw}$
- (4) $\frac{hw}{\eta iB}$
28. A cubical block floats in a pair of liquids of density 2ρ and ρ as shown in figure. The density of the cubical block is



Class (XII)

- (1) $\frac{5\rho}{3}$
 (2) $\frac{\rho}{3}$
 (3) $\frac{4\rho}{3}$
 (4) 4ρ



29. A capacitor of capacitance C is charged to a potential difference of V . The charging battery is disconnected and the capacitor is connected to a capacitor of unknown capacitance C_0 . The potential difference across the combination is $V/3$. The value of C_0 is

- (1) C
 (2) $2C$

- (3) $3C$
 (4) $C/2$

30. Light corresponding to the transition $n = 4$ to $n = 2$ in hydrogen atom falls on cesium metal (work function 1.9 eV). The maximum kinetic energy of the emitted photo electrons is

- (1) 1.9 eV
 (2) 1.6 eV
 (3) 2.6 eV
 (4) 0.65 eV

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46. For which of the following heat combustion at constant pressure and constant volume are equal at 25°C?

- (1) Glucose (2) Acetic acid
(3) Formic acid (4) Benzene

SECTION - II

Assertion – Reason Type Questions

Directions : Questions number 47 to 51 are Assertion-Reason type questions. Each of these questions contains two statements. Statement-1 (Assertion) and Statement-2 (Reason). Each of these questions also has four alternative choices, only one of which is the correct answer. You have to select the correct choice.

47. Statement-1 : Diamond is more thermally stable than graphite.

and

Statement-2 : Diamond has 3D network structure and graphite has layer structure.

- (1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1
(2) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1
(3) Statement-1 is True, Statement-2 is False
(4) Statement-1 is False, Statement-2 is True
48. Statement-1 : Hg metal is purified by distillation process.

and

Statement-2 : Hg has low boiling point.

- (1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1
(2) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1
(3) Statement-1 is True, Statement-2 is False
(4) Statement-1 is False, Statement-2 is True
49. Statement-1 : KMnO_4 is coloured due to charge transfer.

and

Statement-2 : KMnO_4 has no unpaired electron.

- (1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1
(2) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for

Statement-1

- (3) Statement-1 is True, Statement-2 is False
(4) Statement-1 is False, Statement-2 is True

50. Statement-1 : Allyl radical is more stable than benzyl radical.

and

Statement-2 : To prepare allylic free radical, C–H bond energy is less than C–H bond energy to prepare benzyl radical

- (1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1
(2) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1
(3) Statement-1 is True, Statement-2 is False
(4) Statement-1 is False, Statement-2 is True

51. Statement-1 : Primary and secondary amines can be distinguished by using CHCl_3/KOH

and

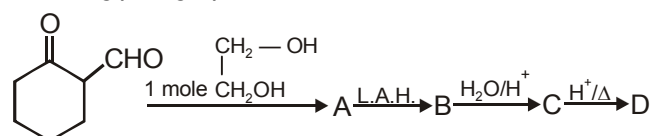
Statement-2 : Only primary amine reacts with CHCl_3/KOH .

- (1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1
(2) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1
(3) Statement-1 is True, Statement-2 is False
(4) Statement-1 is False, Statement-2 is True

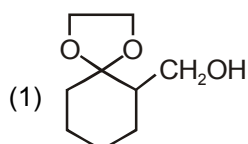
SECTION - III

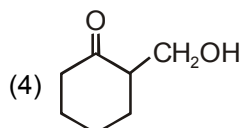
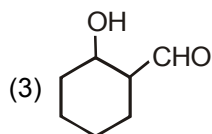
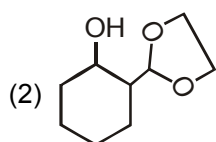
Comprehension Type Questions

Directions : Question No. 52 to 54 are based on the following paragraph.



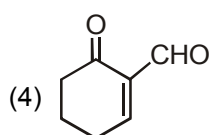
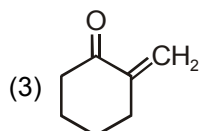
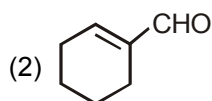
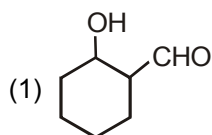
52. Product (B) is





53. Product (C) can give
- (1) Positive Victor Meyer test
 - (2) Positive Tollen's test
 - (3) Positive haloform test
 - (4) Both (1) & (2)

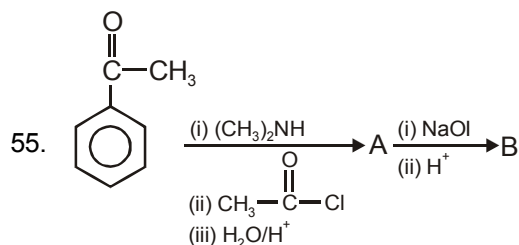
54. Product (D) is



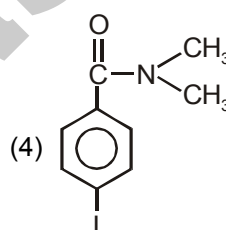
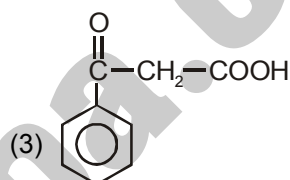
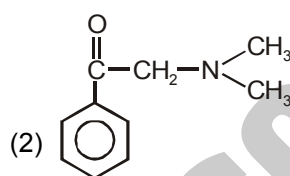
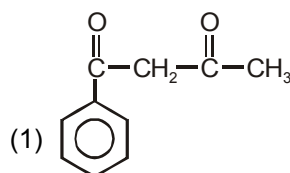
SECTION - IV

Straight Objective Question

Directions : Question No. 55 to 60 are based on (Straight Single Choice - Multiple Concept Questions and/or Difficulty/Lengthy calculations & Application based questions)



Product (B) is



56. There are two volatile components A and B having vapour pressures 150 mm and 300 mm respectively. An ideal solution is prepared by mixing of 1 mole of A and 2 mole of B. The mole fraction of component A in vapour phase will be

- (1) 0.67
- (2) 0.80
- (3) 0.60
- (4) 0.20

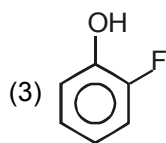
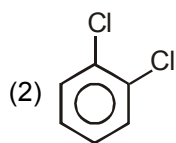
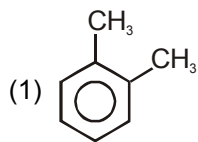
57. In a crystal atoms A are in c.c.p lattice, atoms B are in all octahedral voids and atoms C are in tetrahedral voids. If all atoms of one body diagonal plane are removed. The new molecular formula of crystal will be

- (1) $A_5B_4C_4$
- (2) $A_3B_4C_8$
- (3) $A_4B_5C_4$
- (4) $A_5B_5C_4$

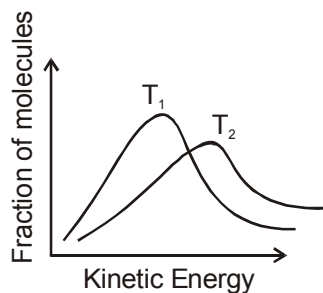
Class (XII)

58. The correct decreasing order of polarity is

- (1) $\text{HF} > \text{H}_2\text{O} > \text{NH}_3$
- (2) $\text{HF} > \text{NH}_3 > \text{H}_2\text{O}$
- (3) $\text{SO}_2 > \text{HF} > \text{H}_2\text{O}$
- (4) $\text{HF} > \text{SO}_2 > \text{HO}$

59. In which of the following species $\mu_{\text{observed}} > \mu_{\text{theoretical}}$ 

(4) All of these



Then choose the correct statement

- (1) $T_2 > T_1$
- (2) Most probable kinetic energy increases
- (3) Fraction of molecule possessing most probable kinetic energy decreases
- (4) All of these

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MATHEMATICS**SECTION - I****Straight Single Choice Multiple Type Questions /
Application Based Single Choice Questions**

This section contains 16 multiple choice questions numbered 61 to 76. Each question has 4 choices (1), (2), (3) and (4), out of which **ONLY ONE** is correct.

Choose the correct answer :

61. The number of solutions of the equation $|x - 2010| + |x + 2010| = 4019$ is
 (1) 0 (2) 1
 (3) 2 (4) 3
62. The number of values of θ satisfying $2\sin^2\theta + \sin\theta - 1 = 0$ and $\sin 2\theta - 2\sin\theta - \cos\theta + 1 = 0$ and lying in $[-\pi, \pi]$ is
 (1) 0 (2) 2
 (3) 4 (4) 6
63. Let origin z_1, z_2 form the vertices of an equilateral triangle. If z_1, z_2 are the roots of the equation $z^2 + 4z + b = 0$, then
 (1) $b = 16$ (2) $b = 8$
 (3) $b = \frac{16}{3}$ (4) 4
64. Letters of the word 'AAKASH' are rearranged and written in alphabetical order. The number of words appearing before word AAKASH is
 (1) 12 (2) 14
 (3) 11 (4) 13
65. Let x, y, z be positive real numbers (not equal to one). The value of $\begin{vmatrix} 1 & \log_x y & \log_x z \\ \log_y x & 1 & \log_y z \\ \log_z x & \log_x y & 1 \end{vmatrix}$ is equal to
 (1) 0 (2) 1
 (3) xyz (4) $\frac{1}{xyz}$
66. If the numbers $\log_3 2, \log_3(2^x - 5), \log_3\left(2^x - \frac{7}{2}\right)$ are in A.P., then the possible value of x is
 (1) 1 (2) 2
 (3) 3 (4) 4
67. $\lim_{x \rightarrow 0} \frac{\sqrt{1 - \cos 2010x}}{1005x}$
 (1) Is equal to $\sqrt{2}$
- (2) Is equal to $-\sqrt{2}$
 (3) Doesnot exist as LHL \neq RHL
 (4) Doesnot exist LHL is not defined
68. The number of equivalence relations in the set $\{1, 2, 3\}$ containing $(1, 2)$ and $(2, 1)$ is
 (1) 0 (2) 2
 (3) 4 (4) 8
69. The imaginary part of $i, i = \sqrt{-1}$, is
 (1) 0 (2) 1
 (3) 2 (4) -1
70. The number of irrational terms in the expansion of $\left(2^{\frac{1}{3}} + 5^{\frac{1}{5}}\right)^{95}$ is
 (1) 7 (2) 89
 (3) 96 (4) 85
71. In an A.P. if the sum of first n terms equals to the sum of first m terms, then the sum of first $(m + n)$ terms is
 (1) $m + n$ (2) $-(m + n)$
 (3) $-mn$ (4) 0
72. Let $P(B) = \frac{1}{2}, P(A \cap B \cap \bar{C}) = \frac{1}{8}$ and $P(\bar{A} \cap B \cap \bar{C}) = \frac{1}{8}$, then the value of $P(B \cap C)$ is
 (1) $\frac{1}{2}$ (2) $\frac{1}{8}$
 (3) $\frac{1}{4}$ (4) $\frac{1}{5}$
73. If the mid points of sides of a triangle are $(2, 4), (6, 8), (1, 3)$, then the centroid of the triangle is
 (1) $(1, 2)$
 (2) $(3, 5)$
 (3) $(5, 3)$
 (4) $(0, 0)$
74. The locus of mid point of chords of circle $x^2 + y^2 - 2x - 2y - 1 = 0$ which subtends a right angle at the centre is $2x^2 + 2y^2 + kx - 4y + 1 = 0$, then k equals
 (1) 0 (2) -4
 (3) 4 (4) 5
75. Tangents are drawn at the ends of conjugate diameters of the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$. The area of parallelogram formed by these tangents is

- (1) 13 (2) 6
(3) 24 (4) 42

76. The angle between the tangents drawn from the point $(-502, 2011)$ to the parabola $y^2 = 2008x$ is

- (1) $\frac{\pi}{3}$ (2) $\frac{\pi}{4}$
(3) $\frac{\pi}{6}$ (4) $\frac{\pi}{2}$

SECTION - II

Assertion – Reason Type Questions

Directions : Questions number 77 to 81 are Assertion-Reason type questions. Each of these questions contains two statements. Statement-1 (Assertion) and Statement-2 (Reason). Each of these questions also has four alternative choices, only one of which is the correct answer. You have to select the correct choice.

77. Statement-1 : $f(x) = \begin{cases} 1-x^2, & -\frac{1}{2} < x < 1 \\ x-1, & 1 \leq x < \frac{7}{4} \end{cases}$ has one

point in $\left(-\frac{1}{2}, \frac{7}{4}\right)$ where $f'(x) = 0$.

and

Statement-2 : If a function satisfies conditions of Rolle's theorem in internal $[a, b]$, then there exists at least one value of x , say c , for which $f'(c) = 0$, $a < c < b$.

- (1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1
(2) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1
(3) Statement-1 is True, Statement-2 is False
(4) Statement-1 is False, Statement-2 is True

78. Statement-1 : $\int_0^{50} e^{x-[x]} dx = 50(e-1)$.

and

Statement-2 : $f(x) = \{x\}$ is a periodic function with period one.

- (1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1
(2) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1
(3) Statement-1 is True, Statement-2 is False

(4) Statement-1 is False, Statement-2 is True

79. Statement-1

$$\int_0^{2\pi} \frac{\sin^4 x}{\sin^4 x + \cos^4 x} dx = 2 \int_0^{\pi} \frac{\sin^4 x}{\sin^4 x + \cos^4 x} dx.$$

and

Statement-2 : $\int_{-a}^a f(x) dx = 2 \int_0^a f(x) dx$, if $f(x)$ is an even function.

- (1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1
(2) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1
(3) Statement-1 is True, Statement-2 is False
(4) Statement-1 is False, Statement-2 is True

80. Statement-1 : If $x > 0$, then the minimum value of $x^{2010} + \frac{2010}{x}$ is 2011.

and

Statement-2 : For $x < 0$, the maximum value of $x + \frac{1}{x}$ is -2 .

- (1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1
(2) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1
(3) Statement-1 is True, Statement-2 is False
(4) Statement-1 is False, Statement-2 is True

81. Statement-1 : Let $\frac{\pi}{2} \leq x \leq \frac{3\pi}{2}$, then

$$\sin^{-1}(\sin x) = \pi - x.$$

and

$$\text{Statement-2 : } \sin^{-1} x + \cos^{-1} x = \frac{\pi}{2}.$$

- (1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1
(2) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1
(3) Statement-1 is True, Statement-2 is False
(4) Statement-1 is False, Statement-2 is True

SECTION - III

Comprehension Type Questions

Directions : Question No. 82 to 84 are based on the following paragraph.

Let us consider indefinite integral

$$\int (\sin x - \cos x)^{-\frac{1}{3}} (\sin x - 2\cos x)^{-\frac{5}{3}} dx$$

$$= -\frac{3}{2}(f(x))^{\frac{2}{3}} + C, \text{ where } C$$

is a constant of integration.

With the given information answer the following questions.

82. The distance of $(0, 0, 0)$ from plane $x + y + z + 1 = 0$ is d . The value of $(d\sqrt{3} - 2f(0))$ is equal to
- (1) 0 (2) 2
(3) 3 (4) 4

83. Let $g(x) = (\tan x - 2) f(x) + 1$, then $\int_0^{\pi/4} g(x) \cot x dx$

equals

- (1) $\frac{\pi}{2}$ (2) $\frac{\pi}{4}$
(3) $\frac{3\pi}{4}$ (4) $\frac{\pi}{8}$
84. The value of $\lim_{x \rightarrow \frac{\pi}{2}} f(x)$ is
- (1) 3 (2) 2
(3) 1 (4) 0

SECTION - IV

Straight Objective Question

Directions : Question No. 85 to 90 are based on (Straight Single Choice - Multiple Concept Questions and/or Difficulty/Lengthy calculations & Application based questions)

85. The statement $\sim (p \leftrightarrow q)$ is equivalent to

- (1) $(p \wedge \sim q) \vee (q \wedge \sim p)$ (2) $(p \wedge \sim q)$
(3) $\sim (\sim p \vee q)$ (4) $\sim (q \wedge \sim p)$

86. The length of perpendicular drawn from origin to the normal at any point θ to the curve

$$x = a(\cos\theta + \theta\sin\theta), y = a(\sin\theta - \theta\cos\theta)$$

- (1) $4a$ (2) $3a$
(3) $2a$ (4) a

87. If a, b, c are in G.P. and the equations $ax^2 + 2bx + c = 0$ and $dx^2 + 2ex + f = 0$ have a

common root, then $\frac{d}{a}, \frac{e}{b}, \frac{f}{c}$ are in

- (1) A.P. (2) G.P.
(3) H.P. (4) A.G.P.

88. Let $\vec{a} = 2\hat{i} + \hat{j} + \hat{k}$, $\vec{b} = \hat{i} + 2\hat{j} - \hat{k}$ and a unit vector \vec{c} be coplanar. If \vec{c} is perpendicular to \vec{a} , then \vec{c} is equal to

- (1) $\frac{1}{\sqrt{2}}(-\hat{j} + \hat{k})$ (2) $\frac{1}{\sqrt{3}}(\hat{i} - \hat{j} - \hat{k})$
(3) $\frac{1}{\sqrt{5}}(\hat{i} - 2\hat{j})$ (4) $\frac{1}{\sqrt{3}}(\hat{i} - \hat{j} - \hat{k})$

89. Let a, b, c be the sides of a triangle such that the system of equations $ax + by + cz = 0$, $bx + cy + az = 0$, $cx + ay + bz = 0$, has infinitely many solutions, then

- (1) $a = b \neq c$ (2) $a \neq b = c$
(3) $a = b = c$ (4) $a \neq b \neq c$

90. The area of the region bounded by $y = 2 - |x|$ and $y = ||x| - 1|$ is

- (1) 5 sq. units (2) $\frac{5}{2}$ sq. units
(3) 9 sq. units (4) $\frac{9}{2}$ sq. units

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WRONG METHODS CORRECT METHOD

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5.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	20.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	35.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	50.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	65.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	80.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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