

**JEE (MAIN)**

**TEST PAPER**

**SUBJECT : PHYSICS,CHEMISTRY, MATHEMATICS**

**TEST CODE : TEST PAPER-5**

**QUESTION PAPER**

**TIME : 3 HRS**

**MARKS : 300**

**INSTRUCTIONS**

**GENERAL INSTRUCTIONS :**

1. This test consists of 75 questions.
2. There are three parts in the question paper A, B, C consisting of Physics, Chemistry and Mathematics having 25 questions in each part
3. 20 questions will be Multiple choice questions & 5 questions will have answer to be filled as numerical value.
4. Marking scheme :

Type of Questions	Total Number of Questions	Correct Answer	Incorrect Answer	Unanswered
MCQ's	20	+4	Minus One Mark(-1)	No Mark (0)
Numerical Values	5	+4	No Mark (0)	No Mark (0)

5. There is only one correct response for each question. Filling up more than one response in each question will be treated as wrong response and marks for wrong response will be deducted accordingly as per instruction 4 above.

**OPTICAL MARK RECOGNITION (OMR) :**

6. The OMR will be provided to the students.
7. Darken the appropriate bubbles on the OMR sheet by applying sufficient pressure.
8. The OMR sheet will be collected by the invigilator at the end of the examination.
9. Do not tamper with or mutilate the OMR. Do not use the OMR for rough work.
10. Write your name, Batch name, name of the center, Test Code, roll number and signature with pen in the space provided for this purpose on the OMR. Do not write any of these details anywhere else on the OMR.

**DARKENING THE BUBBLES ON THE OMR :**

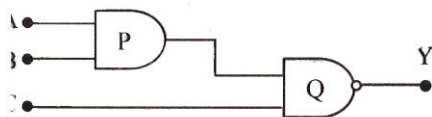
11. Use a BLACK BALL POINT PEN to darken the bubbles on the OMR.
12. Darken the bubble COMPLETELY.
13. Darken the bubbles ONLY IF you are sure of the answer. There is NO WAY to erase or "un-darken" a darkened bubble.

## Part A - PHYSICS

- Q.1 A vector  $\vec{a}$  makes an angle  $30^\circ$  and  $\vec{b}$  makes an angle  $120^\circ$  with X-axis. The magnitude of these vectors are 9 unit and 12 unit respectively. The magnitude of resultant vector is  
 (a) 23 unit                      (b) 4 unit                      (c) 15 unit                      (d) 3 unit
- Q.2 A ball of mass  $m$  is moving towards a batsman at a speed  $v$ . The batsman strikes the ball and deflects it by an angle  $\theta$  without changing its speed. The impulse imparted to the ball is given by  
 (a)  $mv \cos \theta$                       (b)  $mv \sin \theta$                       (c)  $2mv \cos\left(\frac{\theta}{2}\right)$                       (d)  $2mv \sin\left(\frac{\theta}{2}\right)$
- Q.3 At the highest point of the path of a projectile,  
 (a) kinetic energy is maximum                      (b) potential energy is minimum  
 (c) kinetic energy is minimum                      (d) total energy is maximum.
- Q.4 A sphere 'P' of mass 'm' moving with velocity 10 m/s collides head-on with another sphere 'Q' of mass 'm' which is moving with 8 m/s. The ratio of final velocity of 'Q' to initial velocity of 'P' is ( $e$ = coefficient of restitution)  
 (a)  $\frac{e-9}{10}$                       (b)  $\left[\frac{e-9}{10}\right]^{1/2}$                       (c)  $\frac{e+9}{10}$                       (d)  $\left[\frac{e+9}{10}\right]^2$
- Q.5 Assertion: Speed of innerlayers of a whirlwind in a tornadois alarmingly high.  
 Reason: Moment of inertia is low about tornado's axis of rotation.  
 (a) Assertion is true, Reason is True  
     Reason is a correct explanation for Assertion  
 (b) Assertion is True, Reason is True;  
     Reason is not a correct explanation for Assertion  
 (c) Assertion is True, Reason is False.  
 (d) Assertion is False, Reason is True.
- Q.6 The pans of a physical balance are in equilibrium. Air is blown under the right hand pan; then the right hand pan will  
 (a) move up                      (b) move down  
 (c) move erratically                      (d) remain at the same level
- Q.7 The net force acting on a water molecule when it is situated at surface, middle and bottom layer of water placed in an open glass container in air is repectively (neglecting effect of gravity)  
 (a) zero, non-zero, zero.                      (b) non-zero, zero, zero  
 (c) non-zero, zero , non-zero                      (d) zero, zero, non-zero
- Q.8 60 g of ice at  $0^\circ$  is mixed with 60 g of steam at  $100^\circ$  C. At thermal equilibrium, the mixture contains (Latent heat of steam and ice are  $540 \text{ cal g}^{-1}$  and  $80 \text{ cal g}^{-1}$  respectively, specific heat of water= $1 \text{ cal g}^{-1} \text{ }^\circ\text{C}^{-1}$ )  
 (a) 80 g of water and 40 g of steam at  $100^\circ$  C                      (b) 120 g of water at  $90^\circ$  C  
 (c) 120 g of water at  $100^\circ$  C                      (d) 40 g of steam and 80 g of water at  $0^\circ$  C
- Q.9 One mole of an ideal monoatomic gas undergoes a process described by the equation  $PV^3 = \text{constant}$ . The heat apacity of the gas during this process is

- (a)R                      (b)  $\frac{3}{2}R$                       (c)  $\frac{5}{2}R$                       (d) 2R
- Q.10 An ideal gas having  $f$  degrees of freedom is isobarically heated. the ratio of the work done by it to the change in its internal energy will be
- (a)  $\frac{2}{f-2}$                       (b)  $\frac{f-2}{2}$                       (c)  $\frac{2}{f}$                       (d)  $\frac{f}{2}$
- Q.11 Two particles each of mass 10 g and charge  $10\mu\text{C}$  are at some distance from each other on a horizontal surface . If the coefficient of static friction between each particle and horizontal surface is 0.5, then what is the distance between them if they are in limiting equilibrium?( $g=10 \text{ m/s}^2$ )
- (a) 3.21 m                      (b)1.5 m                      (c)10.32 m                      (d) 4.24 m
- Q.12 When three capacitors of equal capacities are connected in parallel and one capacitor of the same capacity is connected in series with its combination . The resultant capacity is  $3.75\mu\text{F}$ .The capacity of each capacitor is
- (a)  $5\mu\text{F}$                       (b) $6\mu\text{F}$                       (c) $7\mu\text{F}$                       (d)  $8\mu\text{F}$
- Q.13 A circuit contains an ammeter, a battery of 30 V and resistance 40.8 ohm all connected in series. If the ammeter has a coil resistance 480 ohm and a shunt of 20 ohm, the reading in the ammeter will be:
- (a) 1A                      (b) 0.5A                      (c) 0.25A                      (d) 2A
- Q.14 The deflection of galvanometer falls from 60 to 20, when  $15\Omega$  shunt is connected across it.The galvanometer resistance is
- (a)  $15\Omega$                       (b)  $24\Omega$                       (c)  $30\Omega$                       (d)  $48\Omega$
- Q.15 The orbital speed of an electron orbiting around the nucleus in a circular orbit of radius  $r$  is  $v$ . Then the magnetic dipole moment of the electron will be
- (a)  $evr$                       (b)  $\frac{evr}{2}$                       (c)  $\frac{ev}{2r}$                       (d)  $\frac{vr}{2e}$
- Q.16 One require 11eV of energy to dissociate a carbon monoxide molecule into carbon and oxygen atoms. The minimum frequency of the appropriate electromagnetic radiation to achieve the dissociation lies in
- (a) visible region                      (b) infrared region  
(c) ultraviolet region                      (d) microwave region
- Q.17 A concave lens of glass refractive index 1.5 has both surfaces of the same radius of curvature  $R$ . On immersion in a medium of refractive index 1.75, it will behave as a
- (a) convergent lens of focal length  $3.5 R$                       (b) convergent lens of focal length  $3.0R$ .  
(c) divergent lens of focal length  $3.5 R$ .                      (d) divergent lens of focal length  $3.0R$ .
- Q.18 In Young's double slit experiment, bichromatic light of wavelengths 600 nm and 840 nm are used. The distance between the slits is 0.12 nm and the distance between the plane of the slits and the screen is 120 cm. The minimum distance between two successive region of complete darkness is
- (a) 42 mm                      (b) 5.6 mm                      (c) 14 mm                      (d) 28 mm
- Q.19 In  $\beta$ -decay, the subatomic particles that are emitted can be
- (a) positively charged                      (b) negatively charged  
(c) neutral                      (d) any of these

- Q.20 What is the output Y in the following circuit, when all the three inputs A,B,C are first 0 and then 1 ?

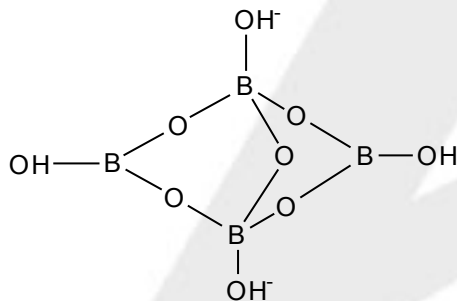


- (a) 1, 1                      (b) 0,1                      (c) 0,0                      (d) 1,0
- Q.21 Figure given shows a sinusoidal wave on a string. If the frequency of the wave is 200 Hz and the mass per unit length of the string is 0.2 g/m, the power transmitted by the wave is \_\_\_\_\_?
- Q.22 The percentage decrease in the acceleration due to the gravity at a depth of 160 km below the surface of the earth is (Given that radius of the earth is  $R = 6400$  km)
- Q.23 1 cc of water is taken from the surface to the bottom of the ocean 8 km deep. If volume elasticity of water is 24,000 atmosphere, then the change in volume of water will be?
- Q.24 A particle performs S.H.M with amplitude 25 cm and period 3 s. The minimum time required for it to move between two points 12.5 cm on either side of the mean position is \_\_\_\_\_?
- Q.25 The radius of a uniform wire is  $r = 0.021$  cm. the value of  $\pi$  is given to be 3.142. What is the area of cross section of the wire upto approximate significant figures?

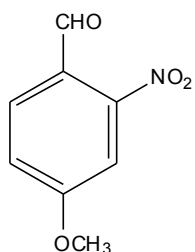
## Part - B - CHEMISTRY

- Q.26 \_\_\_\_\_ are the smallest particles of matter was one of the assumptions of Dalton's atomic theory.  
 (a) Atoms                      (b) Molecules                      (c) Ions                      (d) Elements
- Q.27 The energy of a photon is calculated by  
 (a)  $E = h\nu$                       (b)  $E = \frac{h}{\nu}$                       (c)  $E = \nu\lambda$                       (d)  $E = \frac{h\lambda}{c}$
- Q.28 The group having isoelectronic species is \_\_\_\_\_.  
 (a)  $O^{2-}, F^-, Na^+, Mg^{2+}$                       (b)  $O^-, F^-, Na, Mg^+$   
 (c)  $O^{2-}, F^-, Na, Mg^{2+}$                       (d)  $O^-, F^-, Na^+, Mg^{2+}$
- Q.29 Predict the CORRECT order among the following \_\_\_\_\_,  
 (a) bond pair-bond pair > lone pair-bond pair > lone pair-lone pair  
 (b) lone pair- bond pair > bond pair-bond pair > lone pair -lone pair  
 (c) lone pair-lone pair > lone pair-bond pair > bond pair-bond pair  
 (d) lone pair- lone pair bond pair-bond pair > lone pair - bond pair
- Q.30 For a sample of perfect gas when its pressure is changed isothermally from  $P_i$  to  $P_f$ , the entropy change is given by  
 (a)  $\Delta S = RT \ln\left(\frac{P_i}{P_f}\right)$                       (b)  $\Delta S = nR \ln\left(\frac{P_f}{P_i}\right)$   
 (c)  $\Delta S = nR \ln\left(\frac{P_i}{P_f}\right)$                       (d)  $\Delta S = nRT \ln\left(\frac{P_f}{P_i}\right)$

- Q.31 Assertion: All Arrhenius acids are also Bronsted acids but all Arrhenius bases are not Bronsted bases.  
Reason: An Arrhenius base is a substance which gives  $\text{OH}^-$  ion in the solution. A Bronsted base is a substance which accepts a proton.
- (a) Assertion and reason are true. Reason is the correct explanation of Assertion.  
 (b) Assertion and Reason are true. Reason is not the correct explanation of Assertion.  
 (c) Assertion is true. Reason is false.  
 (d) Assertion is false. Reason is true.
- Q.32 Which of the following statement is CORRECT?
- (a) Reduction is a substance which increases the oxidation number of other substance.  
 (b) Oxidising agent undergoes a decrease in its own oxidation number.  
 (c) Reduction means loss of electrons.  
 (d) Reducing agent is a substance that accepts electrons.
- Q.33 Heavy water is \_\_\_\_\_.
- (a) known as hard water  
 (b) water of mineral springs  
 (c) water obtained by repeated distillation and condensation of ordinary water  
 (d) ordinary water containing dissolved salts and heavy metals.
- Q.34 Choose the CORRECT order of metallic character from the options given below.
- (a)  $\text{K} < \text{Ca} > \text{Ba}$                       (b)  $\text{K} > \text{Ca} > \text{Ba}$                       (c)  $\text{K} < \text{Ca} < \text{Ba}$                       (d)  $\text{K} > \text{Ca} < \text{Ba}$
- Q.35 In diborane, \_\_\_\_\_.
- (a) 2 bridged hydrogen atoms are present                      (b) 3 bridged hydrogen atoms are present  
 (c) 4 bridged hydrogen atoms are present                      (d) 5 bridged hydrogen atoms are present
- Q.36 The following structural unit is present in \_\_\_\_\_.

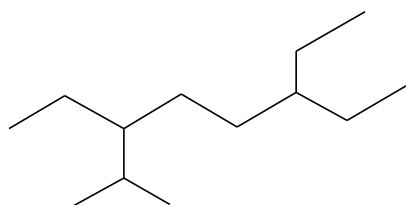


- (a) borane                      (b) borax                      (c) boric acid                      (d) silicates
- Q.37 IUPAC name of the compound is \_\_\_\_\_.



- (a) 2-Formyl-5-methoxynitrobenzene                      (b) 4-Formyl-3-nitroanisole  
 (c) 4-Methoxy-2-nitrobenzaldehyde                      (d) 4-Formyl-5-nitroanisole

Q.38 The CORRECT IUPAC name of the following alkane is \_\_\_\_\_.



- (a) 3,6-Diethyl-2-methyloctane  
 (b) 6-Isopropyl-3-ethyloctane  
 (c) 2-Methyl-3-ethyloctane  
 (d) 3-Isopropyl-6-ethyloctane

Q.39 Predict the IUPAC name of the alkene which would give  $\text{CH}_3\text{CHO}$  and  $\text{CH}_3\text{CH}_2\text{CHO}$  on reductive ozonolysis?

- (a) 2-Methylhex-3-ene  
 (b) 4-Methylpent-2-ene  
 (c) 2-Methylpent-3-ene  
 (d) 5-Methylhex-3-ene

Q.40 The number of types of bonds between two carbon atoms in calcium carbide is \_\_\_\_\_.

- (a) two sigma, one pi  
 (b) position isomer  
 (c) functional isomer  
 (d) optical isomer

Q.41 Identify the INCORRECT match:

Term	Unit
(A) Conductance	$\Omega^{-1}$
(B) Molar conductivity	$\Omega^{-1}m^2mol^{-1}$
(C) Resistivity	$\Omega m^{-1}$
(D) Conductivity	$\Omega^{-1}m^{-1}$

Q.42 When initial concentration of a reactant of a reactant is doubled in a reaction, its half-time period is not affected. The order of the reaction is \_\_\_\_\_.

- (a) zero  
 (b) first  
 (c) second  
 (d) more than zero but less than first

Q.43 Which of the following adsorption will NOT show the below mentioned general characteristics?

- (i) High enthalpy of adsorption.  
 (ii) High activation energy.  
 (iii) Formation of unilayer of adsorbate on adsorbent surface.  
 (a) Adsorption of acetic acid in solution by charcoal.  
 (b) Adsorption of oxygen on Pt.  
 (c) Adsorption of CO on W.  
 (d) Adsorption of  $\text{H}_2$  on Ni.

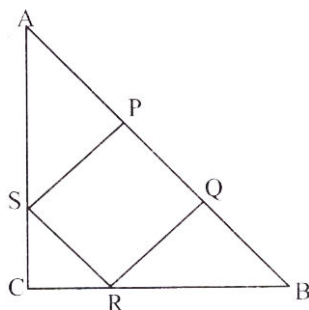
Q.44 Strong reducing behaviour of  $\text{H}_3\text{PO}_2$  is due to \_\_\_\_\_.

- (a) low/high oxidation state of phosphorous  
 (b) presence of two -OH groups and one P-H bond  
 (c) presence of one -OH group and two P-H bonds  
 (d) high electron gain enthalpy of phosphorous

- Q.45 Identify the INCORRECT statement regarding 3d transition series.
- (a) The strength of metallic bonds increases from Sc to Cr and then it decreases.
- (b) The second ionization enthalpy of Cr is high because of stable  $d^5$  configuration.
- (c) The number of oxidation states increases from Sc to Mn and then decreases from Fe to Zn.
- (d) The first ionization enthalpy decreases from Sc to Zn as the atomic number increases.
- Q.46 Praveen went to a hill station where he experienced some breathing problems due to low density of oxygen. If at NTP density of oxygen is  $1.520 \text{ g L}^{-1}$ , what is the difference in densities, if the temperature at the hill station is  $3^\circ \text{C}$  and pressure is 705 mm. The hill is at a height of 2173 m.
- Q.47 A metal crystallizes into two cubic phases, face centred cubic (FCC) and body centred cubic (BCC) whose unit cell lengths are 3.5 and  $3.0 \text{ \AA}$ , respectively. Calculate the ratio of the densities of FCC and BCC.
- Q.48 A mixture contains  $\text{N}_2\text{O}_4$  and  $\text{NO}_2$  in the ratio of 2 : 1 by volume. The vapour density of the mixture is \_\_\_\_\_?
- Q.49 The pH 0.10 M  $\text{NH}_3$  solution is [Given  $K_b = 1.8 \times 10^{-5}$ ;  $\log 1.35 = 0.13$ ]
- Q.50 In an aqueous solution  $\text{AgNO}_3$  and  $\text{CuSO}_4$  are connected in series. If Ag deposited at cathode is 1.08 g, Then Cu deposited is \_\_\_\_\_?

## Part - C - MATHEMATICS

- Q.51 If  $P(x) = ax^2 + bx + c$ ,  $Q(x) = -ax^2 + dx + c$  where  $ac \neq 0$ , then the equation  $P(x)Q(x) = 0$  has
- (a) all four real roots. (b) atleast two real roots.
- (c) exactly two real roots. (d) all four non-real roots.
- Q.52 If  $\tan^2 \theta - (1 + \sqrt{3})\tan \theta + \sqrt{3} = 0$ , then the general value of  $\theta$  is
- (a)  $n\pi + \frac{\pi}{4}, n\pi + \frac{\pi}{3}$  (b)  $n\pi - \frac{\pi}{4}, n\pi + \frac{\pi}{3}$  (c)  $n\pi + \frac{\pi}{4}, n\pi - \frac{\pi}{3}$  (d)  $n\pi - \frac{\pi}{4}, n\pi - \frac{\pi}{3}$
- Q.53 PQRS is a square inscribed in a right triangle ACB. Let h be the distance of the vertex C from AB. If  $\frac{1}{h} + \frac{1}{c} = \frac{2}{3}$ , then the length of side of the square is when AB is equal to C



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

- Q.54 If complex numbers  $z_1, z_2,$  and  $z_3$  represent the vertices A, B and C respectively of an isosceles triangle ABC of which  $\angle C$  is right angle, then correct statement is
- (a)  $z_1^2 + z_2^2 + z_3^3 = z_1 z_2 z_3$  (b)  $(z_3 - z_1)^2 = z_3 - z_2$   
 (c)  $(z_1 - z_2)^2 = (z_1 - z_3)(z_3 - z_2)$  (d)  $(z_1 - z_2)^2 = 2(z_1 - z_3)(z_3 - z_2)$
- Q.55 If  $m$  is A.M. of two distinct real number  $l$  and  $n$  ( $l, n > 1$ ) and  $G_1, G_2$  and  $G_3$  are three geometric mean between  $l$  and  $n$ , then  $G_1^4 + 2G_2^4 + G_3^4$  equals
- (a)  $4l^2mn$  (b)  $4lm^2n$  (c)  $4lmn^2$  (d)  $4l^2m^2n^2$
- Q.56 If  $a > 2b > 0$ , then the positive value of  $m$  for which  $y = mx - b\sqrt{1 + m^2}$  is a common tangent to  $x^2 + y^2 = b^2$  and  $(x - a)^2 + y^2 = b^2$  is
- (a)  $\frac{2b}{\sqrt{a^2 - 4b^2}}$  (b)  $\frac{\sqrt{a^2 - 4b^2}}{2b}$  (c)  $\frac{2b}{a - 2b}$  (d)  $\frac{b}{a - 2b}$
- Q.57 Tangents are drawn through a point P to the ellipse  $4x^2 + 5y^2 = 20$  having inclinations  $\alpha$  and  $\beta$  such that  $\tan(\alpha + \beta) = k$ , the locus of P is
- (a)  $k(x^2 - y^2 - 1) = 2xy$  (b)  $k(x^2 + y^2 - 1) = xy$  (c)  $k(x^2 + y^2) = 2xy$  (d) none of these
- Q.58 Let S be the sum of the digits of the coefficient of  $x^6$  in the expansion of  $(1 + 2x - 3x^2)^4$ . Then which of the following statements is not correct?
- (a) S is the square of an integer (b) S is divisible by 3  
 (c) G.C.D of S and 6 is 6. (d) S is divisible by 9
- Q.59 A purse contains two 50 paise coins, four 25 paise coins and six 10 paise coins, 5 coins are taken out from the purse (at random). The probability that the sum taken out is at least Rs. 1.50 is
- (a)  $\frac{40}{{}^{12}C_5}$  (b)  $\frac{42}{{}^{12}C_5}$  (c)  $\frac{41}{{}^{12}C_5}$  (d) 42
- Q.60 For a moderately skewed distribution, quartile deviation and the standard deviation are related by
- (a) S.D. =  $\frac{2}{3}$  Q.D. (b) S.D. =  $\frac{3}{2}$  Q.D. (c) S.D. =  $\frac{3}{4}$  Q.D. (d) S.D. =  $\frac{4}{3}$  Q.D.
- Q.61 One hundred identical coins, each with probability  $p$  of showing up heads are tossed once. If  $0 < p < 1$  and the probability of heads showing on 50 coins is equal to that of heads showing on 51 coins, then the value of  $p$  is
- (a)  $\frac{1}{10}$  (b)  $\frac{49}{101}$  (c)  $\frac{50}{101}$  (d)  $\frac{51}{101}$
- Q.62 Let a convergent sequence  $\langle b_n \rangle$  of real numbers satisfy the recurrence relation:
- $$b_{n+1} = \frac{1}{3} \left( 2b_n + \frac{125}{b_n^2} \right), b_n \neq 0, \text{ then } \lim_{n \rightarrow \infty} b_n =$$
- (a) is 0 (b) does not exist  
 (c) is 5 (d)  $\frac{2}{3}$



Q.63 The derivative of  $\tan^{-1} \frac{x}{\sqrt{a^2 - x^2}}$  is

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

Q.64 The interval of values of  $a$  such that every tangent to the curve  $y = x^3 - ax^2 + x + 1$  has acute inclination, is

- (a)  $(-\sqrt{2}, \sqrt{2})$       (b)  $\left(-\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}\right)$       (c)  $(-\sqrt{3}, \sqrt{3})$       (d)  $\left(-\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$

Q.65  $\int \frac{\cos^{-1} x}{x^3} dx$  equals

- (a)  $-\frac{1}{2x^2} \cos^{-1} x + \frac{1}{2} \cdot \frac{\sqrt{1-x^2}}{x} + c$       (b)  $-\frac{1}{2x^2} \cos^{-1} x + \frac{1}{2} \cdot \frac{x^2}{\sqrt{1-x^2}} + c$   
 (c)  $\frac{1}{2x^2} \cos^{-1} x - \frac{1}{2} \cdot \frac{\sqrt{1-x^2}}{x} + c$       (d)  $-\frac{1}{2x^2} \cos^{-1} x - \frac{1}{2} \cdot \frac{x^2}{\sqrt{1-x^2}} + c$

Q.66 The value of  $\int_0^{n\pi+v} |\sin x| dx$  is

- (a)  $2n+1+\cos v$       (b)  $2n+1-\cos v$       (c)  $2n+1$       (d)  $2n+\cos v$

Q.67 The area of the region

$\{(x, y) \in R : y \geq \sqrt{|x+3|}, 5y \leq x+9 \leq 15\}$  is equal to

- (a)  $\frac{1}{6}$       (b)  $\frac{4}{3}$       (c)  $\frac{3}{2}$       (d)  $\frac{5}{3}$

Q.68 The minimum area of the triangle whose vertices are  $-\hat{i} + \hat{j} + 2\hat{k}$ ,  $\hat{i} + 2\hat{j} + 3\hat{k}$  and  $t\hat{i} + \hat{j} + \hat{k}$ , where  $t$  is a real number, is

- (a)  $\frac{1}{2}$  sq. unit      (b)  $\frac{\sqrt{5}}{2}$  sq. unit      (c) 1 sq. unit      (d)  $\frac{\sqrt{3}}{2}$  sq. unit

Q.69 Consider the truth table of  $p \oplus q$  given as

p	q	$p \oplus q$
T	T	F
T	F	T
F	T	T
F	F	F

Then which of the following has same truth value as  $p \oplus q$ ?

- (a)  $(p \leftrightarrow q)$       (b)  $\sim(p \leftrightarrow q)$       (c)  $(p \rightarrow q)$       (d)  $\sim(p \rightarrow q)$

Q.70 The length of the perpendicular drawn from the point (3, -1, 11) to the

line  $\frac{x}{2} = \frac{y-2}{3} = \frac{z-3}{4}$  is \_\_\_\_\_?

(a)  $\sqrt{33}$

(b)  $\sqrt{53}$

(c)  $\sqrt{66}$

(d)  $\sqrt{29}$

Q.71 P(x) is a polynomial with integer coefficients and has the lowest possible degree. If one of the zeroes of P(x) is  $\sqrt[3]{11} + \sqrt[3]{121}$ , then the product of all zeroes is \_\_\_\_\_?

Q.72 In a town of 10,000 familie, it was found taht 40% family buy newspaper A, 20% buy newspaper Band 10% families buy newspaper C, 5% families buy A and B, 3% buy B and C and 4% buy A and C. If 2% families buy all the three newspapers, then number of families which buy A only is \_\_\_\_\_?

Q.73 If  ${}^{28}C_{2r} : {}^{24}C_{2r-4} = 225 : 11$ , then the value of r is \_\_\_\_\_?

Q.74 The greatest value of  $f(x) = (x+1)^{1/3} - (x-1)^{1/3}$  on [0, 1] is \_\_\_\_\_?

Q.75 A GP consists of an even number of terms. If the sum of all the terms is 5 times the sum of the terms occupying odd places, then the common ratio will be equal to ?

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