JEE EXPERT

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CORONA KO STOP KARNA HAI
AT LOCKDOWN, UNLOCK YOUR POTENTIAL
PRACTICE TEST – 08

Time: 3 Hours ***Maximum Marks: 240***

Instructions:

A– Question paper format:

The question paper consists of **3 SECTION** (Chemistry, Physics and Mathematics). Each section has 2 parts.

Part–A:

(i) It contains **7** multiple choice questions. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **only one is correct,**

(ii) It contains **4** multiple choice questions. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **one or more is/are correct.**

(iii) It contains **2** groups of questions. Each group has 2 or 3 questions based on a paragraph. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **only one is correct.**

Part–C: It contains **7** questions. The answer to each of the questions is a single–digit integer, ranging from 0 to 9. The answer will have to appropriately bubbled in the OMR sheet as per the instructions given at the beginning of the section.

B–Marking scheme:

The question paper consists of **3 SECTION** (Chemistry, Physics and Mathematics). Each part consists of four types questions.

(i) **Single Correct Choice:** You will be **awarded 3 marks (Total Marks: 21)** if you darken only the bubble corresponding to the correct answer and zero mark if no bubbles are darkened. In all other cases, minus **one (–1) mark** will be awarded.

(ii) **Multiple Correct Answers Type:** You will be awarded **4 marks (Total Marks: 16)** if you darken only the bubble corresponding to the correct answers and zero mark if no bubbles are darkened. No negative marks will be awarded in this Section.

(iii) **Comprehension Type:** You will be awarded **3 marks (Total Marks: 15)** if you darken only the bubble corresponding to the correct answer and zero mark if no bubbles are darkened. In all other cases, **minus one (–1)** mark will be awarded.

(iv) **Integer Answer Type:** You will be awarded **4 marks (Total Marks: 28)** if you darken the bubble corresponding to the correct answer and zero mark if no bubble is darkened. No negative marks will be awarded for in this Section

Atomic No. : H=1, He=2, Li=3, Be=4, B=5, C=6, N=7, O=8, F=9, Na=11, Mg=12, Al = 13, Si = 14, P = 15, S = 16, Cl = 17, Ar =18, K=19, Ca=20,Cr=24, Mn=25, Fe=26, Co=27, Ni=28, Cu=29, Zn=30, As=33, Br = 35, Ag = 47, Si = 21, Sn = 50, Ti = 22,I = 53, Xe = 54, Ba = 56, Pb = 82, U = 92, V = 50.

Atomic masses: H =1, He=4, Li=7, Be=9, B=11, C=12, N=14, O=16, F=19, Na=23, Mg=24, Al=27, Si=28, P=31, S=32, Cl=35.5, K=39, Ca=40, Cr=52, Mn=55, Fe=56, Co=59, Ni=58.7, Cu=63.5, Zn = 65.4, As = 75, Br = 80, Ag = 108, Sn = 118.7, I = 127, Xe = 131, Ba = 137, Pb = 207, U = 238.

Enrollment No.: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Name: ……Centre ……

Batch: …… Date ……..

CHEMISTRY

SECTION–1 (PART– A) (Total Marks: 21) (3, – 1)

Single Correct Choice Type

This section contains 7 multiple choice questions. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

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1. Initial concentration of reactant for the nth order reaction is 'a'. Which of the following is correct for $t_{1/2}$ of the reaction?

(A) $\ln t_{1/2} = \ln k - (n-1)\ln a$ (B) $\ln t_{1/2} = \ln n + \ln k - \ln a$

(C) $t_{1/2} = \ln n - \ln k + \ln a$ (D) $\ln t_{1/2} = n \ln a$

2. The value of K for self ionization of formic acid is 10^{-4} at room temperature. What percentage of formic acid is converted to formate ion? (Given : d_{HCOOH} = 1.22 g/cc)

(A) 0.194% (B) 0.0045%

(C) 0.025% (D) 0.37%

3. Each NH_3 molecule has six other NH_3 molecules as nearest neighbours in solid state. ΔH of sublimation of solid NH_3 at its melting point is 30.8 KJ mol^{-1} and in the absence of H–bonding estimated ΔH of sublimation is 14.4 KJ mol^{-1}. The strength of H–bond in solid NH_3 is

(A) 5.47 KJ mol^{-1} (B) 10.93 KJ mol^{-1}

(C) 16.40 KJ mol^{-1} (D) – 16.40 KJ mol^{-1}

4. A sample 10 mol of an ideal gas expands is thermally and reversibly form a pressure of 10 atm to 1 atm at 300 K. The work done by the system is used in lifting an object. What is the largest mass of the object which can be lifted through a height of 150 metre?

(A) 31842 Kg (B) 39.03 Kg

(C) 342.58 Kg (D) 58.55 Kg

5. ΔH_f^o of water is -285.8 KJ mol^{-1}. If enthalpy of neutralization of HCl and NaOH is -57.3 KJ mol^{-1}, then ΔH_f^o of $\overline{O}H$ will be

(A) -228.5 KJ mol^{-1} (B) 228.5 KJ mol^{-1}

(C) 114.25 KJ mol^{-1} (D) – 114.25 KJ mol^{-1}

6. When 0.1 mole of anhydrous $CuSO_4$ is dissolved in water the heat evolved is 1.451 Kcal. If 0.1 mol of $CuSO_4.5H_2O$ is dissolved in water the heat absorbed is 0.264 Kcal. The molar heat of hydration of $CuSO_4$ in Kcal is

(A) 11.87 (B) – 11.87
(C) 17.15 (D) – 17.15

7. $\frac{Kp}{Kc}$ for the reaction $CO(g) + \frac{1}{2}O_2(g) \rightleftharpoons CO_2$ (g) will be

(A) 1 (B) $\sqrt{RT}$

(C) $\frac{1}{\sqrt{RT}}$ (D) RT

Multiple Correct Answers Type (Total Marks: 16) (4,0)

This section contains 4 multiple correct answer(s) type questions. Each question has 4 choices (A), (B), (C) and (D), out of which ONE OR MORE is/are correct.

8. Which of the following are wrong statements?

(A) K_w is always constant and equal to 10^{-14}.
(B) PH + POH = PKw at all temperatures
(C) Salts of strong acid and strong base undergo hydrolysis.
(D) Addition of CH_3COONa to acetic acid solution decreases the PH of solution of acetic acid.

9. Enthalpy change equals internal energy change when

(A) All the reactants and products are in solution
(B) Reaction is carried out in a closed vessel.
(C) Number of moles of gaseous reactants and that of the products are equal.
(D) Reaction is carried out at constant pressure.

10. For the gas phase reaction
$C_2H_4 + H_2 \rightleftharpoons C_2H_6$; $\Delta H = -136.8\, KJ\ mol^{-1}$ carried out in a vessel, the equilibrium concentration of C_2H_4 is increased by

(A) Increasing the temperature (B) Increasing the pressure
(C) Decreasing the temperature (D) Decreasing the pressure.

11. A buffer solution can be prepared from a mixture of

(A) CH_3COONa and CH_3COOH in water
(B) CH_3COONa and HCl in water under certain conditions.
(C) NH_4OH and NH_4Cl in water
(D) NaCl and HCl in water

Comprehension Type (Total Marks: 15) (Total Marks : 15) (3, – 1)

This section contains 2 paragraphs. Based upon each paragraph, 3 or 2 multiple choice questions have to be answered. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.

C_{12-13}: Paragraph for Question Nos. 12 to 13

Read the paragraph carefully and answer the following questions:

The heat of formation of one mole of HI from H_2 and I_2 vapour at 25°c is – 8000 cal. Given molar heat capacities of H_2, I_2 and HI vapours.

$C_{pH_2(g)} = 6.5 + 0.0017T$

$C_{pI_2(g)} = 6.5 + 0.0038T$

$C_{pHI(g)} = 6.5 + 0.0016T$

12. The total change in heat capacity at constant pressure is

(A) 0.00115 T cal deg^{-1} (B) – 0.00115 T cal deg^{-1}

(C) 0.00115 cal (D) 0.00115 cal $deg^{-1}g^{-1}$

13. The heat of formation of HI at 10°c is

(A) + 7995 cal (B) – 7995 cal

(C) -1080 cal (D) 7999.82 cal.

C_{14-16}: Paragraph for Question Nos. 14 to 16

Read the paragraph carefully and answer the following questions:

Ionic product is the product of the concentrations of the ions of electrolytes raised to power of their coefficients in the balanced chemical equation in the solution of any concentration. Its value is not constant and varies with change in concentration. Ionic product of the saturated or supersaturated solution is called solubility product, K_{SP}.

(i) When $K_{ip} = K_{sp}$, the solution is just saturated and no precipitation takes place.

(ii) When $K_{ip} < K_{sp}$, the solution is unsaturated and more of the electrolyte can dissolve in the solution

(iii) When $K_{ip} > K_{sp}$, the solution is supersaturated and precipitation takes place.

14. A salt containing zn is mixed with $(NH_4)_2S$ of molarity 0.03 M. The amount of Zn^{2+} that remain unprecipitated in 15 ml of this solution is (K_{sp} of zns = 4.5×10^{-24}) [amount of Zn^{2+} ion added is negligible]

(A) 1.46×10^{-22} g (B) 9.75×10^{-21} g

(B) 1.5×10^{-22} g (D) 2.01×10^{-23} g

15. The solubility of $Pb(OH)_2$ in water is 6.7×10^{-6}M. what will happen to the solubility of $Pb(OH)_2$ in a buffer solution of pH = 8 ?

(A) solubility will increase (B) solubility will decrease

(C) solubility will remain same (D) None of these

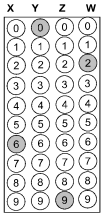
16. The solubility product of $Cr(OH)_3$ can be given by

(A) $K_{sp} = K_w^3 \left[H_3O^+\right]^3$ (B) $K_{sp} = \left[Cr^{3+}\right]\left[3\overline{O}H\right]^3$

(C) $K_{sp} = \dfrac{\left[Cr^{3+}\right] \times K_w^3}{\left[H_3O^+\right]^3}$ (D) $K_{sp} = \left[cr^{3+}\right]\left[\dfrac{1}{3}\overline{O}H\right]^3$

SECTION–1 (PART– C) (Total Marks : 28) (4, 0)
Integer Answer Type

This section contains 7 questions. The answer to each of the questions is a single-digit integer, ranging from 0 to 9. The appropriate bubbles below the respective question numbers in the ORS have to darkened. For example, if the correct answers to question numbers X, Y and W (say) are 6, 0, 9 and 2, respectively, then the correct darkening of bubbles will look like the following:



1. For a hypothetical reversible reaction $\frac{1}{2}A_2(g) + \frac{3}{2}B_2(g) \rightleftharpoons AB_3(g)$; $\Delta H = -20\,KJ$. The standard entropies of A_2, B_2 and AB_3 are 60, 40 and 50 J $K^{-1}mol^{-1}$ respectively. The above reaction will be at equilibrium at (x × 100) K, where X is _____.

2. The bond energy of an O – H bond is 109 Kcal mol^{-1}. When 5×10^{-3} mole of water is formed, the energy released in kcals is approximately. [formation of H_2O is taking place from free oxygen and hydrogen atom]

3. When 0.01 mole of NaOH are added to a litre of buffer solution, its pH changes from 4.745 to 4.815. The buffer capacity of the buffer solution is 0.07 y. The value of y is _____.

4. The latent heat of vaporization of water at 350 K and 1 atm pressure is 10.0 Kcal/mole. The change in internal energy for vaporization of one mole of water at the same temperature & pressure is _____ Kcal. (nearest integer)

5. A certain weak acid has a dissociation constant of 1.0×10^{-5}. The equilibrium constant for its reaction with a strong base is 10^x. The value of x is _____

6. Ka for HCN is 5×10^{-10} at 25^oc. For maintaining a constant pH of 9, the vol. of 5 M KCN solution required to be added to 10 ml of 2M HCN solution is _____. ($10^{-0.3010} = 0.5$)

7. If 50 ml of 0.2 M NaCN is mixed with 50 ml of 0.2 M HCl, then $[H_3O^+] = \left[CN^-\right] = x \times 10^{-6}$ where x is _____ (Kb for $C\overline{N}$ $= 2 \times 10^{-5}$).

* * *

PHYSICS

SECTION – II (PART – A) (Total Marks : 21) (3, – 1)

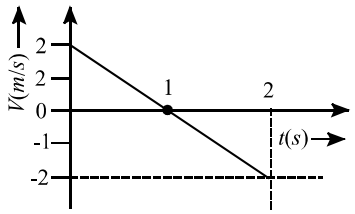
(Single Correct Choice Type)

This section contains **7 multiple choice questions.** Each question has four choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

1. A ball takes *t* seconds to fall from height h_1 and 2*t* seconds to fall from height h_2. Thus h_1/h_2 is

   (A) 2 (B) 4 (C) 0.5 (D) 0.25

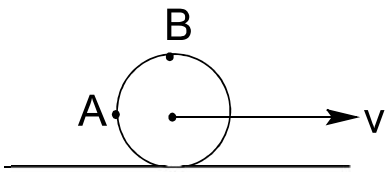
2. Velocity – time graph of a particle in motion is shown. Then displacement and distance covered by the particle in 2 seconds is,



   (A) 2, 4m (B) 0, 2m

   (C) 2, 2m (D) 0, 0m

3. A ring is rolling on a rough horizontal surface without slipping with a linear speed '*v*'. Referring to the figure, ratio of speeds of points B and A is :



   (A) 1 :1 (B) 1 : 2

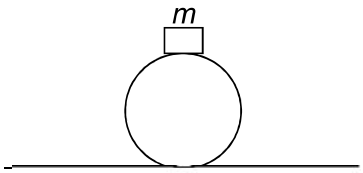
   (C) $\sqrt{2}$:1 (D) 1 : $\sqrt{2}$

4. A particle of mass '*m*' is moving along a circle of radius 'r'. At some instant, its speed is '*v*' and it is gaining speed at a uniform rate '*a*', then, at the given instant, acceleration of the particle is:

   (A) along the radius (B) inclined to radius at $\theta = \sin^{-1}\dfrac{1}{\left[1+\dfrac{v^4}{a^2r^2}\right]^{1/2}}$

   (C) inclined to radius at $\theta = \cos^{-1}\dfrac{ar}{v^2}$ (D) inclined to radius at $\theta = \tan^{-1}\dfrac{v^2}{ar}$

5. In the figure shows a large frictionless sphere of radius 'R'. The sphere is fixed on the ground. A mass 'm' begins to slide on the sphere from the top of it. Height from the ground where the object leaves contact with the sphere is:



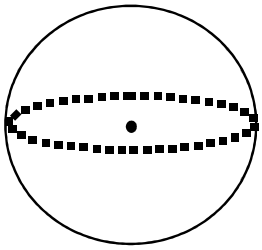
   (A) $\frac{7}{5}R$ (B) $\frac{9}{4}R$ (C) $\frac{12}{7}R$ (D) $\frac{5}{3}R$

6. An object of mass '*m*' is projected with a velocity '*u*' at an angle 45^0 with the horizontal. When the object is at maximum height, its angular momentum about the point of projection is:

   (A) $\dfrac{mu^2}{g}$ (B) $\dfrac{mu^2}{2g}$

(C) $\frac{mu^3}{4\sqrt{2}g}$ (D) $\frac{mu\sqrt{u}}{2g}$

7. In the figure shows a system of two rings, each of mass 'M' and radius 'R'. They have a common centre but their planes are mutually perpendicular. Moment of inertia of their system about an axis through the common centre and perpendicular to the plane of one of the rings is:



(A) $\frac{5}{2}MR^2$ (B) MR^2

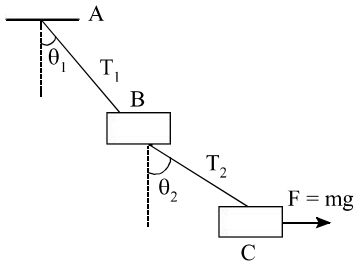
(C) 2 MR^2 (D) $\frac{3}{2}MR^2$

SECTION – II (PART – A) (Total Marks : 16) (4, 0)

(Multiple Correct Answers Type)

This section contains **4 multiple choice questions.** Each question has four choices (A), (B), (C) and (D), out of which **ONE or MORE** may be correct.

8. The blocks *B* and *C* in the figure have mass m each. The strings *AB* and *BC* are light, having tensions T_1 and T_2 respectively. The system is in equilibrium with a constant horizontal force mg acting on *C*.



(A) $\tan\theta_1 = \frac{1}{2}$ (B) $\tan\theta_2 = 1$

(C) $T_1 = \sqrt{5}\,mg$ (D) $T_2 = \sqrt{2}\,mg$

9. If for a liquid in a vessel force of cohesion is twice of adhesion:

(A) The meniscus will be convex (B) The liquid will wet the solid

(C) The angle of contact will be obtuse (D) There will be capillary descent

10. A solid cylinder of mass *m* and radius *r* is rolling on a rough inclined plane of inclination θ. The coefficient of friction between the cylinder and incline is μ. Then:

(A) frictional force is always μ mg cos θ

(B) friction is a dissipative force

(C) by decreasing θ, frictional force decreases

(D) friction opposes translation and supports rotation

11. A particle moves on a straight line with a uniform velocity. The angular momentum of the particle is:

(A) Always zero

(B) Zero about a point on the straight line

(C) Zero about a point away from the straight line

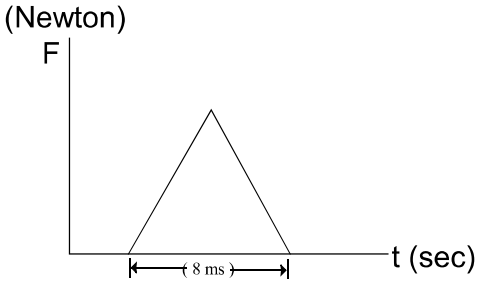
(D) Constant always about a given point not on the line

SECTION – II (PART – A) (Total Marks : 15) (3, – 1)
(Comprehension Type)

This section contains **2 paragraphs.** Based upon one of the paragraphs **3 multiple choice questions** and based on the other paragraph **2 multiple choice questions** have to be answered. Each of these questions has four choices A), B), C) and (D) out of WHICH **ONLY ONE** is correct.

Paragraph for Question Nos. 12 to 13

A ball of mass 250 gm is thrown with a speed 30 m/s. The ball strikes a bat and its is hit straight back along the same line at a speed 50 m/s. Variation of the interaction force, as long as the ball remains in contact with the bat, is as shown in the figure.



12. Maximum force exerted by the bat on the ball is

(A) 2500 N (B) 5000 N (C) 7500 N (D) 1250 N

13. Average force exerted by the bat on the ball is

(A) 5000 N (B) 1250 N (C) 2500 N (D) 7500 N

Paragraph for Question Nos. 14 to 16

Two discs A and B are mounted coaxially on a vertical axle. The discs have moments of inertia *I* and 2*I* respectively about the common axis. Disc A is imparted an initial angular velocity 2ω using the entire potential energy of a spring compressed by a distance x_1. Disc B is imparted an angular velocity ω by a spring having the same spring constant and compressed by a distance x_2. Both the discs rotate in the clockwise direction.

14. The ratio $\frac{x_1}{x_2}$ is:

(A) 2 (B) $\frac{1}{2}$ (C) $\sqrt{2}$ (D) $\frac{1}{\sqrt{2}}$

15. When disc B is brought in contact with disc A, they acquire a common angular velocity in time *t*. The average frictional torque on one disc by the other during this period is

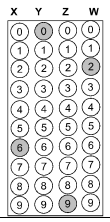
(A) $\frac{2I\omega}{3t}$ (B) $\frac{9I\omega}{3t}$ (C) $\frac{9I\omega}{4t}$ (D) $\frac{3I\omega}{2t}$

16. The loss of kinetic energy during the above process is

(A) $\frac{l\omega^2}{2}$ (B) $\frac{l\omega^2}{3}$ (C) $\frac{l\omega^2}{4}$ (D) $\frac{l\omega^2}{6}$

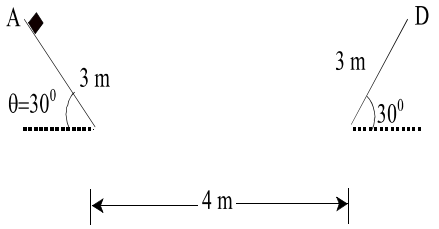
(PART – C) (Total Marks : 28) (4, 0)
(Integer Answer Type)

This Section contains **7 questions.** The answer to each question is a **single-digit integer,** ranging from 0 to 9. The bubble corresponding to the correct answer is to be darkened in the ORS.



1. A particle is projected up an inclined plane (of inclination β) at an elevation α to the horizontal. Find the ratio between $\tan\alpha$ and $\tan\beta$, if the particle strikes the plane horizontally.

2. A track has two inclined surfaces AB and AC each of length 3 m and angle of inclination of 30^0 with the horizontal and a central horizontal part of length 4 m as shown in fig. A block of mass 0.2 kg slides from rest from point A. The inclined surfaces are frictionless. If the coefficient of friction between the block and the horizontal flat surface is 0.2, where will the block finally come to rest?
[Give the answer in $(10^{-1}\,m)$ unit]

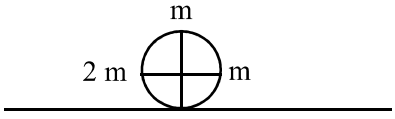


3. Two particles of masses 2 kg and 1 kg are moving along the same line with speeds 2 m/s and 5 m/s respectively. What is the speed of centre of mass of the system if both the particles are moving in same direction?

4. A ball of mass m approaches a wall of mass M (>> m) with speed 4 m/s along the normal to the wall. The speed of wall is 1 /s towards the ball. The speed of the ball after an elastic collision with the wall is _____.

5. Ball 1 collides head on with an another identical ball 2 at rest. For what value of coefficient of restitution e, the velocity of second ball becomes two times that of 1 after collision, the value of e is $\frac{1}{k}$, k is _____.

6. A ring of mass m and radius R has three particles attached to the ring. The centre of the ring has a speed v_0. The kinetic energy of the system is k mv^2: (slipping is absent), the value of k is_____.



7. A rod of mass M & length L is lying on a horizontal frictionless table. A particle of mass m traveling ⊥r to the rod hits the rod at its end point. The collision is elastic. After the collision

the particle comes to rest. The ratio of M/m is _____.

PAPER-1: MATHEMATICS

SECTION– III : (PART-A) (Total Marks : 21) (3, –1)

(Single Correct Choice Type)

This section contains **7 multiple choice questions.** Each question has four choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

1. Find the locus of the mid point of all chords of the circle $x^2 + y^2 – 2x – 2y = 0$ such that the pair of lines joining (0, 0) and the point of intersection of the chords with the circler make equal angle with x axis

(A) x + y = 2 (B) x – y = 2 (C) x + y + 2 = 0 (D) x – y + 2 = 0

2. If two distinct chords drawn from the point (p, q) on the circle $x^2 + y^2 = px + qy$ are bisected by the x – axis, then

(A) $p^2 = q^2$ (B) $p^2 = 8\,q^2$ (C) $p^2 < 8\,q^2$ (D) $p^2 > 8q^2$

3. If tangent is drawn at a variable point 'P' on the parabola $y^2 = 4ax$, then circle drawn, taking the intercept of the tangent between 'P' an the directrix as diameter, will always pass through

(A) (a, 0) (B) (-a, 0) (C) $(a, \pm 2a)$ (D) (0, 0)

4. If $z_1 = \left(\sqrt{3} + i\sqrt{3}\right)$ and $z_2 = \sqrt{3} + i$, then the complex number $\left(\frac{z_1}{z_2}\right)^{50}$ lies in the

(A) First quadrant (B) second quadrant (C) third quadrant (D) fourth quadrant.

5. If two arithmetic means A_1, A_2, two geometric mean G_1, G_2 and two harmonic mean H_1, H_2 are inserted any two numbers, then $\frac{A_1 + A_2}{H_1 + H_2}$ is

(A) $\frac{G_1G_2}{H_1H_2}$ (B) $\sqrt{G_1G_2}$ (C) $\frac{H_1H_2}{G_1G_2}$ (D) None of these

6. If p(-3, 2) is one end of the focal chord PQ of the parabola $y^2 + 4x + 4y = 0$, then the slope of the normal at Q is

(A) – ½ (B) 2 (C) ½ (D) – 2

7. If $|z – 2 – i| = |z| \left|\sin\left(\frac{\pi}{4} – \arg z\right)\right|$, then locus of z is

(A) A point (B) A pair of straight line

(C) Circle (D) Parabola

SECTION – III(PART-A) (Total Marks : 16) (4,0)
(Multiple Correct Answers Type)

This section contains **4 multiple choice questions.** Each question has four choices (A), (B), (C) and (D), out of which **ONE or MORE** may be correct.

8. If $16a^2 + 25b^2 - c^2 = 40ab$, then the family of lines $ax + by + c = 0$ is concurrent at the point(s)

(A) (4, –5) (B) (–4, –5) (C) (–4, 5) (D) none of these

9. If $\frac{\sin^4 x}{2} + \frac{\cos^4 x}{3} = \frac{1}{5}$, then

(A) $\tan^2 x = \frac{2}{3}$ (B) $\frac{\sin^8 x}{8} + \frac{\cos^8 x}{27} = \frac{1}{125}$ (C) $\tan^2 x = \frac{1}{3}$ (D) $\frac{\sin^8 x}{8} + \frac{\cos^8 x}{27} = \frac{2}{125}$

10. Let $S_k = \lim_{n\to\infty} \sum_{i=0}^{n} \frac{1}{(k+1)^i}$. Then $\sum_{k=1}^{n} k s_k$ equals

(A) $\frac{n(n+1)}{2}$ (B) $\frac{n(n-1)}{2}$ (C) $\frac{n(n+2)}{2}$ (D) $\frac{n(n+3)}{2}$

11. If the complex number Z satisfies | i Z + 2 | = Im (Z), then

(A) Min value of |Z| = 1 (B) Max value of $|Z| = \sqrt{5}$

(C) Min value of arg $Z = \pi/4$ (D) Max value of $\arg Z = \frac{3\pi}{4}$

SECTION – III (PART-A) (Total Marks : 15) (3, –1)
(Paragraph Type)

This section contains **2 paragraphs.** Based upon one of the paragraphs **3 multiple choice questions** and based on the other paragraph **2 multiple choice questions** have to be answered. Each of these questions has four choices A), B), C) and (D) out of WHICH **ONLY ONE** is correct.

Paragraph for Question Nos. 12 to 13

Read the paragraph carefully and answer the following questions.

We know that, it $a_1, a_2, a_3, \ldots\ldots\ldots, a_n$ are in H.P, then $\frac{1}{a_1}, \frac{1}{a_2}, \ldots\ldots\ldots, \frac{1}{a_n}$ are in A.P and vice versa. If $a_1, a_2, \ldots\ldots\ldots, a_n$ are in A.P. with common difference d, then for any b(> 0), the numbers $b^{a_2}, b^{a_2}, b^{a_3}, \ldots\ldots\ldots, b^{a_n}$ are in G.P. with common ratio b^d. If $a_1, a_2, \ldots\ldots\ldots, a_n$ are positive and in G.P. with common ratio r, then for any base b (b>0), $\log_b a_1, \log_b a_2, \ldots\ldots\ldots, \log_b a_n$ are in A.P with common difference $\log_b^r$

12. If a, b, c, d are in G.P. and $a^x = b^y = c^z = d^v$, then x, y, z, v are in

(A) A.P (B) G.P (C) H.P (D) None of these

13. If a, b, c are in H.P, then $4^{-a^{-1}}, 4^{-b^{-1}}, 4^{-c^{-1}}$ are in

(A) A.P (B) G.P (C) H.P (D) None of these

Paragraph for Question Nos. 14 to 16

Read the paragraph carefully and answer the following questions.

A circle of radius 1 is inscribed in an equilateral ΔPQR. The points of contact C with the sides PQ, QR, RP are D,E,F respectively. The line PQ is given by the equation $x\sqrt{3}+y-6=0$ and the point D is $\left(\frac{3\sqrt{3}}{2}, \frac{3}{2}\right)$. Further, it is given that the origin and the centre of C are on the same side of the line PQ.

14. The equation of circle C is

(A) $\left(x-2\sqrt{3}\right)^2+(y-1)^2=1$ (B) $\left(x-2\sqrt{3}\right)^2+\left(y+\frac{1}{2}\right)^2=1$

(C) $\left(x-\sqrt{3}\right)^2+(y+1)^2=1$ (D) $\left(x-\sqrt{3}\right)^2+(y-1)^2=1$

15. Points E & F are given by

(A) $\left(\frac{\sqrt{3}}{2}, \frac{3}{2}\right), (\sqrt{3}, 0)$ (B) $\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right), (\sqrt{3}, 0)$

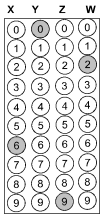
(C) $\left(\frac{\sqrt{3}}{2}, \frac{3}{2}\right), \left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$ (D) $\left(\frac{3}{2}, \frac{\sqrt{3}}{2}\right), \left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

16. Equation of the sides QR, RP are

(A) $y=\frac{2}{\sqrt{3}}x+1,\ y=-\frac{2}{\sqrt{3}}x-1$ (B) $y=\frac{1}{\sqrt{3}}x,\ y=0$

(C) $y=\frac{\sqrt{3}}{2}x+1,\ y=-\frac{\sqrt{3}}{2}x-1$ (D) $y=x\sqrt{3},\ y=0$

SECTION – III (PART- C) (Total Marks : 28) (4, 0)
(Integer Answer Type)



This Section contains **7 questions.** The answer to each question is a **single-digit integer,** ranging from 0 to 9. The bubble corresponding to the correct answer is to be darkened in the ORS.

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1. The value of $6+\log_{\frac{3}{2}}\left(\frac{1}{3\sqrt{2}}\right)\sqrt{4-\frac{1}{3\sqrt{2}}\sqrt{4-\frac{1}{3\sqrt{2}}\sqrt{4-\frac{1}{3\sqrt{2}}.....}}}$ is _____.

2. If $2x+3y=7$ and $x\geq 0$, $y\geq 0$ and greatest value of x^3y^4 is $\frac{32}{k}$. Then k is equal to ___.

3. If W is imaginary root of $Z^{28} = 1$, and such that | w + 1 | is maximum then $\frac{1}{2}\left|w-\frac{1}{w}\right| =$, is equal to _____.

4. If AFB is a focal chord of the parabola $y^2=4ax$ (F is focus) and length of latus rectum of the parabola is $\frac{80}{k}$. Then k is equal to ___.

5. $2\cos 10^0 + \sin 100^\circ + \sin 1000^\circ + \sin 10000^\circ = \sin(10x^\circ)$ then x is equal to _____.

6. If $\frac{w-5}{w+5}$ is purely imaginary and imaginary part of $\alpha = 8$ for complex number w and α, then minimum value of $|w-\alpha|$ is _____.

7. If abc = 8 and a, b, c > 0, then the minimum value of $\sqrt{(2+a)(2+b)(2+c)}$ is _____

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