FIITJEE

ALL INDIA INTERNAL TEST SERIES

CHEMISTRY, MATHEMATICS & PHYSICS

SET – A

APT - 6 | **108600** | **Ai²TS-10**

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

CLASS XII Paper – 2)

INSTRUCTIONS

- Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.
- You are not allowed to leave the Examination Hall before the end of the test.

Caution: Question Paper CODE as given above MUST be correctly marked in the answer OMR sheet before attempting the paper. Wrong CODE or no CODE will give wrong results.

A. General Instructions

- ✓ Attempt ALL the questions. Answers have to be marked on the OMR sheets.
- ✓ This question paper contains **Three Sections**.
- ✓ **Section – I** is *"Chemistry"*, **Section – II** is *"Mathematics"* and **Section – III** is *"Physics"*.
- ✓ Each Section is further divided into two Parts: **Part – A** & **Part – C**.
- ✓ Rough spaces are provided for rough work inside the question paper. No additional sheets will be provided for rough work.
- ✓ Blank Papers, clip boards, log tables, slide rule, calculator, cellular phones, pagers and electronic devices, in any form, are not allowed.

B. Filling of OMR Sheet

1. Ensure matching of OMR sheet with the Question paper before you start marking your answers on OMR sheet.
2. On the OMR sheet, darken the appropriate bubble with HB pencil for each character of your Enrolment No. and write in ink your Name, Test Centre and other details at the designated places.
3. OMR sheet contains alphabets, numerals & special characters for marking answers.

C. Marking Scheme For All Three Parts.

(i) **PART-A (01 – 08)** contains 8 Multiple Choice Questions which have One or More Than One Correct answer. Each question carries **+4 marks** for correct answer and **–2 mark** for wrong answer.
PART-A (09 – 12) contains 2 Paragraphs. Based upon each paragraph, 2 Multiple Choice Questions have to be answered. Each question has Only One Correct answer and carries **+4 marks** for the correct answer and **–2 mark** for a wrong answer.

(ii) **PART-C (01 – 08)** contains 8 Numerical Based questions with Single Digit Integer as answer, ranging from 0 to 9 and each question carries **+4 marks** for correct answer. There is no negative marking.

Name of Candidate :

Batch ID : **Date of Examination :** / / 2 0 1

Enrolment Number :

SECTION- I: CHEMISTRY

PART– A (One or More Than One Options Correct Type)

This section contains **8 multiple choice type questions.** Each question has four choices (A), (B), (C) and (D) out of which **ONE** or **MORE THAN ONE** are correct.

1. The probability of finding an electron in the p_x – orbital is /are
   (A) zero at the nucleus
   (B) The same on all the sides around the nucleus
   (C) Zero on the yz – plane
   (D) Maximum on two opposite sides of the nucleus along the x-axis

2. For the above endothermic reaction: $C_{(s)} + CO_{2(g)} \rightleftharpoons 2CO_{(g)}$
   (A) The equilibrium shifts in the forward direction if more of CO_2 is added
   (B) The equilibrium shifts in backward direction if more of CO is added
   (C) The equilibrium shifts in the forward direction if inert gas is added at constant pressure
   (D) The equilibrium shifts in the backward direction if temperature is decreased

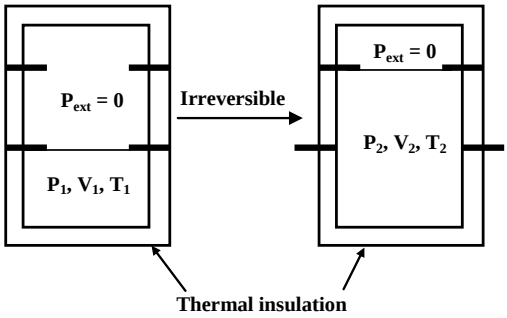
3. Which of the following pairs contain only reducing carbohydrates?
   (A) Maltose, Sucrose
   (B) Fructose, Maltose
   (C) Starch, Ribose
   (D) Glucose, Galactose

4. Sodium cyanide is sometimes added in froth flotation processes with ZnS and PbS minerals because
   (A) It acts as a depressant
   (B) $Pb(CN)_2$ is precipitated while no effect on ZnS
   (C) ZnS forms $Zn(CN)_2$ and comes out with froth
   (D) ZnS forms soluble complex while PbS forms froth

5. For the reaction:
   $I^- + ClO_3^- + H_2SO_4 \longrightarrow Cl^- + HSO_4^- + I_2$
   The correct statement(s) in the balanced equation is/are:
   (A) Stoichiometric coefficient of HSO_4^- is 6.
   (B) Iodide is oxidized.
   (C) Sulphur is reduced.
   (D) H_2O is one of the products.

Space for rough work

6. An ideal gas in a thermally insulated vessel at internal pressure = P_1, volume = V_1 and absolute temperature = T_1 expands irreversibly against zero external pressure, as shown in the diagram. The final internal pressure, volume and absolute temperature of the gas are P_2, V_2 and T_2, respectively. For this expansion,



(A) $q = 0$ (B) $T_2 = T_1$

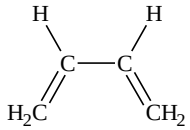
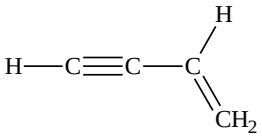
(C) $P_2V_2 = P_1V_1$ (D) $P_2V_2^{\gamma} = P_1V_1^{\gamma}$

7. The pair(s) of coordination complexes/ions exhibiting the same kind of isomerism is(are)

(A) $[Cr(NH_3)_5Cl]Cl_2$ and $[Cr(NH_3)_4Cl_2]Cl$ (B) $[Co(NH_3)_4Cl_2]^+$ and $[Pt(NH_3)_2(H_2O)Cl]^+$

(C) $[CoBr_2Cl_2]^{2-}$ and $[PtBr_2Cl_2]^{2-}$ (D) $[Pt(NH_3)_3(NO_3)]Cl$ and $[Pt(NH_3)_3Cl]Br$

8. Amongst the given options, the compound(s) in which all the atoms are in one plane in all the possible conformations (if any), is (are)

(A)  (B) 

(C) $H_2C{=}C{=}O$ (D) $H_2C{=}C{=}CH_2$

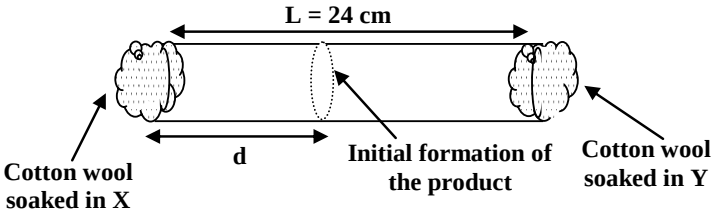
Space for rough work

Comprehension type (Only One Option Correct)

This section contains **2 Paragraphs**. Based upon each paragraph, 2 Multiple Choice Questions have to be answered. Each question has **only one correct answer** among the four given options (A), (B), (C) and (D).

Paragraph for Questions 9 & 10

X and Y are two volatile liquids with molar weights of 10 g mol^{-1} and 40 g mol^{-1} respectively. Two cotton plugs, one soaked in X and the other soaked in Y, are simultaneously placed at the ends of a tube of length L = 24 cm, as shown in the figure. The tube is filled with an inert gas at 1 atmosphere pressure and a temperature of 300 K. Vapours of X and Y react to form a product which is first observed at a distance d cm from the plug soaked in X. Take X and Y to have equal molecular diameters and assume ideal behaviour for the inert gas and the two vapours.

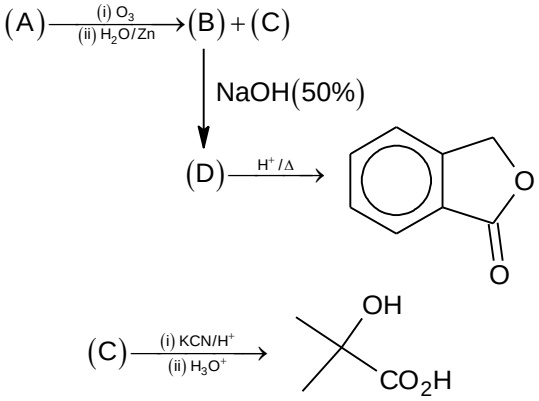


9. The value of d in cm (shown in the figure), as estimated from Graham's law, is
   (A) 8 (B) 12
   (C) 16 (D) 20

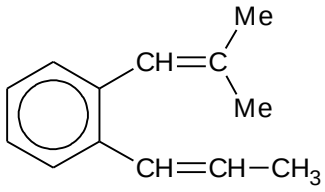
10. The experimental value of **d** is found to be smaller than the estimate obtained using Graham's law. This is due to
   (A) larger mean free path for **X** as compared to that of **Y**.
   (B) larger mean free path for **Y** as compared to that of **X**.
   (C) greater collision frequency of **Y** with the inert gas as compared to that of **X** with the inert gas.
   (D) greater collision frequency of **X** with the inert gas as compared to that of **Y** with the inert gas.

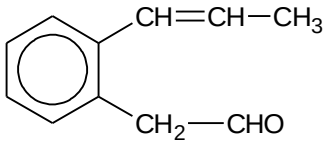
Space for rough work

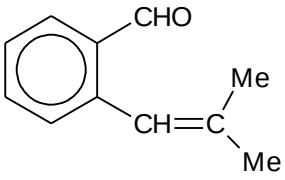
Paragraph for Questions 11 & 12

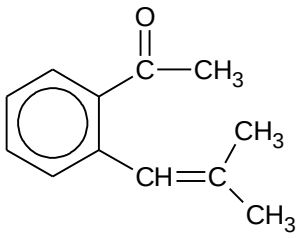


11. Structure of (A) is:

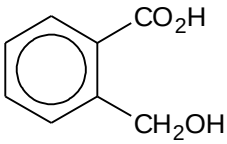
(A) 

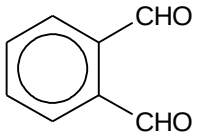
(B) 

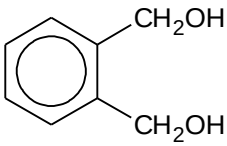
(C) 

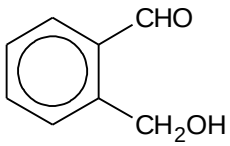
(D) 

12. Structure of (B) is:

(A) 

(B) 

(C) 

(D) 

Space for rough work

PART – C: (Only Integer Value Correct Type)

This section contains **8 questions.** Each question, when worked out will result in one integer from 0 to 9 (both inclusive).

1. Consider all possible isomeric ketones, including stereoisomers of MW = 100. All these isomers are independently reacted with $NaBH_4$ (NOTE: stereoisomers are also reacted separately). The total number of ketones that give a racemic product(s) is/are

2. The half cell potentials of a half cell A^{x+}, $A^{(x+n)+}$/Pt were found to be as follows

Percent of reduced form	24.4	48.8
Cell potential /V	0.101	0.115

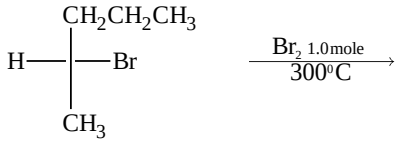
Determine the approximate value of n.

3. A metal 'M' of molar mass 96 g mol^{-1} reacts with fluorine to form a salt that can be represented as MF_x. In order to determine x, a 9.18 g of sample of salt is dissolved in 100 g of water and its boiling point was determined to be 374.38 K. What is the value of 'x' in salt MF_x?
Given K_b(water) 0.512 K. Kg mol^{-1}. Assume complete dissociation of salt. (B.P of H_2O = 373 K)

4. If the freezing point of a 0.01 molal aqueous solution of a cobalt (III) chloride-ammonia complex(which behaves as a strong electrolyte) is – 0.0558^{0}C, the number of chloride(s) in the coordination sphere of the complex is
[K_f of water = 1.86 K kg mol^{-1}]

5. Not considering the electronic spin, the degeneracy of the second excited state(n = 3) of H atom is 9, while the degeneracy of the second excited state of H^- is

6. In the following monobromination reaction, the number of possible chiral products is



(1.0 mole)

(enantiomerically pure)

7. The value of x in $H_xCr(CO)_5$ is -

8. How many moles of water vapour is evolved when 1 mole of **hydrated aluminium chloride dimer** ($Al_2Cl_6.12H_2O$) is strongly heated.

Space for rough work

SECTION II: MATHEMATICS

PART – A

(Multiple Correct Choice Type)

*This section contains **8 multiple choice questions.** Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which only **ONE OR MORE THAN ONE** is/are correct*

1. 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

2. Let $f(x + y) = f(x) + f(y) + 2xy - 1 \ \forall\ x, y \in R$. If f(x) is differentiable and $f'(0) = \sin\phi$, then
   (A) $f(x) < 0 \ \forall\ x \in R$ (B) $f(x) > 0 \ \forall\ x \in R$
   (C) $f(x) \geq \frac{3}{4} \ \forall\ x \in R$ (D) $-1 \leq f(x) \leq 1 \ \forall\ x \in R$

3. If $A = \begin{bmatrix} \alpha & \beta \\ 0 & \alpha \end{bmatrix}$ is the n^{th} root of I_2, then choose the correct statement
   (A) if n is odd, $\alpha = 1, \beta = 0$ (B) if n is odd, $\alpha = -1, \beta = 0$
   (C) if n is even, $\alpha = 1, \beta = 0$ (D) if n is even, $\alpha = -1, \beta = 0$

4. The term independent of x in the expansion of $(x + 1/x)^{2n}$ is
   (A) $\frac{1.3.5. \ .....(2n-1).2^n}{n\ !}$ (B) $\frac{1.3.5.....(2n-1).2^n}{n\ !\ \ n\ !}$
   (C) $\frac{1.3.5. \ .... \ (2n-1)}{n\ !}$ (D) $\frac{1\cdot 2\cdot 3\cdot ...\cdot 2n}{n!\ \ n!}$

5. If $A = \int_0^\infty \frac{\sin x}{x} dx$, then the value of the integral $\int_0^\infty \frac{\sin ax \cos bx}{x} dx$ must be
   (A) A if a > b > 0 (B) 2A if a + b = 0
   (C) $\frac{A}{a+b}$ (D) 0 if b > a > 0

Space for rough work

6. The integral values of 'a' for which the equation $\cos^2 x - (a^2 + a + 5)\,|\cos x| + (a^3 + 3a^2 + 2a + 6) = 0$ has real solution(s)

(A) -3 (B) -2

(C) -1 (D) 0

7. The differential equation of the curve for which the initial co-ordinate (y-intercept) of any tangent is equal to the corresponding subnormal

(A) is linear (B) is homogeneous

(C) is non homogeneous (D) is none of these

8. On the ellipse $4x^2 + 9y^2 = 1$, the points at which the tangents are parallel to the line $8x = 9y$ are

(A) $\left(\frac{2}{5}, \frac{1}{5}\right)$ (B) $\left(-\frac{2}{5}, \frac{1}{5}\right)$

(C) $\left(-\frac{2}{5}, -\frac{1}{5}\right)$ (D) $\left(\frac{2}{5}, -\frac{1}{5}\right)$

Space for rough work

PART – A

(Comprehension Type)

*This section contains **2 groups of questions.** Each group has 2 multiple choice question based on a paragraph. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which only **ONE** is correct*

Paragraph for Question Nos. 9 to 10

Let A, B, C be three sets of complex numbers as defined below

$A = \{z : \text{Im} z \geq 1\}$

$B = \{z : |z - 2 - i| = 3\}$

$C = \{z : \text{Re}((1-i)z) = \sqrt{2}\}$.

9. The number of elements in the set $A \cap B \cap C$ is

(A) 0 (B) 1

(C) 2 (D) ∞

10. Let z be any point in $A \cap B \cap C$. Then, $|z+1-i|^2 + |z-5-i|^2$ lies between

(A) 25 and 29 (B) 30 and 34

(C) 35 and 39 (D) 40 and 44

Paragraph for Question Nos. 11 to 12

To the circle $x^2 + y^2 = 4$ two tangents are drawn from P (– 4, 0), which touch the circle at T_1 and T_2 and a rhombus $PT_1P'T_2$ is completed.

11. Circumcentre of the triangle PT_1T_2 is at

(A) (– 2, 0) (B) (2, 0)

(C) $\left(\frac{\sqrt{3}}{2}, 0\right)$ (D) none of these

12. Ratio of the area of the triangle PT_1P' to that of $P'T_1T_2$ is

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

(C) $\sqrt{3} : 2$ (D) none of these

Space for rough work

PART – C

(One Integer Value Correct Type)

*This section contains **8 questions**. Each question, when worked out will result in **one integer** from 0 to 9 (both inclusive).*

1. If in ΔABC, sinA sinB sinC + cosA cosB = 1, then the value of sinC = _____

2. Let $z = \frac{-1+\sqrt{3}i}{2}$, where $i = \sqrt{-1}$, and r, s $\in \{1, 2, 3\}$. Let $P = \begin{bmatrix} (-z)^r & z^{2s} \\ z^{2s} & z^r \end{bmatrix}$ and I be the identity matrix of order 2. Then the total number of ordered pairs (r, s) for which $P^2 = -I$ is _____

3. If circum radius of ΔABC is 3 cm and its area is 6 cm^2 and DEF is triangle formed by foot of perpendicular drawn from A, B, C on sides BC, CA, AB respectively then perimeter of Δ DEF in cm is _____

4. If $\vec{a}, \vec{b}$ are non-collinear vectors, then the value of x for which the vectors $\vec{\alpha} = (x-2)\vec{a} + \vec{b}$, $\vec{\beta} = (2x-1)\vec{a} - \vec{b}$ are collinear, is _____

5. The sum of infinite terms of the series $\frac{3}{1^2} + \frac{5}{1^2+2^2} + \frac{7}{1^2+2^2+3^2} + \frac{9}{1^2+2^2+3^2+4^2} + \ldots$ is _____

6. Point (α, β, γ) lies on the plane x + y + z = 2. Let $\vec{a} = \alpha\hat{i} + \beta\hat{j} + \gamma\hat{k}$, $\hat{k} \times (\hat{k} \times \vec{a}) = \vec{0}$, then γ = _____

7. Number of points of intersection of the hyperbolas $x^2 - 2x - y^2 + 4y - 4 = 0$ and $x^2 - 2x - y^2 + 4y - 2 = 0$ is/are _____

8. Let f (x) be a continuous function defined for $1 \le x \le 3$. If f (x) takes rational values for all x and f (2) = 5, then f (1.5) is equal to _____

Space for rough work

SECTION – III : PHYSICS

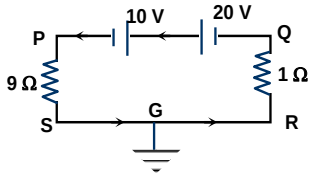
PART – A

(Straight Objective Type)

*This section contains **8 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONE or MORE are correct**.*

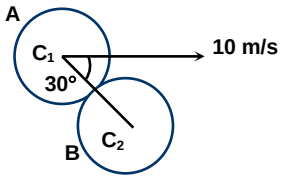
1. Two satellites of same mass of a planet in circular orbits have periods of revolutions 32 days and 256 days. If the orbital radius of the first is R, then
(A) the kinetic energy of the second is less than that of the first
(B) the total mechanical energy of the second is greater than that of the first
(C) radius of the orbit of second is 4R
(D) radius of the orbit of second is 8R

2. In the circuit shown
(A) the potential at P is -7.5 V
(B) the potential at Q is -1 V
(C) the potential at R is zero
(D) the potential at S is zero



3. When a capillary tube is dipped in a liquid, the liquid rises to a height h in the tube. The free liquid surface inside the tube is hemispherical in shape. The tube is now pushed down so that the height of the tube outside the liquid is less than h.
(A) The liquid will ooze out of the tube slowly.
(B) The liquid will come out of the tube like in a small fountain.
(C) The free liquid surface inside the tube will not be hemispherical.
(D) The liquid will fill the tube but not come out of its upper end.

4. A ball A collides elastically with an another identical ball B with velocity 10 m/s at an angle of 30^0 from the line joining their centres C_1 and C_2. Select the correct alternative(s)
(A) Velocity of ball A after collision is 5 m/s.
(B) Velocity of ball B after collision is $5\sqrt{3}$ m/s
(C) Both the balls move at right angles after collision.
(D) Kinetic energy will not be conserved here, because collision is not head on.



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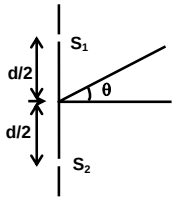
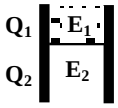
5. The potential energy U in joule of a particle of mass 1 kg moving in x-y plane obeys the law U = 3x + 4y, where (x, y) are the co-ordinates of the particle in metre. If the particle is at rest at (6, 4) at time t=0, then:
(A) the particle has constant acceleration
(B) the particle has zero acceleration
(C) the speed of particle when it crosses the y-axis is 10 m/s
(D) coordinates of the particle at t = 1 sec are (4.5, 2)

6. In an interference arrangement similar to Young's double-slit experiment, the slits S_1 and S_2 are illuminated with coherent microwave sources, each of frequency 10^6 Hz. The source are synchronized to have zero phase difference. The slits are separated by a distance d = 150.0 m. The intensity I (θ) is measured as a function of θ, where θ is defined as shown. If I_0 is the maximum intensity, then I (θ) for $0 \le \theta$ 90° is given b



(A) I (θ) = $I_o/2$ for θ = 30° (B) I(θ) = $I_o/4$ for θ = 90°
(C) I (θ) = I_o for θ = 0° (D) I (θ) is constant for all values of θ

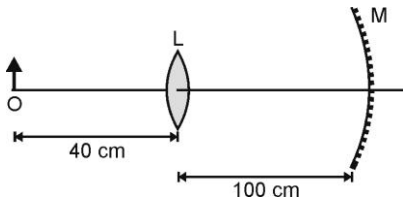
7. A parallel plate capacitor has a dielectric slab of dielectric constant K between its plates that covers 1/3 of the area of its plates, as shown in the figure. The total capacitance of the capacitor is C while that of the portion with dielectric in between is C_1. When the capacitor is charged, the plate area covered by the dielectric gets charge Q_1 and the rest of the area gets charge Q_2. The electric field in the dielectric is E_1 and that in the other portion is E_2. Choose the correct option/options, ignoring edge effects.



(A) $\frac{E_1}{E_2} = 1$ (B) $\frac{E_1}{E_2} = \frac{1}{K}$

(C) $\frac{Q_1}{Q_2} = \frac{3}{K}$ (D) $\frac{C}{C_1} = \frac{2+K}{K}$

8. An object is placed at a distance 40 cm from a convex lens of focal length = 20 cm. A concave mirror of focal length 30 cm is also place on other side of lens at a distance 100 cm. Final image of object is formed through lens after reflection from mirror ; then



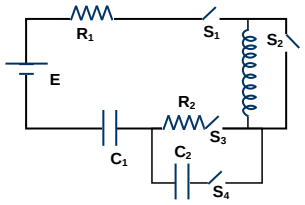
(A) The final image is real, erect and of same size of object
(B) The final image is real, inverted and of same size of object
(C) Distance between final image and mirror is 60 cm
(D) Distance between final image and lens is 40 cm

Space for rough work

Paragraph Type

*This section contains **2 paragraphs.** Based upon each of the paragraphs **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. 9 to 10



With reference to the circuit shown in the figure, four events are defined as:
Event A : switch S_1 is closed
Event B: switch S_2 is closed
Event C : switch S_3 is closed
Event D: switch S_4 is closed
Assuming that one or more of these events can take place simultaneously, answer the following questions

9. Current driven by battery immediately after (A + B + C) events only

(A) $\frac{E}{R_1+R_2}$ (B) $\frac{E}{R_1}$

(C) zero (D) infinite

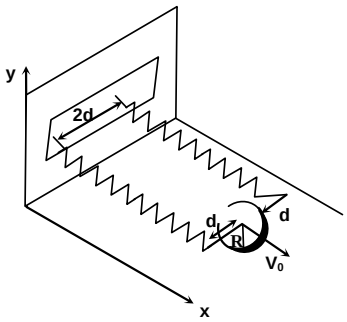
10. Voltage across capacitor C_1 immediate after (A + C) events only

(A) E (B) zero

(C) $\frac{ER_2}{R_1+R_2}$ (D) $\frac{ER_1}{R_1+R_2}$

Paragraph for Question Nos. 11 to 12

A uniform thin cylindrical disk of mass M and radius R is attached to two identical massless springs of spring constant k which are fixed to the wall as shown in the figure. The springs are attached to the axle of the disk symmetrically on either side at a distance d from its centre. The axle is massless and both the springs and the axle are in horizontal plane. The unstretched length of each spring is L. The disk is initially at its equilibrium position with its centre of mass (CM) at a distance L from the wall. The disk rolls without slipping with velocity $\vec{V}_0 = V_0\hat{i}$. The coefficient of friction is μ.



11. The net external force acting on the disk when its centre of mass is at displacement x with respect to its equilibrium position is

(A) $-kx$ (B) $-2kx$

(C) $-\frac{2kx}{3}$ (D) $-\frac{4kx}{3}$

12. The centre of mass of the disk undergoes simple harmonic motion with angular frequency ω equal to

(A) $\sqrt{\frac{k}{M}}$ (B) $\sqrt{\frac{2k}{M}}$

(C) $\sqrt{\frac{2k}{3M}}$ (D) $\sqrt{\frac{4k}{3M}}$

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PART – C

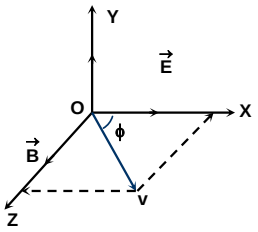
(Integer Type)

*This section contains **8 questions**. The answer to each of the questions is a **single-digit integer**, ranging from 0 to 9. The correct digit below the question number in the ORS is to be bubbled.*

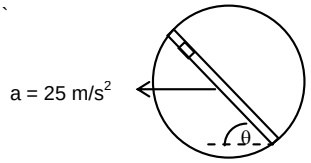
1. A radioactive sample has decay constant λ. The rate of production of nuclei in the given sample as $\frac{9\lambda N_0^2}{N}$, where N_0 is the number of radioactive nuclei in the sample at t = 0 and N is the number of radioactive nuclei in the sample at time t = t sec. If the number of nuclei present in the radioactive sample at $t \to \infty$ is $m \times 10^6$ nuclei then find the value of m. (Given $N_0 = 10^6$ nuclei)

2. One mole of a gas (γ = 5/3) is initially at temperature 27° C and occupy a volume V. The gas is first expanded at constant pressure until its volume double. Then it undergoes an adiabatic change until the temperature returns to its initial value. If the total work done in the process λ(150R) Joule, then find the value of λ. (R is the gas constant)

3. A proton is moving with uniform velocity in x-z plane at an angle of 30° with x-axis, in the presence of an electrostatic field $\vec{E} = (4\,kV/m)\hat{j}$ and magnetic field $\vec{B}$ = (50 mT) $\hat{k}$. The pitch of the helical trajectory followed by the proton is approximately $k \times 10^{-2} m$ when the electric field is switched off. Find k.
(Mass of proton is 1.67×10^{-27} kg.)



4. A circular disc with a groove along its diameter is placed horizontally. A block of mass 1 kg is placed as shown. The co-efficient of friction between the block and all surfaces of groove in contact is μ = 2/5. The disc has an acceleration of 25 m/s^2. The acceleration of the block with respect to disc is 2k m/s^2. Find the value of k.



cos θ = 4/5
sin θ = 3/5

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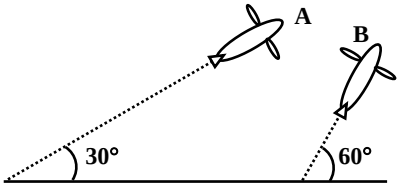
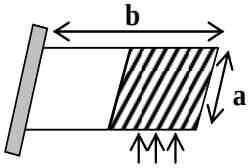
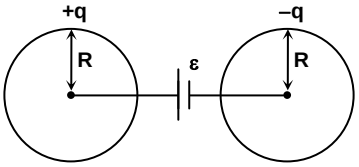
5. Airplanes A and B are flying with constant velocity in the same vertical plane at angles 30° and 60° with respect to the horizontal respectively as shown in the figure. The speed of A is $100\sqrt{3}$ ms^{-1}. At time t = 0 s, an observer in A finds B at a distance of 500 m. This observer sees B moving with a constant velocity perpendicular to the line of motion of A. If at t = t_0, A just escapes being hit by B, t_0 in seconds is



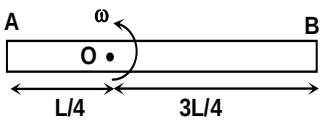
6. There is a rectangular plate of mass M kg of dimensions (a × b). The plate is held in horizontal position by striking n small balls each of mass m per unit area per unit time. These are striking in the shaded half region of the plate. The balls are colliding elastically with velocity v = (2.5×k)m/s. Find k.
It is given n = 100, M = 3 kg, m = 0.01 kg; b = 2 m; a = 1 m; g = 10 m/s^2.



7. Consider two metallic spheres each of radius R separated by a large distance and connected with a battery of emf ε as shown in the figure. In the electrical equilibrium the charges on the spheres are +q and −q. If q = k($2\pi\varepsilon_0 R\varepsilon$), then the value of k is …….



8. A metal rod AB of length L rotates with a constant angular velocity ω about an axis pasing through O and normal to its length. The magnitide of emf induced between ends A and B in the absence of external magnetic field is $\frac{mL^2\omega^2}{ke}$. Here m is mass of electron and e is charge on electron. Find the value of k.



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