FIITJEE INTERNAL Phase Test

BATCHES – Class – XII (CTY426 Batches)

PHYSICS, CHEMISTRY & MATHEMATICS

QP CODE: 100982 **RIT – 2**

Time Allotted: 3 Hours **Maximum Marks: 180**

- 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.

INSTRUCTIONS

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

1. Attempt ALL the questions. Answers have to be marked on the OMR sheets.
2. This question paper contains **Three Sections.**
3. **Section-I** is Physics, **Section-II** is Chemistry and **Section-III** is Mathematics.
4. All the section can be filled in **PART-A & B** of OMR.
5. Rough spaces are provided for rough work inside the question paper. No additional sheets will be provided for rough work.
6. 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 ***Blue/Black Ball Point Pen*** 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 Two Parts.

(i) **PART–A** (**01–03)** contains **(3)** Multiple Choice Questions which have **One or More Than One Correct** answer.
Full Marks: **+4** If only the bubble(s) corresponding to all the correct options(s) is (are) darkened.
Partial Marks: **+1** For darkening a bubble corresponding **to each correct option,** provided NO incorrect option is darkened.
Zero Marks: **0** If none of the bubbles is darkened.
***Negative Marks*: –1 In all other cases.**
For example, if **(A), (C) and (D)** are all the correct options for a question, darkening all these three will result in **+4 marks**; darkening only **(A) and (D)** will result in **+2 marks**; and darkening **(A) and (B)** will result in **–1** marks, as a wrong option is also darkened.

(ii) **Part-A (04-07) –** Contains Four (04) multiple choice questions which have ONLY ONE CORRECT answer Each question carries **+3 marks** for correct answer and **-1 marks** for wrong answer.

(iii) **Part-A (08-11) –** This section contains Four (04) Matching List Sets. Each set has **ONE** Multiple Choice Question. Each set has **TWO** lists: **List-I** and **List-II**. **List-I** has **Four** entries (P), (Q), (R) and (S) and **List-II** has **Five** entries (1), (2), (3), (4) and (5). **FOUR** options are given in each Multiple Choice Question based on **List-I** and **List-II** and **ONLY ONE** of these four options satisfies the condition asked in the Multiple Choice Question. Each question carries **+3 Marks** for correct answer and **-1 marks** for wrong answer.

(iii) **Part-B (01-06)** This section contains **SIX (06)** questions. The answer to each question is a **NON-NEGATIVE INTEGER**. For each question, enter the correct integer corresponding to the answer. Each question carries **+4 marks** for correct answer. **There is no negative marking.**

Name of the Candidate: _____

Batch: _____ **Date of Examination:** _____

Enrolment Number: _____

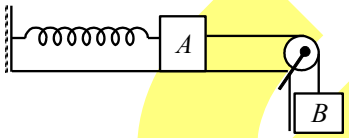
SECTION – I : PHYSICS

(PART – A)

(One or More Than One Options Correct Type)

This section contains **3 multiple choice questions.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONE** or **MORE THAN ONE is correct.**

1. In the adjoining figure block *A* is of mass *m* and block *B* is of mass 2m. The spring has a force constant *k*. All the surfaces are smooth and the system is released from rest with spring unstretched



(A) The maximum extension of the spring is $\frac{4mg}{k}$

(B) The speed of block *A* when extension in spring is $\frac{2mg}{k}$, is $2g\sqrt{\frac{2m}{3k}}$

(C) Net acceleration of block *B* when the extension in the spring is maximum, is $\frac{2}{3}g$.

(D) Tension in the thread for extension of $\frac{2mg}{k}$ in spring is *mg*.

2. A particle of mass 5 *kg* moving in the *X*-*Y* plane has its potential energy given by $U=(-7x+24y)$ Joule. The particle is initially at origin and has velocity $\vec{u}=(14.4\hat{i}+4.2\hat{j})$ *m*/*s*

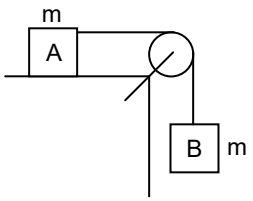
(A) the particle has speed 25 *m*/*s* at $t=4\,\text{sec}$

(B) the particle has an acceleration $5\ \text{m/s}^2$

(C) the acceleration of particle is normal to its initial velocity

(D) none of these

3. In the shown arrangement the blocks are released from rest and allowed to move through a distance of h. There is no friction and the string is light. Then



(A) total mechanical energy of the system is not conserved since besides gravity tension also does work on each of the blocks.

(B) work done by tension on each block is separately zero.

(C) work done by tension on block A is positive and on block B it is negative.

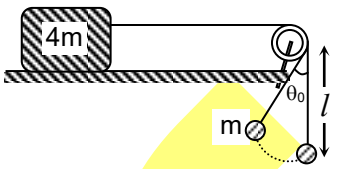
(D) total mechanical energy is conserved.

Space For Rough Work

(Single Correct Answer Type)

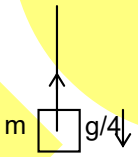
This section contains **4 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE is correct.**

4. Two bodies of masses *m* and 4 *m* are attached with string as shown in the figure. The body of mass *m* hanging from a string of length *l* is executing oscillations of angular amplitude θ_0, while the other body is at rest. The minimum coefficient of friction between the mass 4 *m* and the horizontal surface should be



(A) $\left(\frac{2-\cos\theta_0}{3}\right)$ (B) $2\cos^2\left(\frac{\theta_0}{2}\right)$ (C) $\left(\frac{1-\cos\theta_0}{2}\right)$ (D) $\left(\frac{3-2\cos\theta_0}{4}\right)$

5. The work done by tension in lowering down a block of mass = m kg through a distance 'd' is



(A) $mg\frac{d}{4}$ (B) $3mg\frac{d}{4}$

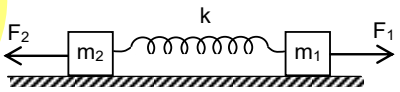
(C) $-3mg\frac{d}{4}$ (D) mgd

6. A force F = -k(yi + xj) acts on a particle moving in xy plane. Starting from the origin, the particle is taken along the positive x axis to the point (a, 0) and than parallel to the y-axis to the point (a, a). the total work done by the force F on the particle is

(A) $-2ka^2$ (B) $2ka^2$

(C) $-ka^2$ (D) ka^2

7. Two blocks of masses m_1 and m_2 are connected with a spring of string constant k. They are kept on a smooth horizontal surface as shown in figure. Initially, the blocks are at rest and the spring is unstretched. If the blocks are pulled by forces F_1 and F_2 as shown in figure, then maximum extension in the spring will be



(A) $\frac{F_1m_1+F_2m_2}{K(m+m_2)}$ (B) $\frac{F_1m_2+F_2m}{K(m+m_2)}$

(C) $2\frac{F_1m_2+F_2m_1}{K(m_1+m_2)}$ (D) $\frac{F_1m_1+F_2m_2}{2K(m_1+m_2)}$

Space For Rough Work

(Matching List Sets)

This section contains **FOUR (04)** Matching List Sets. Each set has **ONE** Multiple Choice Question. Each set has **TWO** lists: **List-I** and **List-II**. **List-I** has **Four** entries (P), (Q), (R) and (S) and **List-II** has **Five** entries (1), (2), (3), (4) and (5). **FOUR** options are given in each Multiple Choice Question based on **List-I** and **List-II** and **ONLY ONE** of these four options satisfies the condition asked in the Multiple Choice Question.

8. When a body is moving vertically up with constant velocity, then match the following:

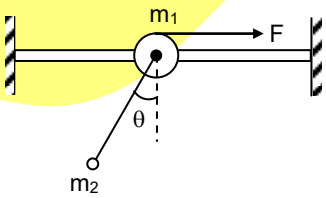
List-I		List-II	
(P)	Work done by lifting force is	(1)	negative
(Q)	Total work done by all the forces is	(2)	positive
(R)	Work done by gravity	(3)	zero
(S)	Work done by lifting force + work done by gravity force	(4)	Many positive values
		(5)	Many negative values

The correct option is:

(A) P → 2 ; Q → 3 ; R → 5 ; S → 1 (B) P → 2 ; Q → 3 ; R → 1 ; S → 3

(C) P → 4 ; Q → 5 ; R → 2 ; S → 3 (D) P → 3 ; Q → 1 ; R → 4 ; S → 2

9. A horizontal force F pulls a ring of mass m_1 such that θ remains constant with time. The ring is constrained to move along a smooth rigid horizontal wire. A bob of mass m_2 hangs from m_1 by an inextensible light string. Then match the entries of List-I with that of List-II.



List-I		List-II	
(P)	F	(1)	$(m_1 + m_2)\, g$
(Q)	Force acing on m_2 is	(2)	$m_2 g \sec\theta$
(R)	Tension in the string is	(3)	$m_2 \dfrac{F}{m_1 + m_2}$
(S)	Force acting on m_1 by the wire is	(4)	$(m_1 + m_2)\, g \tan\theta$
		(5)	$m_1 g \sec\theta$

The correct option is:

(A) P → 4 ; Q → 3 ; R → 2 ; S → 1 (B) P → 4 ; Q → 3 ; R → 1 ; S → 5

(C) P → 3 ; Q → 4 ; R → 2 ; S → 1 (D) P → 2 ; Q → 1 ; R → 5 ; S → 3

Space For Rough Work

10. A man pushes a block of 30 kg along a level floor at a constant speed with a force directed at 45° below the horizontal. If the coefficient of friction is 0.20, then match the following.

List-I		List-II	
(P)	Work done by all forces exerted by the surface on the block in 20 m	(1)	zero
(Q)	Work done by the force of gravity	(2)	–1500 J
(R)	Work done by the man on the block in pushing it through 10 m	(3)	750
(S)	Net force on the block	(4)	30 J
		(5)	60 J

The correct option is:
(A) P → 2 ; Q → 1 ; R → 4 ; S → 3 (B) P → 4 ; Q → 2 ; R → 5 ; S → 3
(C) P → 2 ; Q → 1 ; R → 3 ; S → 1 (D) P → 3 ; Q → 5 ; R → 2 ; S → 1

11. A chain of length ℓ and mass m lies on the surface of a smooth sphere of radius R > ℓ with one end tied to the top of the sphere.

List-I		List-II	
(P)	Gravitational potential energy w.r.t. centre of the sphere	(1)	$\frac{Rg}{\ell}\left[1-\cos\left(\frac{\ell}{R}\right)\right]$
(Q)	The chain is released and slides down, its KE when it has slid by θ	(2)	$\frac{2Rg}{\ell}\left[\sin\left(\frac{\ell}{R}\right)+\sin\theta-\sin\left(\theta+\frac{\ell}{R}\right)\right]$
(R)	The initial tangential acceleration	(3)	$\frac{MR^2g}{\ell}\sin\left(\frac{\ell}{R}\right)$
(S)	The radial acceleration a_r	(4)	$\frac{MR^2g}{\ell}\left[\sin\left(\frac{\ell}{R}\right)+\sin\theta-\sin\left(\theta+\frac{\ell}{R}\right)\right]$
		(5)	$Rg\left[1-\sin\left(\frac{\ell}{R}\right)\right]$

The correct option is:
(A) P → 3 ; Q → 4 ; R → 2 ; S → 5 (B) P → 4 ; Q → 1 ; R → 3 ; S → 2
(C) P → 2 ; Q → 5 ; R → 3 ; S → 2 (D) P → 3 ; Q → 4 ; R → 1 ; S → 2

Space For Rough Work

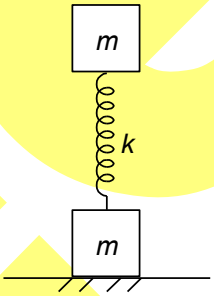
(PART – B)

(Non – Negative Integer)

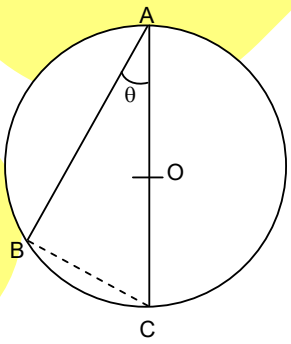
1. A particle of mass m is moving in a circular path of constant radius r(1m) such that it's centripetal acceleration a_c is varying with time t as $a_c = k^2rt^2$, where k is a constant, then power delivered to the particle by the forces acting on it at t = 5 sec. (take $mk^2 = 1$ unit)

2. An object is displaced from point A(1m, 2m, 3m) to a point B(2m, 3m, 4m) under a constant force $\vec{F} = \left(2\hat{i} + 3\hat{j} + 4\hat{k}\right)$N. Find the work done by this force in this process. (in joule)

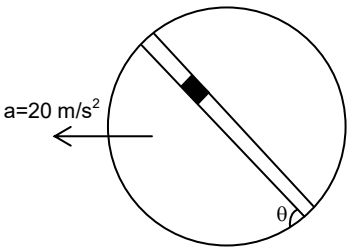
3. A system consists of two identical slabs each of mass m linked by compressed weightless spring of stiffness k as shown in Figure. The slabs are also connected by a thread, which is burnt at a certain moment. If the value of $\Delta\ell$ the initial compression of spring, the lower slab will bounce up after the thread is burned through is $\frac{x\,mg}{k}$, then find the value of 'x'.



4. A bead is free to slide down on a smooth wire tightly stretched between point A and B on a vertical circle of radius 10 m. Find the time taken(in s) by the bead to reach the point B, if the bead slide from rest from the highest point A on the circle. (take g = 10 m/s^2)



5. A circular disc with a groove along its diameter is placed horizontally. A block of mass 1kg is placed as shown. The co efficient of friction between the block and all surfaces of groove in contact is $\mu = \frac{2}{5}$. The disc has an acceleration of 20 m/s^2. Then acceleration of the block w.r.t disc will be in nearest integer.($\theta = 37^0$)



6. A block of mass 1 kg lies on a horizontal surface in a truck. The coefficient of static friction between the block and the surface is 0.6. If the acceleration of the truck is 5 m/s^2, then what frictional force acting on the block (in newton).

Space For Rough Work

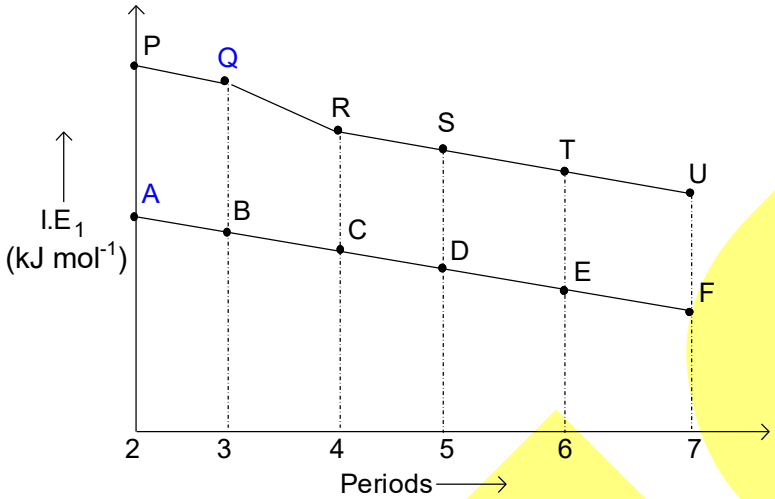
SECTION – II : CHEMISTRY

(PART – A)

(One or More Than One Options Correct Type)

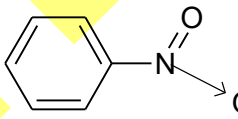
This section contains **3 multiple choice questions.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONE** or **MORE THAN ONE is correct.**

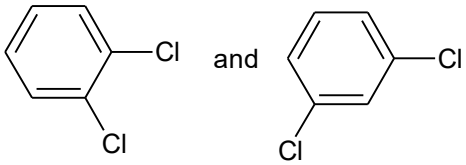
1.



The first ionization energies of the s-block elements are given above.
Choose the correct statements
(A) the second ionization energy of 'B' is higher than that of 'Q'.
(B) the sulphate of 'S' is more soluble in water than that of 'Q'.
(C) the iodide of 'A' is more soluble than that of 'E' in water.
(D) nitride of 'Q' has higher molar mass than that of 'A'.

2. In which of the following option(s), the dipole moment(s) of the left side molecule(s) is/are greater than that of the right side molecule(s)?

(A) Cis-$XeCl_2F_2$ and trans-$XeCl_2F_2$ (B)  and H_2O

(C) CH_3Cl and $CHCl_3$ (D) 

3. IF_2^+ (1), IF_2^- (2)
Which of the following is/are correct for the species (1) and (2)?
(A) Bond angle: 2 > 1 (B) % of s-character in I – F bond: 1 > 2
(C) Number of lone pairs: 1 > 2 (D) Dipole moment: 2 > 1

Space For Rough Work

(Single Correct Answer Type)

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

4. The % ionic character in a covalent bond A – B is expressed as:
% Ionic character = $16|\chi_A - \chi_B| + 3.5|\chi_A - \chi_B|^2$
χ_A = Electronegativity of A, χ_B = Electronegativity of B
The electronegativity values of F = 4, O = 3.5, N = 3 and C = 2.1.
Choose the correct statement from the following
(A) The % ionic character of OF_2 is 8.875.
(B) O_2 contains 80% of covalent character.
(C) % ionic character of NO is greater than CO.
(D) The C – C sigma bond in $CH_2 = CH_2$ is more ionic than the C – C sigma bond in $HC \equiv CH$

5.

Compounds	**Lattice energy in kJ mol^{-1}**
PF_2	2906
QF_2	2610
RF	703
SF	647
Ions	**Hydration energies in kJ mol^{-1}**
R^+	-413
S^+	-321
P^{2+}	-1920
Q^{2+}	-1650
F^-	-506

P, Q, R and S are s-block metals. The lattice energies of their fluorides and the hydration energy of their ions are given above. Which salt can be easily crystallized from its saturated solution?
(A) PF_2 (B) QF_2 (C) RF (D) SF

6. If the bond angles of $MF_2 = MCl_2 = MBr_2 = MI_2$ are identical and equal to 180°, which is M?
(A) Be (B) Mg (C) Ca (D) Sr

7. In the given substances carbon undergoes sp^3 hybridization. The covalent bond of which contains exactly 25% s-orbital character/
(A) CH_2F_2 (B) diamond (C) CF_2Cl_2 (D) $CHCl_3$

Space For Rough Work

(Matching List Sets)

This section contains **FOUR (04)** Matching List Sets. Each set has **ONE** Multiple Choice Question. Each set has **TWO** lists: **List-I** and **List-II**. **List-I** has **Four** entries (P), (Q), (R) and (S) and **List-II** has **Five** entries (1), (2), (3), (4) and (5). **FOUR** options are given in each Multiple Choice Question based on **List-I** and **List-II** and **ONLY ONE** of these four options satisfies the condition asked in the Multiple Choice Question.

8. Match the compounds mentioned in list-I with their characteristics mentioned in list-II.

List – I		List – II	
(P)	CO_2	(1)	The solid form exists as three dimensional network solid
(Q)	SO_2	(2)	Contains one unpaired electron on central atom
(R)	NO_2	(3)	Has linear structure
(S)	SiO_2	(4)	Central atom undergoes sp^2 hybridization
		(5)	Contains only sigma bonds

(A) P $\rightarrow$ 3; Q $\rightarrow$ 2; R $\rightarrow$ 4; S $\rightarrow$ 5
(B) P $\rightarrow$ 3; Q $\rightarrow$ 4; R $\rightarrow$ 2; S $\rightarrow$ 1
(C) P $\rightarrow$ 2; Q $\rightarrow$ 4; R $\rightarrow$ 3; S $\rightarrow$ 5
(D) P $\rightarrow$ 3; Q $\rightarrow$ 1; R $\rightarrow$ 4; S $\rightarrow$ 1

9. Match the compounds mentioned in list-I with their characteristics mentioned in list-II.

List – I		List – II	
(P)	COH_2	(1)	Has the smallest bond angle formed by only single bonds out of the four compounds
(Q)	COF_2	(2)	Highest dipole moment among the four compounds
(R)	$COCl_2$	(3)	The central atom bonded with second and third period elements
(S)	$COBr_2$	(4)	Contains the longest single bonds among the four compounds
		(5)	In the compound the single bonds contain maximum s-character of central atom

(A) P $\rightarrow$ 1; Q $\rightarrow$ 3; R $\rightarrow$ 2; S $\rightarrow$ 4
(B) P $\rightarrow$ 2; Q $\rightarrow$ 1; R $\rightarrow$ 3; S $\rightarrow$ 4
(C) P $\rightarrow$ 5; Q $\rightarrow$ 2; R $\rightarrow$ 3; S $\rightarrow$ 4
(D) P $\rightarrow$ 2; Q $\rightarrow$ 3; R $\rightarrow$ 1; S $\rightarrow$ 4

Space For Rough Work

10. Match the compounds mentioned in list-I with their characteristics mentioned in list-II.

List – I (Compound)		List – II (Reaction with H_2O)	
(P)	Mg_3N_2	(1)	A volatile acidic gas is produced
(Q)	KO_2	(2)	A basic gas is produced
(R)	$BeCl_2$	(3)	A neutral homonuclear gas is produced
(S)	CaC_2	(4)	A gas with molar mass 26 g mol^{-1} is produced
		(5)	A gas with molar mass 28 g mol^{-1} is produced

(A) P → 3; Q → 2; R → 1; S → 5
(B) P → 2; Q → 1; R → 3; S → 4
(C) P → 3; Q → 2; R → 5; S → 1
(D) P → 2; Q → 3; R → 1; S → 4

11. Match the homonuclear diatomic molecules mentioned in list-I with their characteristics mentioned in list-II.

List – I (Compound)		List – II (Reaction with H_2O)	
(P)	N_2	(1)	Bond order = 0.5
(Q)	O_2	(2)	Lowest energy differences between HOMO and LUMO
(R)	F_2	(3)	Loss of electrons from ground state increases stability
(S)	Be_2^+	(4)	Loss of electrons from ground state decreases stability
		(5)	Paramagnetic in ground state

(A) P → 4; Q → 3; R → 5; S → 1
(B) P → 4; Q → 2; R → 3; S → 1
(C) P → 3; Q → 4; R → 2; S → 1
(D) P → 4; Q → 3; R → 2; S → 1

(PART – B)

(Non – Negative Integer)

1. The number of valence electrons of a homonuclear diatomic molecule(X_2) is equal to twice the number of valence electrons of atom X. If X is a second period element and the number of valence electron of X_2 is 10. What is the bond order of X_2?

2. AB is a covalent compound. The A – B bond length is 2.3 pm and the covalent radius of A is 1.4 pm. The electronegative difference between A and B is 0.1. If the covalent radius of B in pm unit is x, what is the value of 10x?

Space For Rough Work

3. X^+ is the simplest group-1 cation which forms stable complex with 12 crown 4 ether.
If a = Atomic number of X
b = Coordination number of X
What is the value of (a + b)?

4. Both $BeCl_2$ and $Be(CH_3)_2$ forms polymers.
x = Maximum number of covalent bonds present around each Be atom in $BeCl_2$ polymer.
y = Coordination number of Be in $BeCl_2$ polymer + coordination number of Be in $Be(CH_3)_2$ polymer
z = Coordination number of carbon in $Be(CH_3)_2$ polymer
What is the value of (x + y + z)?

5. In interstitial hydrides of some 3d-transition series elements, the interaction takes place between H_2 molecules and metal atoms. The H_2 molecules can gain and donate electrons by the overlap of σ_{1s} and σ^*_{1s} molecular orbitals with the metal d-orbitals
If x = Number of electrons donated by one H_2 molecule.
and y = Number of electrons are gained by one H_2 molecule
What is the value of (x + y)?

6. The bond length of B – F bond in BF_3 is assumed to be 0.4 $\overset{\circ}{A}$. If the longest distance between any two fluorine atoms in the molecule is expressed as $\left(y\sqrt{3}\right)\overset{\circ}{A}$, what is the value of 10 y?

Space For Rough Work

SECTION – III: MATHEMATICS

(PART – A)

(One or More Than One Options Correct Type)

This section contains **3 multiple choice questions.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONE** or **MORE THAN ONE is correct.**

1. If a, b, c are real numbers such that $a^2 + 4b^2 - c^2 + 4ab = 0$, then the distance between any two lines in the family of lines $ax + by + c = 0$ can be

   (A) 2 (B) $\sqrt{13}$

   (C) $\sqrt{8}$ (D) 4

2. The area of the region bounded by the straight lines $x = K$, $x - 3y = 0$, $x + y = 2$ and by x – axis is $\frac{11}{32}$, then the value of K is/are

   (A) $\frac{9}{4}$ (B) $\frac{9}{2}$

   (C) $\frac{1}{16}$ (D) $\frac{-9}{4}$

3. Let L_1 be a straight line passing through the origin and L_2 be the straight line $x + y = 1$. If the intercepts made by the circle $x^2 + y^2 - x + 3y = 0$ on L_1 and L_2 are equal, then which of the following equations can represent L_1

   (A) $x + y = 0$ (B) $x - y = 0$

   (C) $x + 7y = 0$ (D) $x - 7y = 0$

(Single Correct Answer Type)

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

4. A light ray emerging from the point source placed at P(2, 3) is reflected at a point Q on the y – axis and then passes through the point R(5, 10). Coordinate of Q is:

   (A) (0, 3) (B) (0, 2)

   (C) (0, 5) (D) None of these

5. The equation of the circle passing through the point of intersection of the circles $x^2 + y^2 - 6x + 2y + 4 = 0$ and $x^2 + y^2 + 2x - 6y - 6 = 0$ and having its centre on $y = 0$ is

   (A) $2x^2 + 2y^2 - 8x + 3 = 0$ (B $3x^2 + 3y^2 - 6x + 2y = 0$

   (C) $x^2 + y^2 - 8x - y - 12 = 0$ (D) none of these

Space For Rough Work

6. If the lines $2x-3y+5=0, 9x-5y+14=0$ and $3x-7y+\lambda=0$ are concurrent, then the value of λ is equal to
(A) 7 (B) 8
(C) 10 (D) 9

7. Let P be the point (–3, 0) and Q be a moving point (0, 3t). Let PQ be trisected at R so that R is nearer to Q. RN is drawn perpendicular to PQ meeting the x-axis at N. The locus of the midpoint of RN is
(A) $(x + 3)^2 - 3y = 0$ (B) $(y + 3)^2 - 3x = 0$
(C) $x^2 - y = 1$ (D) $y^2 - x = 1$

(Matching List Sets)

This section contains **FOUR (04)** Matching List Sets. Each set has **ONE** Multiple Choice Question. Each set has **TWO** lists: **List-I** and **List-II**. **List-I** has **Four** entries (P), (Q), (R) and (S) and **List-II** has **Five** entries (1), (2), (3), (4) and (5). **FOUR** options are given in each Multiple Choice Question based on **List-I** and **List-II** and **ONLY ONE** of these four options satisfies the condition asked in the Multiple Choice Question.

8. Match each entry in List – I to the correct entries in List – II.
Each side of a square has lengths 4 units and its centre is at (3, 4). If one of the diagonal is parallel to the line if y = x, then match the following.

	List – I		List – II
(P)	Equation of one of the sides is	(1)	y – x = 1
(Q)	Equation of one of the diagonals is	(2)	y = 6
(R)	One of the vertices of the square is	(3)	x + y = 7
(S)	Midpoint of the one of the sides is	(4)	(1, 4)
		(5)	(1, 2)

(A) P→ (3); Q → (2) ; R→(1); S→(4)
(B) P→ (3); Q → (2) ; R→(5); S→(4)
(C) P→ (2); Q → (1) ; R→(5); S→(4)
(D) P→ (2); Q → (1) ; R→(1); S→(3)

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9. Match each entry in List – I to the correct entries in List – II.

	List – I		List – II
(P)	The value of K for which $x^2+y^2=4$ and $x^2+y^2-2x+2ky=k$ cut orthogonally is	(1)	–35
(Q)	The value of k for which the lines $2x-ky+3=0$, $4x+y+5=0$ cut axes in concyclic points is	(2)	5
(R)	The value of k so that length of tangent from origin to the circle $x^2+y^2-2x-4y-k=0$ is 2 units is	(3)	–4
(S)	The value of k so that length of chord made by line $3x+4y+k=0$, to the circle $x^2+y^2-10x=0$ is of length 6 is	(4)	–8
		(5)	0

(A) P→ (3); Q → (4) ; R→(3); S→(1)
(B) P→ (3); Q → (2) ; R→(5); S→(4)
(C) P→ (2); Q → (1) ; R→(4); S→(5)
(D) P→ (2); Q → (1) ; R→(1); S→(3)

10. Match each entry in List – I to the correct entries in List – II.

	List – I		List – II
(P)	If a circle passes through the points of intersection of the lines $2x - y + 1 = 0$ and $x - \lambda y - 3 = 0$ with the coordinate axes, then λ is	(1)	0
(Q)	A circle circumscribes a triangle whose sides are given by the joint equation $(x+y-4)(xy-2x-y+2)=0$. The diameter of the circle is equal to	(2)	1
(R)	The number of points on the circle $2x^2 + 2y^2 - 3x = 0$, which are at a distance 2 unit from the point (-2, 1) is equal to	(3)	$\sqrt{2}$
(S)	If the angle between the tangents drawn from the origin to the circle $(x-7)^2+(y+1)^2=25$ is $\frac{2\pi}{k}$, then k is	(4)	2
		(5)	4

(A) P→ (3); Q → (4) ; R→(3); S→(4)
(B) P→ (3); Q → (2) ; R→(5); S→(4)
(C) P→ (2); Q → (1) ; R→(4); S→(5)
(D) P→ (4); Q → (3) ; R→(1); S→(5)

Space For Rough Work

11. Match each entry in List – I to the correct entries in List – II.
Let C_1 and C_2 be 2 circles whose equations are $x^2+y^2-2x=0$ and $x^2+y^2+2x=0$ respectively. $P(\lambda, \lambda)$ is a variable point

	List – I		List – II
(P)	P lies inside C_1 but outside C_2	(1)	$\lambda \in (-\infty, -1) \cup (0, \infty)$
(Q)	P lies inside C_2 but outside C_1	(2)	$\lambda \in (-\infty, -1) \cup (1, \infty)$
(R)	P lies outside C_1 but inside C_2	(3)	$\lambda \in (-1, 0)$
(S)	P does not lie inside C_2	(4)	$\lambda \in (0, 1)$
		(5)	$\lambda \in (0, 1) \cup (1, 2)$

(A) P→ (3); Q → (2) ; R→(3); S→(4)
(B) P→ (3); Q → (2) ; R→(5); S→(4)
(C) P→ (4); Q → (3); R→(3); S→(1)
(D) P→ (2); Q → (1) ; R→(1); S→(3)

(PART – B)

(Non – Negative Integer)

1. The number of common tangents to the circle $x^2+y^2-4x-6x-12=0$ and $x^2+y^2+6x+18y+26=0$, is

2. If the straight lines ax + by + p = 0 and $x\cos\alpha+y\sin\alpha=p$ are inclined at an angle $\frac{\pi}{4}$ and concurrent with the straight line $x\sin\alpha-y\cos\alpha=0$, then $a^2 + b^2$ is :

3. If a line $3x+4y-\lambda=0$ lies between the circles $x^2+y^2-2x-2y+1=0$ and $x^2+y^2-18x-2y+78=0$ without touching or intersecting either circle, then the number of integral values 'λ' can assume is

4. If a straight line through $P(\sqrt{3}, 2)$ and inclined at an angle $\frac{\pi}{6}$ with x - axis meets the line $\sqrt{3}x-4y+8=0$ at Q, then $|PQ|$ is

5. Let C_1 and C_2 be the centre of the circle $x^2+y^2-2x-2y-2=0$ and $x^2+y^2-6x-6y+14=0$ respectively. If P and Q are the points of intersection of these circles, then the are (in sq. units) of the quadrilateral PC_1QC_2 is

6. Two circles in the first quadrant of radii r_1 and r_2 touch the coordinate axes. Each of them cuts off an intercept of 2 units with the line $x+y=2$. Then $r_1^2+r_2^2-r_1r_2$ is equal to

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FIITJEE INTERNAL TEST

BATCHES: Class – XII

Code: 100982

JEE ADVANCED LEVEL

ANSWER KEY

ANSWER KEYS

Physics

PART – A

1.	ABC	2.	ABC	3.	CD	4.	D
5.	C	6.	C	7.	C	8.	B
9.	A	10.	C	11.	D		

PART – B

1.	5	2.	9	3.	3	4.	2
5.	7	6.	5				

Chemistry

PART – A

1.	ACD	2.	ABCD	3.	AB	4.	A
5.	A	6.	A	7.	B	8.	B
9.	B	10.	D	11.	D		

PART – B

1.	3	2.	18	3.	7	4.	17
5.	4	6.	4				

Mathematics

PART – A

1.	ABCD	2.	AD	3.	BC	4.	C
5.	A	6.	C	7.	D	8.	C
9.	A	10.	D	11.	C		

PART – B

1.	3	2.	2	3.	8	4.	6
5.	4	6.	7				