

PHYSICS, CHEMISTRY & MATHEMATICS**QP CODE: 100779****Common Test-3****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.
- * In multiple choice questions the options are given as F,T,R & E which correspond to the options A,B,C & D respectively in the 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 (01-04)** – 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.
- (ii) **PART-A (05-07)** 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.
- (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: _____

**Forthcoming
Exam – FTRE on
15th Sept. 2024.****BATCH – NWCMSW425A1**

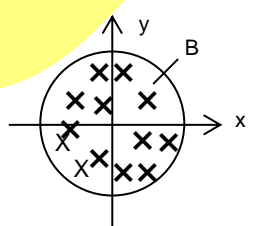
- * In multiple choice questions the options are given as F,T,R & E which correspond to the options A,B,C & D respectively in the OMR sheet.

SECTION – I: PHYSICS

(PART – A)

(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.

- In LCR series AC circuit, the voltage across each of the components L, C and R is 50 V rms. The voltage across the LC combination (rms) will be
 (F) 50 V (T) $50\sqrt{2}V$
 (R) 100 V (E) zero volt
 - A charged particle is thrown perpendicular to a uniform magnetic field only, then
 (F) it must move in a circular path. (T) it may not move on a circular path.
 (R) it must move on a straight path. (E) it may move on a straight path.
 - A loop is kept so that its centre lies at the origin of the coordinate system. A magnetic field has the induction B along z-axis as shown in the figure.
 (F) an e.m.f. and current will be induced in the loop if it rotates about the z-axis
 (T) no e.m.f. is induced and no current flows if the loop is a fiber when it rotates about y-axis
 (R) e.m.f. is induced and induced current flows in the loop if the loop is made of copper and is rotated about y-axis
 (E) if the loop moves about z-axis with constant velocity current flows in it
- 
- A positively charged (+q) particle of mass m has kinetic energy K enters vertically downward in a horizontal field of magnetic induction \vec{B} . The acceleration of the particle is (neglect gravity)
 (F) $qB\sqrt{\frac{2K}{m}}$ (T) $\frac{qB\sqrt{2K}}{(m)^{3/2}}$
 (R) $\frac{2qB}{(m)^{3/2}}\sqrt{2K}$ (E) $2qB\sqrt{\frac{2K}{m}}$

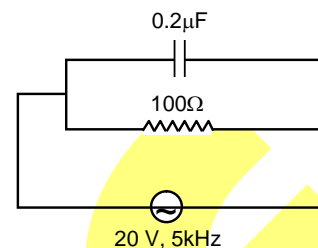
Space For Rough Work

(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**.

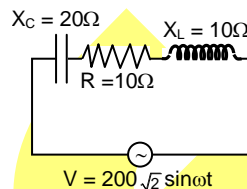
5. A single generator supplies a sine wave of 20V (V_{rms}), 5kHz to the circuit shown in the figure. Then

- (F) the rms current in the resistive branch is 0.2 A
 (T) the rms current in the capacitive branch is 0.1256 A
 (R) the rms current through source is 0.2361 A
 (E) current in both the branches is same



6. In the LCR circuit shown in figure:

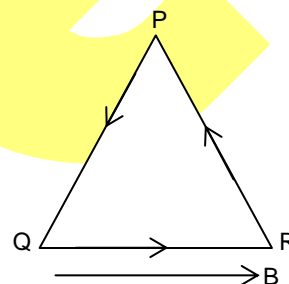
- (F) current will lead the voltage
 (T) rms value of current is 20 A
 (R) power factor of the circuit is $\frac{1}{\sqrt{2}}$
 (E) voltage drop across resistance is 100 V



7. An equilateral triangular loop PQR of side l carries currents i in the direction shown. The loop is kept in uniform magnetic field B , directed parallel to the base of triangle QR as shown. Net force F and torque τ acting on loop is

- (F) $F = 0$
 (R) $\tau = 0$

- (T) $F = \sqrt{3} i l B$
 (E) $\tau = \frac{\sqrt{3} l^2 i B}{4}$

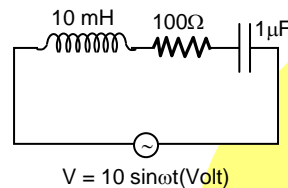


Space For Rough Work

(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. Referring to the given circuit, match List-I with List-II:



List-I		List-II	
(P)	For $\omega = 8000$ rad/s	(1)	Peak current in the circuit is less than 0.1 A
(Q)	For $\omega = 10000$ rad/s	(2)	Voltage across the combination and the current are in same phase
(R)	For $\omega = 10500$ rad/s	(3)	Voltage across the combination leads the current
(S)	For $\omega = 10000$ rad/s, if $R = 50 \Omega$ instead of 100Ω	(4)	Current through the circuit leads the voltage across it

The correct option is:

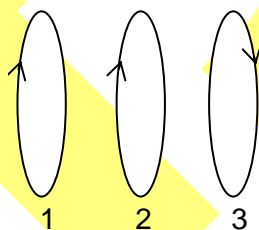
(F) P \rightarrow 1,3 ; Q \rightarrow 3 ; R \rightarrow 4 ; S \rightarrow 2

(T) P \rightarrow 1,4 ; Q \rightarrow 2 ; R \rightarrow 1,3 ; S \rightarrow 2

(R) P \rightarrow 1,2 ; Q \rightarrow 4 ; R \rightarrow 2 ; S \rightarrow 3

(E) P \rightarrow 3,4 ; Q \rightarrow 4 ; R \rightarrow 1,4 ; S \rightarrow 2

9. Three coils are placed in front of each other as shown. Current in 1 and 2 are in same direction while that in 3 is in opposite direction. Match the following



List-I		List-II	
(P)	When current in 1 is increased	(1)	Current in 1 will increase
(Q)	When current in 2 is increased	(2)	Current in 2 will increase
(R)	When current in 3 is increased	(3)	Current in 3 will increase
(S)	When current in 1 is decreased	(4)	Current in 2 will decrease
		(5)	Current in 3 will decrease

The correct option is:

(F) P \rightarrow 3,4 ; Q \rightarrow 3 ; R \rightarrow 1,2 ; S \rightarrow 2,5

(T) P \rightarrow 2,3 ; Q \rightarrow 4 ; R \rightarrow 1 ; S \rightarrow 1,5

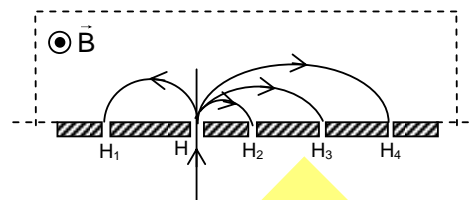
(R) P \rightarrow 3,4 ; Q \rightarrow 5 ; R \rightarrow 2,4 ; S \rightarrow 1,5

(E) P \rightarrow 2,3 ; Q \rightarrow 5 ; R \rightarrow 4 ; S \rightarrow 3,4

Space For Rough Work

10. Match list-I to list-II.

Figure shows a region containing uniform magnetic field \vec{B} in the direction shown. Four charged particles P, Q, R & S enter through a hole H normal to \vec{B} with same velocity \vec{v} . There are four other holes H_1 , H_2 , H_3 and H_4 used as charge separators. P comes out through H_1 , Q through H_2 , R through H_3 and S through H_4 . Then (field is within the box shown)

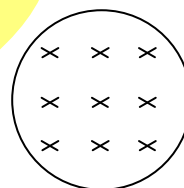
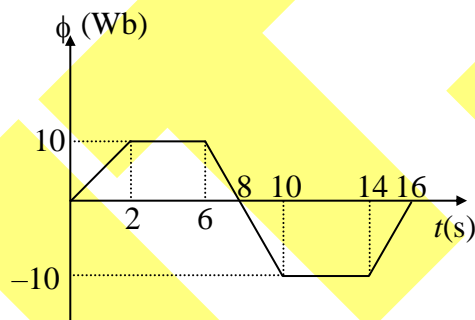


List-I		List-II	
(P)	The negative charge(s) must be	(1)	P
(Q)	Amongst Q, R & S the specific charge is maximum for	(2)	Q
(R)	The speeds of all the particles when they come out of the field will be same for	(3)	R
(S)	The time taken by the particles to come out of the field will be maximum for	(4)	S

The correct option is:

- (F) $P \rightarrow 2$; $Q \rightarrow 1$; $R \rightarrow 2,3,4$; $S \rightarrow 3$ (T) $P \rightarrow 1$; $Q \rightarrow 2$; $R \rightarrow 1,3$; $S \rightarrow 2$
 (R) $P \rightarrow 1$; $Q \rightarrow 2$; $R \rightarrow 1,2,3,4$; $S \rightarrow 4$ (E) $P \rightarrow 1$; $Q \rightarrow 2$; $R \rightarrow 1,2$; $S \rightarrow 3$

11. Magnetic flux in a circular coil of resistance 10Ω and radius $7/44\text{m}$ changes with time as shown in figure. \otimes direction indicates a direction perpendicular a paper inwards. Match the following table.



List-I		List-II	
(P)	At 1s induced current is (in A)	(1)	Clockwise
(Q)	At 7s induced current is (in A)	(2)	anticlockwise
(R)	At 1s induced electric field at circumference is (in N/C)	(3)	5
(S)	Maximum induced emf in coil within $t = 16\text{s}$ (in volt)	(4)	0.5

The correct option is:

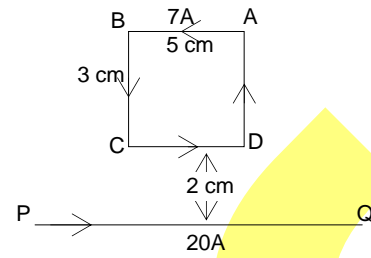
- (F) $P \rightarrow 2,4$; $Q \rightarrow 1,4$; $R \rightarrow 1,3$; $S \rightarrow 4$ (T) $P \rightarrow 1,3$; $Q \rightarrow 4$; $R \rightarrow 2,3$; $S \rightarrow 3$
 (R) $P \rightarrow 2,4$; $Q \rightarrow 1,4$; $R \rightarrow 2,3$; $S \rightarrow 3$ (E) $P \rightarrow 1,4$; $Q \rightarrow 3$; $R \rightarrow 2,4$; $S \rightarrow 2$

Space For Rough Work

(PART – B)

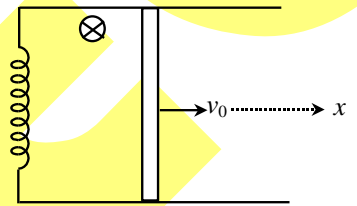
(Non – Negative Integer)

1. A small rectangular loop of sides 5.0 cm and 3.0 cm carries a current of 0.5A. It is placed with its longer side parallel to a long straight conductor of length 5.0 m at a distance of 2 cm from it. If current in the long conductor is 20 A, find the net force (in micro N) on the loop.

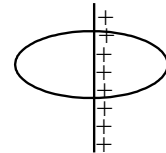


2. When a charged particle is projected in a magnetic field of $(7\hat{i} - 3\hat{j}) \times 10^{-3}$ T, the acceleration of the particle is found to be $(n\hat{i} + 7\hat{j}) \times 10^{-6}$ m/s². Find the value of 'n'.

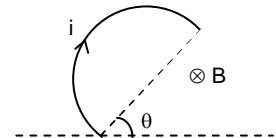
3. A loop is formed by two parallel conductors connected by a solenoid with inductance $L = 2$ H and a conducting rod of mass $m = 8$ kg which can freely (without friction) slide over the conductors. The conductors are located in a horizontal plane and in a uniform vertical magnetic field $B = \pi$ T. The distance between the conductors is $l = 2$ m. At the moment $t = 0$, the rod is imparted on initial velocity $V_0 = 2$ m/s directed to the right. Find the minimum time (in second) in which it will come to initial position if the resistance of loop is negligible.



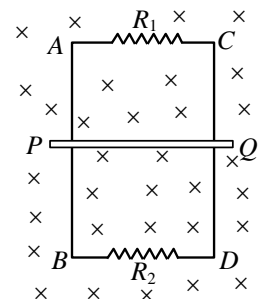
4. A very long uniformly charged rod falls with a constant velocity $V = 5$ m sec⁻¹ through the center of a circular loop of radius $R = 2$ m. Find the magnitude of induced emf (in volt) in the loop. (charge per unit length of rod = 2 C m⁻¹)



5. A semicircular ring of radius R carrying current i is placed in a magnetic field of intensity B so that plane of wire is perpendicular to magnetic field as shown. Net force acting on the ring is $KBiR$. Find the value of K .



6. Two parallel vertical metallic rails AB and CD are separated by 1 m. They are connected at the two ends by resistances R_1 and R_2 as shown. A horizontal metallic bar PQ of mass 0.2 kg slides without friction, vertically down the rails under the action of gravity. There is uniform horizontal magnetic field of 0.6 T perpendicular to plane of the rails. It is observed that when the terminal velocity attained, the power dissipated in R_1 and R_2 are 0.76 W and 1.2 W respectively. Find the terminal velocity of bar in m/s. ($g = 9.8$ m/s²)



Space For Rough Work

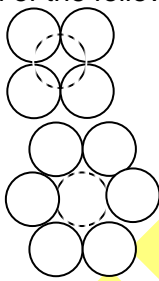
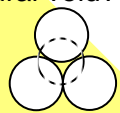
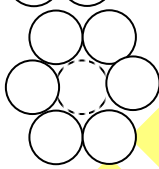
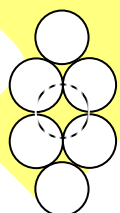
- * In multiple choice questions the options are given as F,T,R & E which correspond to the options A,B,C & D respectively in the OMR sheet.

SECTION - II : CHEMISTRY

(PART - A)

(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.

- If for a particular solution, $\Delta T_f = 0.73^\circ\text{C}$, $K_f = 5.028 \text{ K Kg/mole}$, what is the molality of the solution?
 (F) 0.1452 (T) 23.76
 (R) 132.6 (E) 0.8766
- For the coagulation of a negative sol, the species below, that has the highest flocculating power is
 (F) Ba^{2+} (T) PO_4^{3-}
 (R) SO_4^{2-} (E) Na^+
- Which of the following figure represents a tetrahedral void?
 (F)  (T) 
 (R)  (E) 
- Which of the following does not contain S -S bond?
 (F) $\text{H}_2\text{S}_2\text{O}_3$ (T) $\text{H}_2\text{S}_2\text{O}_7$
 (R) $\text{H}_2\text{S}_2\text{O}_4$ (E) $\text{H}_2\text{S}_2\text{O}_5$

(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.

- Mixture(s) showing positive deviation from Raoult's law at 35°C is(are)
 (F) carbon tetrachloride + methanol (T) carbon disulphide + acetone
 (R) benzene + toluene (E) phenol + aniline

Space For Rough Work

6. Benzene and naphthalene form an ideal solution at room temperature. For the process, the true statement(s) is(are)
- (F) ΔG is positive (T) ΔS_{system} is positive
 (R) $\Delta S_{\text{surroundings}} = 0$ (E) $\Delta H = 0$
7. The density of KBr is 2.75 g/cc. The length of the unit cell is 654 pm. Atomic mass of K is 39 and Br is 80. Then, what is true about the predicted nature of solid.
- (F) unit cell is fcc
 (T) $Z = 4$
 (R) there are four constituents(per unit cells)
 (E) there are 1 Br^- ions at corners and 3 Br^- at the centres of the faces per unit cell

(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 reactions (in the given stoichiometry of the reactants) in List-I with one of their products given in List-II and choose the correct option.

List - I		List - II	
(P)	$\text{P}_2\text{O}_3 + 3\text{H}_2\text{O} \rightarrow$	(1)	$\text{P}(\text{O})(\text{OCH}_3)\text{Cl}_2$
(Q)	$\text{P}_4 + 3\text{NaOH} + 3\text{H}_2\text{O} \rightarrow$	(2)	H_3PO_3
(R)	$\text{PCl}_5 + \text{CH}_3\text{COOH} \rightarrow$	(3)	PH_3
(S)	$\text{H}_3\text{PO}_2 + 2\text{H}_2\text{O} + 4\text{AgNO}_3 \rightarrow$	(4)	POCl_3
		(5)	H_3PO_4

(F) $\text{P} \rightarrow 2$; $\text{Q} \rightarrow 3$; $\text{R} \rightarrow 1$; $\text{S} \rightarrow 5$ (T) $\text{P} \rightarrow 3$; $\text{Q} \rightarrow 5$; $\text{R} \rightarrow 4$; $\text{S} \rightarrow 2$ (R) $\text{P} \rightarrow 5$; $\text{Q} \rightarrow 2$; $\text{R} \rightarrow 1$; $\text{S} \rightarrow 3$ (E) $\text{P} \rightarrow 2$; $\text{Q} \rightarrow 3$; $\text{R} \rightarrow 4$; $\text{S} \rightarrow 5$

9. Match List -I with List-II.

List - I (Molecules ions)		List - II (No. of lone pairs of electron on central atom)	
(P)	IF_7	(1)	Three
(Q)	ICl_4	(2)	One
(R)	XeF_6	(3)	Two
(S)	XeF_2	(4)	Zero
		(5)	Four

(F) $\text{P} \rightarrow 4$; $\text{Q} \rightarrow 1$; $\text{R} \rightarrow 2$; $\text{S} \rightarrow 3$ (T) $\text{P} \rightarrow 2$; $\text{Q} \rightarrow 1$; $\text{R} \rightarrow 4$; $\text{S} \rightarrow 3$ (R) $\text{P} \rightarrow 2$; $\text{Q} \rightarrow 3$; $\text{R} \rightarrow 4$; $\text{S} \rightarrow 1$ (E) $\text{P} \rightarrow 4$; $\text{Q} \rightarrow 3$; $\text{R} \rightarrow 2$; $\text{S} \rightarrow 1$

Space For Rough Work

10. Match List –I with List-II.

List – I		List – II	
(P)	Physisorption	(1)	Single layer adsorption
(Q)	Chemisorption	(2)	Heat of adsorption = 20 – 40 kJ mol ⁻¹
(R)	$N_2(g) + 3H_2(g) \xrightarrow{Fe(S)} 2NH_3(g)$	(3)	Chromatography
(S)	Analytical application of adsorption	(4)	Heterogeneous catalysis
		(5)	Homogeneous catalysis

(F) P → 3; Q → 4; R → 1; S → 2

(T) P → 2; Q → 3; R → 1; S → 4

(R) P → 2; Q → 1; R → 4; S → 3

(E) P → 4; Q → 2; R → 3; S → 1

11. Match the lists

List – I		List – II	
(P)	Saturated solution	(1)	Solution having same osmotic pressure at a given temperature as that of given solution
(Q)	Isotonic solution	(2)	A solution whose osmotic pressure is less than that of another
(R)	Hypotonic solution	(3)	A solution which contains maximum amount of solute that can be dissolved in a given amount of solvent at a given temperature
(S)	Solid solution	(4)	A solution whose osmotic pressure is more than that of another
		(5)	A solution in solid phase

(F) P → 3; Q → 1; R → 2; S → 5

(T) P → 1; Q → 3; R → 5; S → 2

(R) P → 1; Q → 3; R → 2; S → 5

(E) P → 5; Q → 1; R → 2; S → 3

(PART – B)**(Non – Negative Integer)**

- An ideal solution was found to have a vapour pressure of 80 torr when the mole fraction of a non-volatile solute was 0.2. What would be the vapour pressure of the pure solvent(in torr) at the same temperature?
- 1%(wt/vol) solution of urea is isotonic with 3%(wt/vol) solution of a non-electrolytic solution. The mol. wt of solute (in g/mol) is
- The number of lone pairs on Xe in XeOF₂ is
- Number of P – O – P bonds in P₄O₁₀ is
- In a metal M having BCC arrangement edge length of the unit cell is 400 pm. The atomic radius of the metal(in ppm) is ($\sqrt{3} = 1.73$)
- How many effective no. of atom(s) is/are present in a simple cubic unit cell of a metal crystal?

Space For Rough Work

- * In multiple choice questions the options are given as F,T,R & E which correspond to the options A,B,C & D respectively in the OMR sheet.

SECTION – III : MATHEMATICS

(PART – A)

(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.

1. The equation of a circle passing through (1, 1) and touching y – axis at 4 units above the origin is
 (F) $x^2 + y^2 + 16x - 16 = 0$ (T) $x^2 + y^2 + 26x + 2y + 24 = 0$
 (R) $x^2 + y^2 + 10x - 2y - 8 = 0$ (E) $x^2 + y^2 - 10x - 8y + 16 = 0$
2. The coordinates of midpoint of the chord $2x - 5y + 18 = 0$ cut off by the circle $x^2 + y^2 - 6x + 2y - 54 = 0$ are
 (F) (1, 4) (T) (2, 4)
 (R) (4, 1) (E) (1, 1)
3. The locus of mid points of the chords of the circle $x^2 - 2x + y^2 - 2y + 1 = 0$ which are of unit length is
 (F) $(x - 1)^2 + (y - 1)^2 = \frac{3}{4}$ (T) $(x - 1)^2 + (y - 1)^2 = 2$
 (R) $(x - 1)^2 + (y - 1)^2 = 4$ (E) none of these
4. The common tangent to the circles $x^2 + y^2 = 4$ and $x^2 + y^2 + 6x + 8y - 24 = 0$ also passes through the point
 (F) (-4, 6) (T) (6, -2)
 (R) (-6, 4) (E) (4, -2)

(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.

5. The equations of the common tangents to the parabola $y^2 = 8x$ and $x^2 + y^2 - 12x + 4 = 0$ are:
 (F) $y = x + 2$ (T) $y = -x - 2$
 (R) $y = -x + 2$ (E) $y = x - 2$

Space For Rough Work

6. The line $3x + 2y = 24$ meets the y - axis at A and the x - axis at B. C is a point on the perpendicular bisector of AB such that the area of the triangle ABC is 91 sq. units. The coordinates of C are
- (F) $\left(\frac{29}{2}, -1\right)$ (T) $\left(\frac{29}{2}, 13\right)$
 (R) $\left(\frac{-13}{2}, \frac{-3}{2}\right)$ (E) $\left(\frac{-13}{2}, 13\right)$
7. If $ax^2 - 6xy + y^2 + bx + cy + d = 0$ is pair of lines whose slopes are m and m^2 then a is /are
- (F) $a = -8$ (T) $a = 8$
 (R) $a = 27$ (E) $a = -27$

(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. Consider the lines represented by equation $(x^2 + xy - x) \times (x - y) = 0$, forming a triangle. Then match the following

	List - I		List - II
(P)	Orthocentre of triangle	(1)	$\left(\frac{1}{6}, \frac{1}{2}\right)$
(Q)	Circumcentre	(2)	$\left(\frac{1}{2+2\sqrt{2}}, \frac{1}{2}\right)$
(R)	Centroid	(3)	$\left(0, \frac{1}{2}\right)$
(S)	Incentre	(4)	$\left(\frac{1}{2}, \frac{1}{2}\right)$
		(5)	$\left(\frac{1}{3}, \frac{1}{3}\right)$

- (F) P → (4); Q → (3); R → (1); S → (2) (T) P → (2); Q → (4); R → (1); S → (2)
 (R) P → (2); Q → (1); R → (4); S → (3) (E) P → (3); Q → (4); R → (2); S → (3)

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9. Let C_1 and C_2 be two circles whose equations are $x^2 + y^2 - 2x = 0$ and $x^2 + y^2 + 2x = 0$. $P(\lambda, \lambda)$ is a variable point. Then match the following.

	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 outside C_2	(3)	$\lambda \in (-1, 0)$
(S)	P does not lie inside C_2	(4)	$\lambda \in (0, 1)$
		(5)	$(-1, -1)$

- (F) $P \rightarrow (2); Q \rightarrow (4); R \rightarrow (1); S \rightarrow (3)$ (T) $P \rightarrow (2); Q \rightarrow (4); R \rightarrow (1); S \rightarrow (2)$
 (R) $P \rightarrow (4); Q \rightarrow (3); R \rightarrow (2); S \rightarrow (1)$ (E) $P \rightarrow (3); Q \rightarrow (4); R \rightarrow (2); S \rightarrow (3)$

10. $(3, 0)$ is the point from which three normals are drawn to the parabola $y^2 = 4x$ which meet the parabola in the points P, Q and R. Then

	List - I		List - II
(P)	Area of ΔPQR	(1)	2
(Q)	Radius of circumcircle of ΔPQR	(2)	$\frac{5}{2}$
(R)	Centroid of ΔPQR	(3)	$\left(\frac{5}{2}, 0\right)$
(S)	Circumcentre of ΔPQR	(4)	$\left(\frac{2}{3}, 0\right)$
		(5)	$\left(-\frac{2}{3}, \frac{2}{3}\right)$

- (F) $P \rightarrow (2); Q \rightarrow (4); R \rightarrow (1); S \rightarrow (3)$ (T) $P \rightarrow (2); Q \rightarrow (4); R \rightarrow (1); S \rightarrow (2)$
 (R) $P \rightarrow (2); Q \rightarrow (1); R \rightarrow (4); S \rightarrow (3)$ (E) $P \rightarrow (1); Q \rightarrow (2); R \rightarrow (4); S \rightarrow (3)$

11. $A(-2, 0)$ and $B(2, 0)$ are the two fixed points and P is a point such that $PA - PB = 2$. Let S be the circle $x^2 + y^2 = r^2$, then match the following.

	List - I		List - II
(P)	If $r = 2$, then the number of points P satisfying $PA - PB = 2$ and lying on $x^2 + y^2 = r^2$ is	(1)	2
(Q)	If $r = 1$, then the number of points satisfying $PA - PB = 2$ and lying on $x^2 + y^2 = r^2$ is	(2)	4
(R)	For $r = 2$ the number of common tangents is	(3)	0
(S)	For $r = \frac{1}{2}$ the number of common tangents is	(4)	1
		(5)	-2

- (F) $P \rightarrow (2); Q \rightarrow (4); R \rightarrow (1); S \rightarrow (3)$ (T) $P \rightarrow (1); Q \rightarrow (4); R \rightarrow (3); S \rightarrow (1)$
 (R) $P \rightarrow (2); Q \rightarrow (1); R \rightarrow (4); S \rightarrow (3)$ (E) $P \rightarrow (3); Q \rightarrow (4); R \rightarrow (2); S \rightarrow (3)$

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(PART – B)**(Non – Negative Integer)**

1. Length of common chord of circle $(x-1)^2 + (y+1)^2 = 11$ and $(x+1)^2 + (y-1)^2 = 11$ is _____
2. If the normal from the point $P(h, 1)$ on the ellipse $\frac{x^2}{6} + \frac{y^2}{3} = 1$ is perpendicular to the line $x + y = 8$, then the value of h^2 is _____
3. If $\left(m_i, \frac{1}{m_i}\right), m_i > 0, i = 1, 2, 3, 4$ are four distinct points on a circle, then $m_1 m_2 m_3 m_4 =$ _____
4. If the point $P(2, -2)$ is the one end of the focal chord PQ of the parabola $y^2 = 2x$ then the slope of the tangent at Q is _____
5. Area of triangle formed by the lines $x + y = 3$ and angle bisectors of the pair of straight lines $x^2 - y^2 + 2y - 1 = 0$ is _____
6. The radius of circle which passes through the focus of the parabola $x^2 = 4y$ and touches it at point $(6, 9)$ is $k\sqrt{10}$, then k is equal to? _____

Space For Rough Work

FIITJEE INTERNAL TEST

BATCH – NWCMSW425A1

Common Test – 3

Code: 100779

JEE ADVANCED LEVEL

ANSWER KEY

ANSWER KEYS

Physics

PART – A

- | | | | |
|--------|-------|-------|------|
| 1. E | 2. F | 3. R | 4. T |
| 5. FTR | 6. FR | 7. FE | 8. T |
| 9. F | 10. R | 11. R | |

PART – B

- | | | | |
|------|------|------|------|
| 1. 3 | 2. 3 | 3. 2 | 4. 0 |
| 5. 2 | 6. 1 | | |

Chemistry

PART – A

- | | | | |
|-------|--------|---------|------|
| 1. F | 2. F | 3. T | 4. T |
| 5. FT | 6. TRE | 7. FTRE | 8. E |
| 9. E | 10. R | 11. F | |

PART – B

- | | | | |
|--------|--------|------|------|
| 1. 100 | 2. 180 | 3. 2 | 4. 6 |
| 5. 173 | 6. 1 | | |

Mathematics

PART – A

- | | | | |
|-------|-------|-------|------|
| 1. E | 2. F | 3. F | 4. T |
| 5. FT | 6. TR | 7. TE | 8. F |
| 9. R | 10. E | 11. T | |

PART – B

- | | | | |
|------|------|------|------|
| 1. 6 | 2. 4 | 3. 1 | 4. 2 |
| 5. 2 | 6. 5 | | |