

FIITJEE INTERNAL Phase Test

PHYSICS, CHEMISTRY & MATHEMATICS

QP CODE: 101075

Paper-1

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

- Attempt ALL the questions. Answers have to be marked on the OMR sheets.
- This question paper contains **Three Sections**.
- Section-I** is Physics, **Section-II** is Chemistry and **Section-III** is Mathematics.
- All the section can be filled in **PART-A & B** of OMR.
- 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

- Ensure matching of OMR sheet with the Question paper before you start marking your answers on OMR sheet.
- 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.
- OMR sheet contains alphabets, numerals & special characters for marking answers.

C. Marking Scheme For All Two Parts.

- 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.
- 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 option(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.
- Part-A (08-10)** – This section contains Three (03) 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 **+4 Marks** for correct answer and **-1 marks** for wrong answer.
- Part-B** – This section contains **SIX (06)** questions numerical based questions. The answer to each question is a **NUMERICAL VALUE**. If the numerical value has more than two decimal places, truncate/round-off the value to **TWO** decimal places. Each question carries **+4 marks** for correct answer. **There is no negative marking.**

Name of the Candidate: _____

Batch: _____ Date of Examination: _____

Enrolment Number: _____

BATCHES – PANINI426-G1 & PANINI426XII-1_PT-6

SECTION – I: PHYSICS

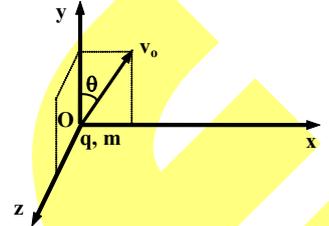
(PART – A)

(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**.

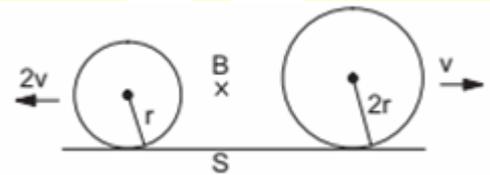
1. A particle of mass m , carrying a charge q , is lying at the origin in a uniform magnetic field directed along X axis. At the instant $t = 0$ it is given a velocity v_0 at an angle θ with the y axis, in the xy plane. The coordinates of the particle after two revolutions will be

- (A) $\left(0, 0, \frac{2\pi m v_0 \sin \theta}{qB}\right)$ (B) $\left(\frac{2\pi m v_0 \sin \theta}{qB}, 0, 0\right)$
 (C) $\left(\frac{4\pi m v_0 \sin \theta}{qB}, 0, 0\right)$ (D) $(0, 0, 0)$



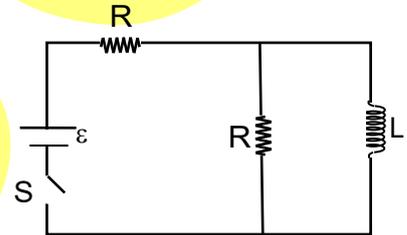
2. Two conducting rings of radii r and $2r$ move in opposite directions with velocities $2v$ and v respectively on a conducting surface S . There is a uniform magnetic field of magnitude B perpendicular to the plane of the rings. The potential difference between the highest points of the two rings is

- (A) zero (B) $2rvB$ (C) $4rvB$ (D) $8rvB$



3. In the given circuit switch S is closed at $t = 0$, then the rate of change of current through the inductor initially is

- (A) 0
 (B) ε/L
 (C) $\varepsilon/2L$
 (D) $2\varepsilon/L$



4. Two long parallel wires are at a distance $2d$ apart. They carry steady equal currents flowing out of the plane of the paper, as shown in figure. The variation of the magnetic field B along the line XX' is given by

- (A) (B)
- (C) (D)

Space For Rough Work

(Matching List Sets)

This section contains **Three (03)** 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 following:

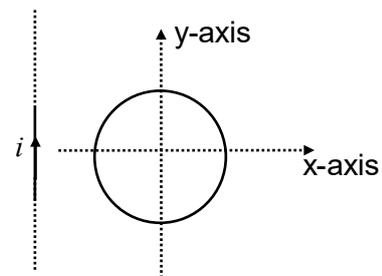
List – I Systems		List – II Paths of charge Particles	
(P)	<p>The charge q is projected perpendicular to the electric field. Then it moves through the magnetic field</p>	(1)	
(Q)	<p>The charge is released from rest in a crossed \vec{B} and \vec{E}</p>	(2)	
(R)	<p>The charge is projected perpendicular to \vec{E} in a crossed \vec{E} and \vec{B}</p>	(3)	
(S)	<p>The charge is projected at a non-zero angle $\theta (< 90^\circ)$ with the magnetic induction.</p>	(4)	
		(5)	

Which one of the following options is correct?

- (A) P→1, Q→3, R→4, S→2
(C) P→3, Q→1, R→4, S→2

- (B) P→3, Q→1, R→5, S→4
(D) P→4, Q→5, R→4, S→2

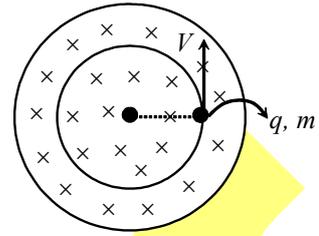
9. A conducting circular rigid loop near a long straight current carrying wire as shown. Match the Columns



List-I		List-II	
(P)	If current is increased	(1)	Induced current in the loop is clockwise
(Q)	If current is decreased	(2)	Induced current in the loop is anticlockwise
(R)	If wire is moved away from the loop maintaining constant current	(3)	Wire will attract the loop and there will be a torque about y-axis
(S)	If wire is moved towards the loop maintaining constant current	(4)	Wire will repel the loop and there will be no torque about y-axis

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

10. The central cross-section of a long cylindrical region containing uniform but time varying magnetic field B is shown. A particle of constant mass and variable positive charge moves in a circle in the plane, so that the radius of the circle remains constant.



List-I		List-II	
(P)	If the magnetic field is increased by 2%, the speed of the particle will	(1)	decrease
(Q)	If the magnetic field is decreased by 4%, the speed of the particle will	(2)	increase
(R)	If the magnetic field is increased by 2%, the charge of the particle will	(3)	change by 1%
(S)	If the magnetic field is decreased by 4%, the charge of the particle will	(4)	change by 2%
		(5)	change by 3%

The correct option is:

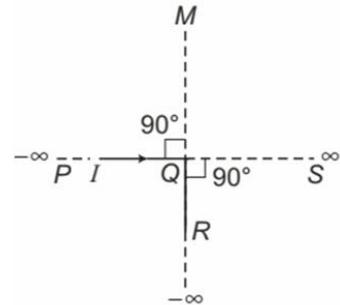
- (A) $P \rightarrow 2,3$; $Q \rightarrow 1,4$; $R \rightarrow 1,3$; $S \rightarrow 2,4$ (B) $P \rightarrow 2,3$; $Q \rightarrow 1,5$; $R \rightarrow 3$; $S \rightarrow 2,4$
 (C) $P \rightarrow 1,5$; $Q \rightarrow 3,4$; $R \rightarrow 2$; $S \rightarrow 2,4$ (D) $P \rightarrow 2$; $Q \rightarrow 3,4$;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

(PART – B)

This section contains **SIX (06)** numerical based questions. The answer to each question is a NUMERICAL VALUE. If the numerical value has more than two decimal places, truncate/round-off the value to TWO decimal places.

1. A particle of mass $m = \sqrt{227}$ gm and charge $q = 7\mu\text{C}$ is projected in a space where magnetic field is given by $\vec{B} = y^2\hat{i} + z^2\hat{j} + x^2\hat{k}$. The initial velocity of projection of particle is $\vec{v} = \hat{i} - 2\hat{j} + 3\hat{k}$ from $(1, 2, 1)$. Find radius of curvature of particle at $t = 0$ in kilometer.

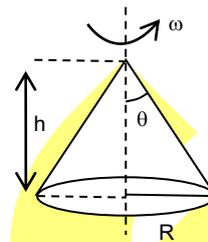
2. An infinitely long conductor PQR is bent to form a right angle as shown in figure. A current I flows through PQR. The magnetic field due to this current at the point M is H_1 . Now, another infinitely long straight conductor QS is connected at Q, so that current is $I/2$ in QR as well as in QS, the current in PQ remaining unchanged. The magnetic field at M is now H_2 . Find $\left(\frac{3H_1}{H_2}\right)$.



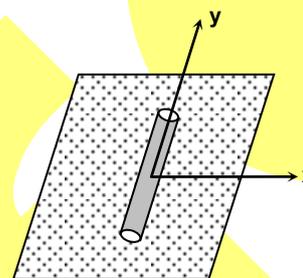
Space For Rough Work

3. An LCR series circuit with 100Ω resistance is connected to an ac source of 200 v and angular frequency 300 rad/s. When only capacitance is removed, the current lags behind, the voltage by 60° when only the inductance is removed, the current leads the voltage by 60° . If the power dissipated in the LCR ckt is 160 k watt then $k =$ _____.

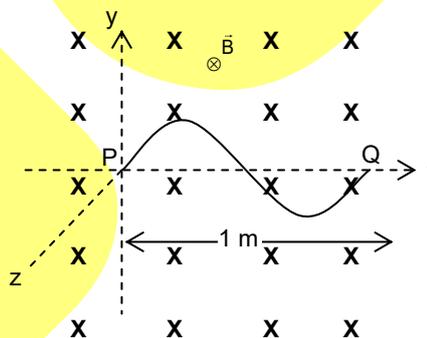
4. 'Q' charge is uniformly distributed over the surface of a right circular cone of semi-vertical angle θ and height h. The cone is uniformly rotated about its axis at angular velocity ω . Magnetic moment associated with the cone is found to be $nQ\omega h^2 \tan^2 \theta$ where value of ' $\frac{1}{n}$ ' is



5. A uniform magnetic field $B = 4$ Tesla exist in the horizontal direction along x-axis. A conducting wire of mass 600 gm and length 5 cm is kept along y-axis on a rough horizontal surface. Conducting wire is carrying a current of magnitude 5 amp along y-axis. The minimum force required along x-axis to move the wire is F_1 . Now the direction of current in the wire is reversed then minimum force required along x-axis to move the wire is F_2 . Find the ratio of $\frac{10F_1}{F_2}$.



6. A wire forming one cycle of sine curve is moved in x - y plane with velocity $\vec{V} = 3\hat{i} + 2\hat{j}$. There exist a magnetic field $\vec{B} = -3\hat{k}$. Find the motional emf in Volts developed across the ends PQ of wire



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.

1. Which of the following ore is not roasted?
 (A) PbS (B) FeS₂ (C) PbSO₄ (D) FeSe
2. In the spinel MgAl₂O₄, the Mg²⁺ ions are present
 (A) at the body centre of a B.C.C unit cell (B) at the corners of a F.C.C unit cell
 (C) at some of the voids of F.C.C unit cell (D) at the face centre of H.C.P unit cell

Space For Rough Work

3. In chemical adsorption if x is the number of adsorption sites occupied and y is the number of adsorption sites available, then the term fractional coverage(θ) can be expressed as
- (A) $\theta = \frac{y}{x}$ (B) $\theta = \frac{x}{y}$ (C) $\theta = \frac{x}{1+y}$ (D) $\theta = \frac{y}{1+x}$
4. $\text{NaCl} + \text{H}_2\text{SO}_4 \longrightarrow \text{NaHSO}_4 + \text{X}$
Product X in the above reaction is
(A) Cl_2 (B) HCl (C) H_2 (D) SO_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. Which of the following reaction produces SO_2 gas?
(A) Burning of sulphur in oxygen (B) Reaction of copper with H_2SO_4
(C) Roasting of sulphide ores (D) Burning of H_2S
6. N_2O_3 is formed by the combination reaction between
(A) N_2O (B) NO (C) NO_2 (D) N_2O_5
7. $\text{SO}_3 + (\text{P}) \longrightarrow (\text{Q}) \xrightarrow{\text{H}_2\text{O}} (\text{P})$
In the above reaction the unknown compounds are
(A) $\text{P} = \text{H}_2\text{S}_2\text{O}_7$ (B) $\text{Q} = \text{H}_2\text{SO}_4$ (C) $\text{P} = \text{H}_2\text{SO}_4$ (D) $\text{Q} = \text{H}_2\text{S}_2\text{O}_7$

(Matching List Sets)

This section contains **Three (03) 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 unit cells mentioned in List-I with their characteristics mentioned in List-II.

List – I		List – II	
(P)	Simple cubic (SC)	(1)	Effective number of atoms per unit cell is 1 for a metallic crystal
(Q)	Body centre cubic(BCC)	(2)	Coordination number is 12 for metallic crystal
(R)	Face centre cubic(FCC)	(3)	Packing fraction is 74%
(S)	Hexagonal close packing(HCP)	(4)	Packing fraction is 68%
		(5)	Contains triangular voids

The correct option is:

- (A) $(\text{P}) \rightarrow (3, 4)$, $(\text{Q}) \rightarrow (4)$, $(\text{R}) \rightarrow (2, 3)$, $(\text{S}) \rightarrow (1, 2)$
 (B) $(\text{P}) \rightarrow (1)$, $(\text{Q}) \rightarrow (4)$, $(\text{R}) \rightarrow (2, 3)$, $(\text{S}) \rightarrow (2, 3)$
 (C) $(\text{P}) \rightarrow (1, 2)$, $(\text{Q}) \rightarrow (3)$, $(\text{R}) \rightarrow (1, 2)$, $(\text{S}) \rightarrow (3)$
 (D) $(\text{P}) \rightarrow (3, 4)$, $(\text{Q}) \rightarrow (3, 4)$, $(\text{R}) \rightarrow (1, 2)$, $(\text{S}) \rightarrow (1)$

Space For Rough Work

9. Match the acids mentioned in List-I with their properties mentioned in List-II.

List – I		List – II	
(P)	H ₃ PO ₃	(1)	Undergoes disproportionation reaction on heating
(Q)	HNO ₂	(2)	Obtained when N ₂ O ₅ reacts with water
(R)	H ₃ PO ₂	(3)	Contains one O – H bond
(S)	HNO ₃	(4)	Obtained when N ₂ O ₃ reacts with water
		(5)	Obtained when P ₂ O ₅ reacts with water

The correct option is:

- (A) (P) → (1), (Q) → (1, 3, 4), (R) → (1, 3), (S) → (2, 3)
 (B) (P) → (1, 2, 3), (Q) → (1, 2), (R) → (2, 4), (S) → (4)
 (C) (P) → (1, 2), (Q) → (2, 3, 4), (R) → (3, 4), (S) → (1, 2)
 (D) (P) → (3, 4), (Q) → (1, 3), (R) → (1, 2, 4), (S) → (1, 3)

10. Match the lists.

List – I (Ores)		List – II (Refining process used for extraction of the metal from the ore)	
(P)	Bauxite	(1)	Distillation
(Q)	Zincite	(2)	Hydrometallurgy
(R)	Blue vitriol	(3)	Electrolysis
(S)	Germanite	(4)	Poling
		(5)	Zone refining

The correct option is:

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

(PART – B)

This section contains **SIX (06)** numerical based questions. The answer to each question is a NUMERICAL VALUE. If the numerical value has more than two decimal places, truncate/round-off the value to TWO decimal places.

- What is the van't Hoff factor of aluminium sulphate if its degree of dissociation(α) is 0.5?
- How many oxygen atom(s) in H₂SO₅ exhibit -1 oxidation state?
- If the ions along all the body diagonals of the unit cell of NaCl are removed. How many effective number of Cl⁻ ions will be present per unit cell?
- The depression in freezing point of an aqueous solution of NaCl is 18.6. What is the molality of the solution?
 [K_f of water = 1.86 K kg mol⁻¹]
 [Assume complete dissociation of NaCl]
- $\text{NH}_4\text{NO}_3 \xrightarrow{\text{Heat}} (\text{X}) + \text{H}_2\text{O}$
 How many nitrogen atom(s) is/are present in the product X of above reaction?
- The packing fraction of the element that crystallises in simple cubic arrangement is π/x . The value of x is

Space For Rough Work

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. If $\int \frac{(2x+1)}{(x^2+4x+1)^{3/2}} dx$, then

(A) $\frac{x^3}{(x^2+4x+1)^{1/2}} + C$

(B) $\frac{x}{(x^2+4x+1)^{1/2}} + C$

(C) $\frac{x^2}{(x^2+4x+1)^{1/2}} + C$

(D) $\frac{1}{(x^2+4x+1)^{1/2}} + C$

2. Given a function g continuous on \mathbb{R} such that $\int_0^1 g(t) dt = 2$ and $g(1) = 5$. If

$f(x) = \frac{1}{2} \int_0^x (x-t)^2 g(t) dt$, then the value of $(f'''(1) - f''(1))$ is equal to:

(A) 0

(B) 3

(C) 5

(D) 7

3. $\int \frac{x^2+20}{(x \sin x + 5 \cos x)^2} dx =$ _____

(A) $\tan\left(x - \tan^{-1} \frac{x}{5}\right) + c$

(B) $\tan\left(2x - \tan^{-1} \frac{x}{5}\right) + c$

(C) $\tan\left(x + \tan^{-1} \frac{x}{5}\right) + c$

(D) $\tan\left(2x + \tan^{-1} \frac{x}{5}\right) + c$

4. Let $f: \mathbb{R} \rightarrow \mathbb{R}$, $f(x) = 1 - x - 4x^3$. The number of integral values of $x \in [0, 4]$ that satisfy the inequality $4(f(x))^3 + f(1-2x) + f(x) < 1$ is equal to

(A) 0

(B) 2

(C) 4

(D) 16

(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. Suppose $J = \int \frac{\sin^2 x + \sin x}{1 + \sin x + \cos x} dx$ and $K = \int \frac{\cos^2 x + \cos x}{1 + \sin x + \cos x} dx$. If C is an arbitrary constant of integration then which of the following is/are correct?

(A) $J = \frac{1}{2}(x - \sin x + \cos x) + C$

(B) $J = K - (\sin x + \cos x) + C$

(C) $J = x - K + C$

(D) $K = \frac{1}{2}(x - \sin x + \cos x) + C$

Space For Rough Work

6. Let $f(x)$ be a non constant twice derivable function defined on \mathbb{R} such that $f(2+x) = f(2-x)$ and $f'\left(\frac{1}{2}\right) = 0 = f'(1)$. Then which of the following is/are correct?
- (A) $f(-4) = f(8)$
 (B) Minimum number of roots of the equation $f''(x) = 0$ in $(0, 4)$ are 4
 (C) $\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} f(2+x) \sin x \, dx = 0$
 (D) $\int_0^2 f(t) 5^{\cos \pi t} \, dt = \int_2^4 f(4-t) 5^{\cos \pi t} \, dt$
7. If A_i is the area bounded by $|x - a_i| + |y| = b_i, i \in \mathbb{N}$, where $a_i + 1 = a_i + \frac{3}{2}b_i$ and $b_{i+1} = \frac{b_i}{2}, a_1 = 0, b_1 = 32$, then
- (A) $A_3 = 128$ (B) $A_3 = 256$
 (C) $\lim_{n \rightarrow \infty} \sum_{i=1}^n A_i = \frac{8}{3}(32)^2$ (D) $\lim_{n \rightarrow \infty} \sum_{i=1}^n A_i = \frac{4}{3}(16)^2$

(Matching List Sets)

This section contains **Three (03)** 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 column

	List - I		List - II
(P)	$\int_0^1 e^x \left(\frac{x^2 + 5x + 7}{x^2 + 6x + 9} \right) dx$	(1)	$e - 1$
(Q)	$\int_0^1 e^x \left(\frac{x^3 - x + 2}{(x^2 + 1)^2} \right) dx$	(2)	$\frac{3e}{4} - \frac{2}{3}$
(R)	$\int_{-1}^0 e^x \frac{(2-x^2)}{(1-x)\sqrt{1-x^2}} dx$	(3)	1
(S)	$\int_0^1 e^{x^4} (x + x^3 + 2x^5) e^{x^2} dx$	(4)	$\frac{e^2}{2}$
		(5)	$e^2 + 1$

- (A) P \rightarrow 2, Q \rightarrow 3, R \rightarrow 5, S \rightarrow 4
 (C) P \rightarrow 2, Q \rightarrow 1, R \rightarrow 4, S \rightarrow 3

- (B) P \rightarrow 2, Q \rightarrow 1, R \rightarrow 3, S \rightarrow 4
 (D) P \rightarrow 1, Q \rightarrow 2, R \rightarrow 4, S \rightarrow 5

Space For Rough Work

9. Let the function defined in column I have domain $\left(0, \frac{\pi}{2}\right)$ then:

List - I		List - II	
(P)	$x^2 + 2\cos x + 2$ on $\left(0, \frac{\pi}{2}\right)$ has	(1)	local maximum at $\cos^{-1}\left(\frac{2}{3}\right)$
(Q)	$9x - 4\tan x$ on $\left(0, \frac{\pi}{2}\right)$ has	(2)	maximum at $x = \frac{1}{2}$
(R)	$\left(\frac{1}{2} - x\right)\cos + \sin x - \frac{x^2 - x}{4}$	(3)	no local extremum
(S)	$\left(\frac{1}{2} - x\right)\cos \pi(x+3) + \left(\frac{1}{\pi}\right)\sin \pi(x+3)$ on $(0, 4)$	(4)	minimum at $x = 1$
		(5)	local minima at $\cos^{-1}\left(\frac{2}{3}\right)$

- (A) P \rightarrow 1, Q \rightarrow 2, R \rightarrow 4, S \rightarrow 5
 (C) P \rightarrow 1, Q \rightarrow 2, R \rightarrow 3, S \rightarrow 4

- (B) P \rightarrow 3, Q \rightarrow 1, R \rightarrow 2, S \rightarrow 4
 (D) P \rightarrow 5, Q \rightarrow 2, R \rightarrow 3, S \rightarrow 4

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

List - I		List - II	
(P)	$y = x^2, y = 2 - x^2 , y = 2$ and right of $x = 1$, then area bounded by the curves	(1)	$\pi - \frac{2}{3}$
(Q)	$x^2 + y^2 = 25, 4y = 4 - x^2 $ and $x = 0, y \geq 0$, then area bounded by the curves	(2)	$25\sin^{-1}\frac{4}{5} + 4$
(R)	$y = x^2, y = \frac{2}{(1+x^2)}$, then area bounded by the curves	(3)	$25\left(\frac{\pi}{4} - \frac{2}{3}\right)$
(S)	$x^2 + y^2 = 10x, y^2 = 5x$, then area bounded by the curves	(4)	$\frac{4}{5}(5 - 3\sqrt{3})$
		(5)	$\pi + \frac{2}{3}$

The correct option is

- (A) P \rightarrow (4) Q \rightarrow (2) R \rightarrow (5) S \rightarrow (1)
 (C) P \rightarrow (3) Q \rightarrow (3) R \rightarrow (4) S \rightarrow (5)

- (B) P \rightarrow (2) Q \rightarrow (4) R \rightarrow (1) S \rightarrow (5)
 (D) P \rightarrow (4) Q \rightarrow (2) R \rightarrow (1) S \rightarrow (3)

Space For Rough Work

(PART – B)

This section contains **SIX (06)** numerical based questions. The answer to each question is a NUMERICAL VALUE. If the numerical value has more than two decimal places, truncate/round-off the value to TWO decimal places.

- Suppose $\int \frac{1-7\cos^2 x}{\sin^7 x \cos^2 x} dx = \frac{g(x)}{\sin^7 x} + C$, where C is an arbitrary constant of integration. Then find the value of $g'(0) + g''\left(\frac{\pi}{4}\right)$.
- If $f(n) = \frac{1}{\pi} \int_0^{\pi/2} \frac{\sin^2(n\theta) d\theta}{\sin^2 \theta}$, $n \in \mathbb{N}$, then evaluate $\frac{f(15) + f(3)}{f(12) - f(10)}$.
- The value of $\int \frac{\tan x}{\tan^2 x + \tan x + 1} dx = x - \frac{2}{\sqrt{A}} \tan^{-1}\left(\frac{2\tan x + 1}{\sqrt{A}}\right) + C$. Then the value of A is:
- Consider the following regions in the plane: $R_1 = \{(x, y) : 0 \leq x \leq 1 \text{ and } 0 \leq y \leq 1\}$
 $R_2 = \left\{ (x, y) : x^2 + y^2 \leq \frac{4}{3} \right\}$
 The area of the region $R_1 \cap R_2$ can be expressed as $\frac{a\sqrt{3} + b\pi}{9}$, where a and b are integers. Then the value of (a + b) equals:
- Find the value of $k > 0$ so that the area of the bounded region enclosed between the parabolas $y = x - kx^2$ and $y = \frac{x^2}{k}$ is maximum.
- If $\int_0^1 \frac{dx}{(1+x)(2+x)\sqrt{x(1-x)}} = \frac{\pi A}{\sqrt{6}(\sqrt{3}+1)}$ then A is equal to

Space For Rough Work

FIITJEE INTERNAL TEST

BATCHES – PANINI426-G1 & PANINI426XII-1

Phase Test – 6 (Paper-1)

Code: 101075

JEE ADVANCED

ANSWER KEY

ANSWER KEYS

Physics

PART – A

- | | | | |
|--------|--------|-------|------|
| 1. C | 2. D | 3. C | 4. B |
| 5. ABD | 6. ABC | 7. AB | 8. C |
| 9. C | 10. A | | |

PART – B

- | | | | |
|-------|------|--------|------|
| 1. 2 | 2. 2 | 3. 2.5 | 4. 4 |
| 5. 14 | 6. 6 | | |

Chemistry

PART – A

- | | | | |
|---------|-------|-------|------|
| 1. C | 2. C | 3. B | 4. B |
| 5. ABCD | 6. BC | 7. CD | 8. B |
| 9. A | 10. C | | |

PART – B

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

Mathematics

PART – A

- | | | | |
|-------|---------|--------------|------|
| 1. B | 2. B | 3. A | 4. C |
| 5. BC | 6. ABCD | 7. AC(bonus) | 8. B |
| 9. B | 10. D | | |

PART – B

- | | | | |
|------|------|------|------|
| 1. 5 | 2. 9 | 3. 3 | 4. 4 |
| 5. 1 | 6. 2 | | |