FIITJEE INTERNAL Phase Test

BATCHES – PANINI426-G1 & PANINI426XII-1_PT-5

PHYSICS, CHEMISTRY & MATHEMATICS

QP CODE: 101011 **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

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 (01-04) –** 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 (08-10) –** 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.

(iii) **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: _____

SECTION – I: PHYSICS

(PART – A)

(Single Correct Answer Type)

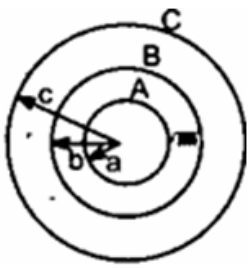
This section contains **4 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE is correct.**

1. Two capacitors C and 2C are connected together in parallel. A slab of dielectric constant K is inserted between the plates of capacitor C such that it occupies the space completely. The capacitors are charged by a battery of voltage V and the battery is then disconnected. Then determine the work done in slowly removing the dielectric from the capacitor.

(A) $\frac{1}{3}(k+2)(k-1)CV^2$ (B) $\frac{1}{6}(k+2)(k-1)CV^2$

(C) $\frac{1}{2}(k-1)CV^2$ (D) $\frac{1}{3}(k+2)CV^2$

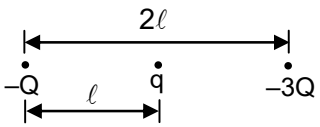
2. Three conducing spheres A, B and C are as shown in figure. The radii of the spheres are a, b and c respectively. A and B are connected by a conducing wire. The capacity of the system is:



(A) $4\pi\varepsilon_0(a+b+c)$ (B) $4\pi\varepsilon_0\left[\frac{bc}{c-b}\right]$

(C) $4\pi\varepsilon_0\left[\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right]$ (D) $4\pi\varepsilon_0\left[\frac{abc}{ab+bc+ca}\right]$

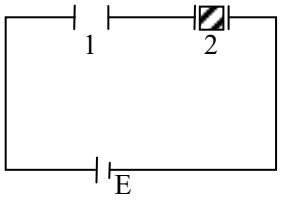
3. Three charges –Q, q and –3Q are arranged as shown in figure. The system of charges will have positive configuration energy if:



(A) $q > \frac{3Q}{8}$ (B) $q < \frac{8Q}{3}$

(C) $q > \frac{3Q}{2}$ (D) $q < \frac{3Q}{8}$

4 Two identical capacitors 1 and 2 are connected in series to a battery as shown in figure. Capacitor 2 contains a dielectric slab of dielectric constant k as shown. Q_1 and Q_2 are the charges stored in the capacitors. Now the dielectric slab is removed and the corresponding charges are Q'_1 and Q'_2. Then



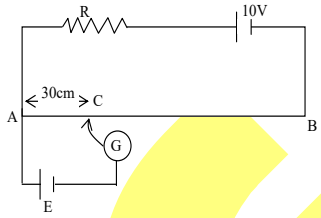
(A) $\frac{Q'_1}{Q_1}=\frac{k+1}{k}$ (B) $\frac{Q'_2}{Q_2}=\frac{k+1}{2}$ (C) $\frac{Q'_2}{Q_2}=\frac{k+1}{2k}$ (D) $\frac{Q'_1}{Q_1}=\frac{k}{2}$

Space For Rough Work

(One or More Than One Options Correct Type)

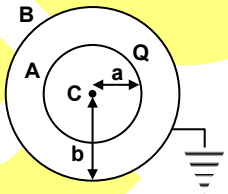
This section contains **3 multiple choice questions.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONE** or **MORE THAN ONE is correct.**

5. AB is a potentiometer wire of length 100 cm and its resistance is 10Ω. It is connected in series with a résistance R = 90Ω and a battery of emf 10V and negligible internal resistance. A source of unknown emf E is balanced by 30 cm length of the potentiometer wire, with jockey position at C.



(A) the value of E is 0.15 V (B) the value of E is 0.30 V
(C) $V_C - V_B = -0.7$ V (D) $V_C - V_B = 0.7$ V

6. A conducting sphere A of radius a, with charge Q, is placed concentrically inside a conducting shell B of radius b. B is earthed. C is the common centre of A and B.



(A) The field at a distance r from C, where $a \le r \le b$, is $k\frac{Q}{r^2}$.

(B) The potential at a distance r from C, where $a \le r \le b$, is $k\frac{Q}{r}$.

(C) The potential difference between A and B is $kQ\left(\frac{1}{a}-\frac{1}{b}\right)$.

(D) The potential at a distance r from C, where $a \le r \le b$, is $kQ\left(\frac{1}{r}-\frac{1}{b}\right)$

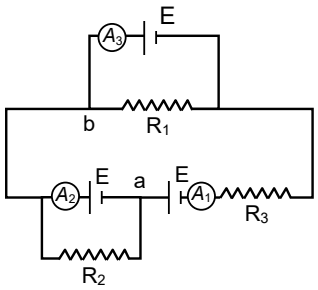
7. A positively charged thin metal ring of radius R is fixed in the x-y plane with its centre at the origin O. A negatively charged particle P is released from rest at the point (0, 0, z_0) where $z_0>0$. Then the motion of P is
(A) periodic for all values of z_0 satisfying $0 < z_0 < \infty$
(B) simple harmonic for all values of z_0 satisfying $0 < z_0 \le R$
(C) approximately simple harmonic provided $z_0 << R$
(D) such that P crosses O and continues to move along the negative z-axis towards $z = -\infty$

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.

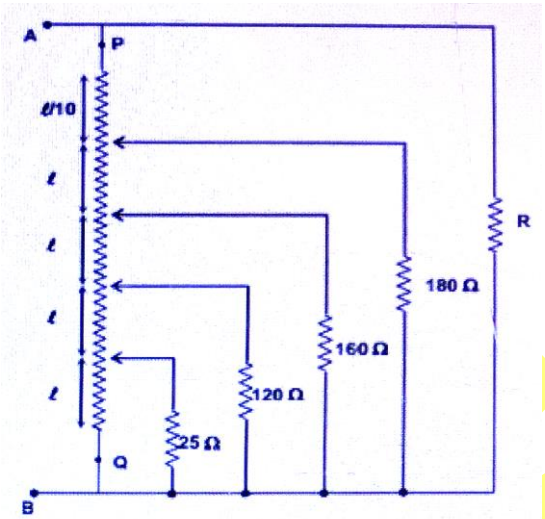


List – I		List – II	
(P)	Reading of ammeter A_1 in ampere is	(1)	4/3
(Q)	Reading of ammeter A_2 in ampere is	(2)	8/3
(R)	Reading of ammeter A_3 in ampere is	(3)	4
(S)	Potential difference between point a and point b in volt is	(4)	zero
		(5)	2

In the above circuit, $R_1 = R_2 = R_3 = 3\Omega$ and e.m.f. of each cell is E = 4V and negligible internal resistance. All ammeters are ideal. Match the following:

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

9. The resistance of wire PQ is 410 Ω, which is tapped with the external wire as shown in the figure. The value of R is not known. If the potential difference between AB is 400 volts. Then

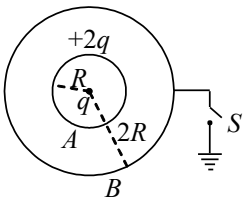


List-I		List-II	
(P)	The resistance of unknown resistor R in Ω, is	(1)	100
(Q)	The equivalent resistance across AB in Ω, is	(2)	$\frac{200}{3}$
(R)	The current in 25 Ω resistor is $\frac{200}{k}$ ampere, then the value of k is	(3)	500
(S)	The potential drop across 120 Ω resistor is $\frac{k}{5}$ volts, then the value of k is	(4)	300
		(5)	200

If the net current through the source battery is 6 ampere, then which of the following is correct.

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

10. Two concentric conducting shells A and B have radii R and 2R. A charge q is placed at the centre of the shells and a charge 2q is given to shell A.



List – I		List – II	
(P)	Charge on inner surface of shell *A*	(1)	$-3q$
(Q)	Charge on inner surface of shell *B*	(2)	Zero
(R)	Charge on outer surface of shell *A*	(3)	$-q$
(S)	Charge on outer surface of shell *B*	(4)	$3q$
		(5)	$2q$

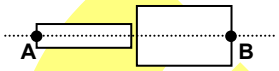
When switch is open

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

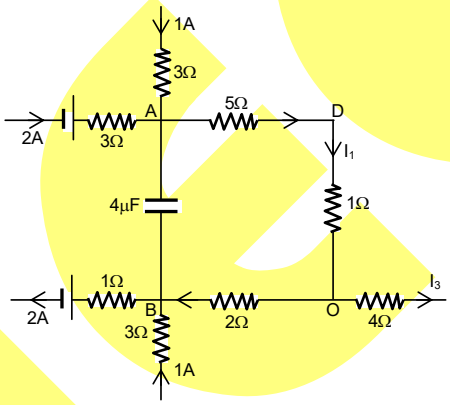
(PART – B)

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.

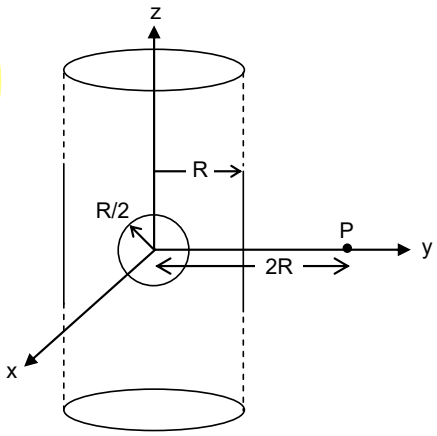
1. A cylindrical element of resistivity ρ, radius r and length ℓ is connected in series with another cylindrical element of conductivity σ, radius 2r and length ℓ, such that axis of both the cylinders is along the same line as shown. The net resistance across A and B is $\left(\rho+\frac{1}{K\sigma}\right)\frac{\ell}{\pi r^2}$. Then find the value of K.



2. A part of a circuit in steady state along with the current flowing in the branches, with value of each resistance is shown in Fig. Calculate the charge(In 10^{-5}C) stored in the capacitor C.

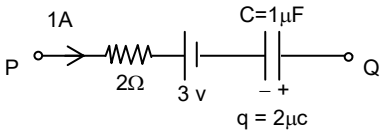


3. An infinitely long cylinder of radius R has a uniform volume charge density ρ. It has a spherical cavity of radius R/2 with its centre on the acids of the cylinder, as shown in the figure. The magnitude of the electric field at the point P, which is at a distance 2R from the axis of the cylinder, is given by the expression $\frac{23\rho R}{16k\varepsilon_0}$. The value of 'k' is

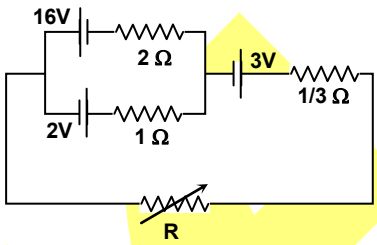


Space For Rough Work

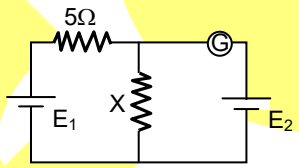
4. IF Potential difference (in volt) between points P and Q is V then value of (8V)/5 is:



5. Three cells of emf 16V, 2V and 3V and internal resistance 2Ω, 1 Ω and ½ Ω respectively are connected with an unknown resistance R as shown in the figure. What is the value of R such that power developed through R is maximum in steady state condition?



6. In the circuit shown, the battery E_1 is ideal and has an e.m.f. 12 V. Battery E_2 has an e.m.f. of 2 V. If the galvanometer G reads zero, find the value of resistance X (In Ω).



Space For Rough Work

SECTION – II: CHEMISTRY

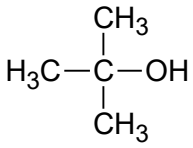
(PART – A)

(Single Correct Answer Type)

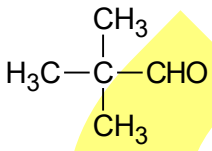
This section contains **4 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE is correct.**

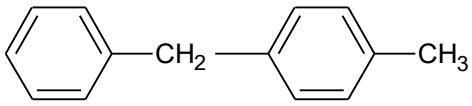
1. Which reacts at the fastest rate with Anhy.$ZnCl_2$/Conc.HCl?

(A) $CH_3CH_2CH_2OH$

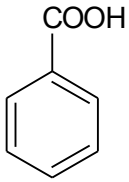
(B) 

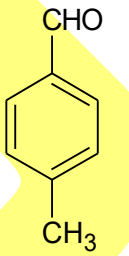
(C) CH_3COCH_3

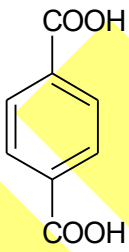
(D) 

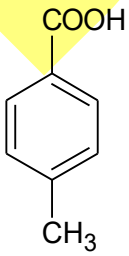
2. 

Which product is not formed when the above compound reacts with acidified $KMnO_4$ solution?

(A) 

(B) 

(C) 

(D) 

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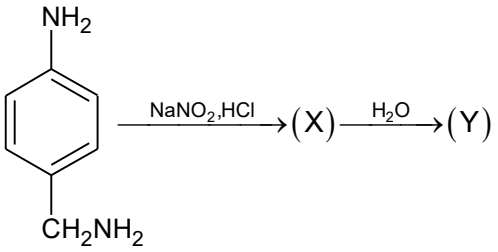
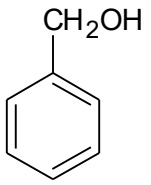
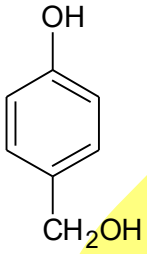
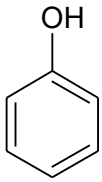
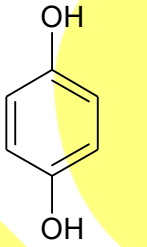
3. 

In above reaction (Y) is

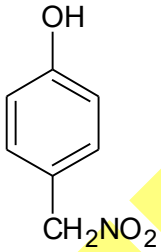
(A) 

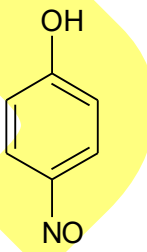
(B) 

(C) 

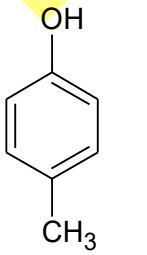
(D) 

4. The most acidic compound out of the following is:

(A) 

(B) 

(C) 

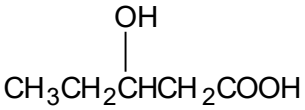
(D) 

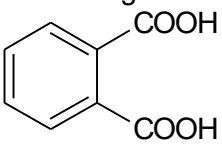
Space For Rough Work

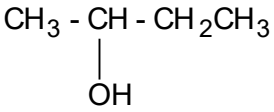
(One or More Than One Options Correct Type)

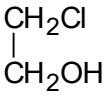
This section contains **3 multiple choice questions.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONE** or **MORE THAN ONE is correct.**

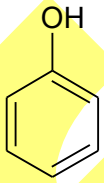
5. Which of the following undergo(es) dehydration upon heating?

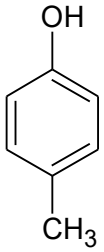
(A) 

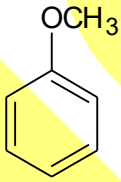
(B) 

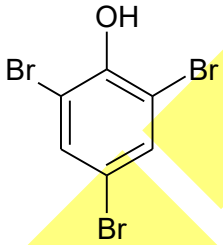
(C) 

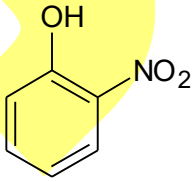
(D) 

6. Which of the following product(s) is/are formed by  through electrophilic substitution reactions?

(A) 

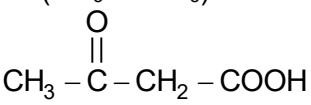
(B) 

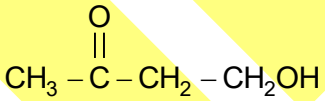
(C) 

(D) 

7. Which of the following compound(s) form(s) acetone (CH_3COCH_3) on heating?

(A) $Ca(OCOCH_3)_2$

(B) 

(C) 

(D) CH_3CH_2CHO

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 lists and answer the questions accordingly

List – I		List– II	
(P)	$CH_3CH_2CHO + HCN \longrightarrow$	(1)	Final product contains a C = N bond
(Q)	$CH_3CHO + NH_3 \longrightarrow$	(2)	Final product is a hydrocarbon
(R)	$CH_3COCH_3 + NH_2NH_2 / KOH \longrightarrow$	(3)	A racemic mixture is formed
(S)	$HCHO + Fehling's\ solution \longrightarrow$	(4)	A red precipitate is formed
		(5)	Hydrolysis of the product forms a chiral alpha hydroxyl carboxylic acid

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

9. Match the lists and answer the questions accordingly

List – I		List– II	
(P)	CH_3COCH_3	(1)	Undergoes HVZ reaction
(Q)	$CH_3\underset{\displaystyle OH}{\underset{\vert}{C}}HCH_3$	(2)	Forms a ketone on heating over copper metal at 300°C
(R)	$CH_3\underset{\displaystyle COOH}{\underset{\vert}{C}}HCH_3$	(3)	Undergoes iodoform reaction
(S)	$CH_3\underset{\displaystyle NH_2}{\underset{\vert}{C}}HCH_3$	(4)	Forms tertiary alcohol with RMgX followed by hydrolysis
		(5)	Undergoes carbylamine reaction

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

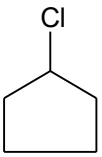
10. Match the following & answer accordingly:

List– I		List– II	
(P)	CH_3CH_2COOH	(1)	forms C_2H_5OH when treated with $LiAlH_4$
(Q)	$CH_3COOC_2H_5$	(2)	Undergoes dehydration when treated with P_4O_{10}
(R)	CH_3CONH_2	(3)	Hydrolysis is irreversible in both acidic and basic medium
(S)	$CH_3COOCOCH_3$	(4)	Is obtained by the reaction between CH_3COCl and CH_3COONa
		(5)	Forms a primary amine when reacts with Br_2/KOH

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

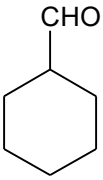
(PART – B)

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.

1. 

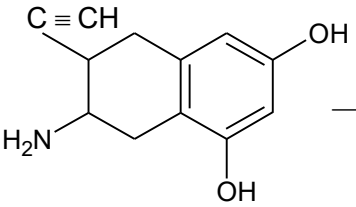
$\xrightarrow[\text{Dry ether}]{\text{Na}} (P) + NaCl$

What is the mass of (P) in g mol^{-1} unit?

2. 

$\xrightarrow[H_2O/H^+]{CH_3MgBr} (P) \xrightarrow[300^oC]{Cu} (Q)$

How many hydrogen atom(s) is/are present in a molecule of (Q)?

3. 

$\xrightarrow{C_2H_5MgCl(excess)}$ Product

How many moles of C_2H_6 is formed in above reaction?

4. $CH_4 \xrightarrow[h\nu]{Cl_2} A + B + C + D$

How many chlorine atom(s) is/are present in the most acidic unknown compound in above reaction?

5. How many monocyclic three member rings including stereoisomers are possible with formula C_4H_5F?

6. $Ph - \overset{O}{\overset{\|}{C}} - O - \overset{O}{\overset{\|}{C}} - CH_3 \xrightarrow{HBr}$ Products

How many oxygen atom(s) is/are present in the product which contains the phenyl group?

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. Let $g(x)=\begin{cases}3x^2-4\sqrt{x}+1 & \text{for } x<1\\ ax+b & \text{for } x\geq 1\end{cases}$

If $g(x)$ is continuous and differentiable for all numbers in its domain then:

(A) $a=b=4$ (B) $a=b=-4$

(C) $a=4$ and $b=-4$ (D) $a=-4$ and $b=4$

2. Let $f:R\to R$ and $g:R\to R$ be two bijective functions such that their graphs are mirror images of each other about the line $y=2$. If $h(x)=f(x)+g(x)$, then $h(0)$ equals

(A) 2 (B) 0

(C) –2 (D) None of these

3. Let $f:R\to R$ be a continuous onto function satisfying $f(x)+f(-x)=0,\forall x\in R$. If $f(-3)=2$ and $f(5)=4$ in $[-5,5]$, then the equation $f(x)=0$ has:

(A) exactly three real roots (B) exactly two real roots

(C) at least five real roots (D) at least three real roots

4. The period of $\sin\frac{\pi}{4}[x]+\cos\frac{\pi x}{2}+\cos\frac{\pi}{3}[x]$, where [x] denotes the GIF of x, is

(A) 8 (B) 12

(C) 24 (D) Non – periodic

(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. Define a relation R on real numbers as

$R=\{(x,y)\in A\times A:\sin^{-1}x+\sin^{-1}xy,\ |x|\leq 1,\ |y|\leq 1\}$

Which of the following is/are correct?

(A) Number of $x\in A$ such that $(x,x)\in R$ is 1

(B) R is transitive relation

(C) The number of ordered pairs in B where $B=\{(x,y):(x,y)\in R,\ x+y=0\}$ is 2

(D) R is symmetric

Space For Rough Work

6. Let $f:A\to B$, where $A=\{1,2,3,4\}, B=\{3,5,7,9,11,13,15,17\}$ and $f(2)=7$

(A) number of one – one function f: $A\to B$ is 25

(B) number of increasing function $f:A\to B$ is 20

(C) number of decreasing function $f:A\to B$ is 5

(D) number of function $f:A\to B$ is 8^3

7. If $f(x)=|x-1|-[x]$, where [x] is the greatest integer less than or equal to x, then

(A) f(1+0)=-1,f(1-0)=0 (B) f(1+0)=0=f(1-0)

(C) $\lim\limits_{x\to1} f(x)$ exists (D) $\lim\limits_{x\to1} f(x)$ does not exist

(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. In the following . [ ] and { } are greatest integer function and fractional part function respectively. Match the functions in List – I with the properties in List – II

(Note: $x\in(-2,2)$)

List – I		List – II	
(P)	$f_1(x)=\left[\frac{4x}{\pi}\right]\operatorname{sgn}(x^2-x+1)$	(1)	Not differentiable at exactly 5 points
(Q)	$f_2(x)=\cos^{-1}\left(\operatorname{sgn}\left(\cos\frac{2x-1}{2}\pi\right)\right)$	(2)	Not differentiable at exactly 3 points
(R)	$f_3(x)=\max.(\{x+1\},\{5-x\})$	(3)	Not differentiable at more than 5 points
(S)	$f_4(x)=\sqrt{x^2}+[x]^2$	(4)	Not differentiable at less than 3 points.
		(5)	Differentiable everywhere

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

(C) P → 1, Q →2, R →3, S →3 (D) P → 1, Q →2, R →3, S →2

Space For Rough Work

9. Match the entries of Column – I with one or more than one entries of column – II. Note that [x], {x} and sign x denote largest integer less than or equal to x, fractional part of x and signum function of x respectively.

List – I		List - II	
(P)	Let $f:[-1,1]\to R$ be defined by $f(x)=\sqrt[5]{x}+\sin^{-1}x$, then $f(x)$ is	(1)	Odd
(Q)	Let $f:R\to\{-1,0,1\}$ be defined by $f(x)=\text{sgn}\left(\frac{1-\lvert x\rvert}{1+\lvert x\rvert}\right)$ then $f(x)$ is	(2)	Even
(R)	Let $f:[-4,2]\to[0,3]$ be defined by $f(x)=\sqrt{8-2x-x^2}$ then $f(x)$ is	(3)	Bijective
(S)	Let $f:(-\infty,0]\to[0,\infty)$ be defined by $f(x)=\frac{2^{-[x]}}{2^{\{x\}}}-2^{\lvert x\rvert}$ then f(x) is	(4)	One – One
		(5)	Many – one

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

10. Consider $f(x)=\lvert\ln\lvert x\rvert\rvert-kx^2$, $x\neq 0$. Match the List – I with the value of k in List – II

List - I		List - I	
(P)	$f(x)=0$ has two distinct solutions	(1)	$k=0$
(Q)	$f(x)=0$ has four distinct solutions	(2)	$k=\frac{1}{2e}$
(R)	$f(x)=0$ has six distinct solutions	(3)	$k\in\left(\frac{1}{2e},\infty\right)$
(S)	$f(x)=$ has no solution	(4)	$k\in(-\infty,0)$
		(5)	$k\in\left(0,\frac{1}{2e}\right)$

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

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.

1. Number of $x_0 \in R$ such that $f(x)=\sum_{k=0}^{4}\left(\sin|x-k|+\cos\left|x-k+\frac{1}{2}\right|\right), x \in R,$ is NOT differentiable at x_0 is

2. $\lim\limits_{x\to\infty}\left(\frac{x^2+5x+3}{x^2+x+3}\right)^x$ is equal to e^{α}, then α will be equal to

3. Let $f:R\to R$ and $g:R\to R$ be respectively given by $f(x)=|x|+1$ and $g(x)=x^2+1$. Define $h:R\to R$ by $h(x)=\begin{cases}\max\{f(x),g(x)\} & \text{if } x\le 0\\ \min\{f(x),g(x)\} & \text{if } x>0\end{cases}$. The number of points where $h(x)$ is not differentiable is

4. Let f be a polynomial function such that $f(f(x))-8x^m=\frac{80}{f''(x)}-64x^2+100 \ \forall x\in R, m\in N$ and $f(|x|)$ is differentiable for all $x\in R$. Then the value of $\left[\frac{f(3)}{m}\right]$ is $([.]\to \text{G.I.F})$

5. The graph of a function $y=f(x)$ is symmetric about the lines $x=2$ and $x=5$. The period of the function can be

6. The number of functions f from set A = $\{0,1,2\}$ to set $B=\{0,1,2,3,4,5,6,7\}$ such that $f(i)\le f(j)$ for $i<j$ and, $i,j\in A$ is

Space For Rough Work

FIITJEE INTERNAL TEST

BATCHES – PANINI426-G1 & PANINI426XII-1

Phase Test – 5 (Paper-1)

Code: 101011

JEE ADVANCED

ANSWER KEY

ANSWER KEYS

Physics

PART – A

1.	B	2.	B	3.	D	4	C
5.	BD	6.	ACD	7.	AC	8.	C
9.	A	10.	A				

PART – B

1.	4.00	2.	8.00	3.	6.00	4.	4.8
5.	1 (bonus)	6.	1.00				

Chemistry

PART – A

1.	B	2.	B	3.	B	4.	C
5.	ABD	6.	ACD	7.	AB	8.	C
9.	A	10.	B				

PART – B

1.	138	2.	14	3.	4	4.	3
5.	6	6.	2				

Mathematics

PART – A

1.	C	2.	D	3.	D	4.	C
5.	AD(bonus)	6.	BCD	7.	AD	8.	D
9.	A	10.	B				

PART – B

1.	5	2.	4	3.	3	4.	2
5.	6	6.	120				