

# FIITJEE INTERNAL TEST

## PHYSICS, CHEMISTRY & MATHEMATICS

CPT-1

CODE:

PAPER - 2

Time Allotted: 3 Hours

Maximum Marks: 201

- 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 Parts.
3. **Part-I** is Physics, **Part-II** is Chemistry and **Part-III** is Mathematics.
4. Each part is further divided into two sections: **Section A & B**.
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 Three Parts.

- (i) **Section-A (01 – 06)** contains 6 multiple choice questions which have only one correct answer. Each question carries **+3 marks** for correct answer and **– 1 mark** for wrong answer.

**Section-A (07 – 09)** contains 3 Assertion-Reasoning multiple choice questions which have only one correct answer. Each question carries **+3 marks** for correct answer and **– 1 mark** for wrong answer.

**Section-A (10 – 15)** contains 2 paragraphs. Based upon each paragraph, 3 multiple choice questions have to be answered. Each question has only one correct answer and carries **+4 marks** for the correct answer and **– 1 mark** for wrong answer.

- (ii) **Section-B (01 – 02)** contains 2 Matrix Match Type Questions which have statements given in 2 columns. Statements in the first column have to be matched with statements in the second column. There may be One or More Than One Correct choices. Each question carries **+8 marks** for all correct answer. For each correct row **+2 marks** will be awarded. **No negative marking** for wrong answer.

Name of the Candidate : \_\_\_\_\_

Batch : \_\_\_\_\_ Date of Examination : \_\_\_\_\_

Enrolment Number : \_\_\_\_\_

BATCH – Two Yr CRP(1820)

# **PART – I : PHYSICS**

## SECTION – A : (Single Correct Answer Type)

This section contains **6 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE is correct**.

1. A wire of length  $\ell$  metres carrying a current  $I$  amperes is bent in the form of a circle. The magnitude of the magnetic moment is

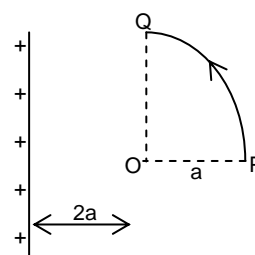
(A)  $\frac{\ell I^2}{2\pi}$  (B)  $\frac{\ell I^2}{4\pi}$   
 (C)  $\frac{\ell^2 I}{2\pi}$  (D)  $\frac{\ell^2 I}{4\pi}$

2. A wire of linear charge density  $\lambda$  passes through a cuboid of length  $l$ , breadth  $b$  and height  $h$  ( $l > b > h$ ) in such a manner that flux through the cuboid is maximum. The position of the wire is now changed, so that the flux through the cuboid is minimum. The ratio of maximum flux to minimum flux will be:

(A)  $\frac{\sqrt{l^2 + b^2}}{h}$  (B)  $\frac{\sqrt{l^2 + b^2 + h^2}}{h}$   
 (C)  $\frac{h}{\sqrt{l^2 + b^2}}$  (D)  $\frac{l}{\sqrt{l^2 + b^2 + h^2}}$

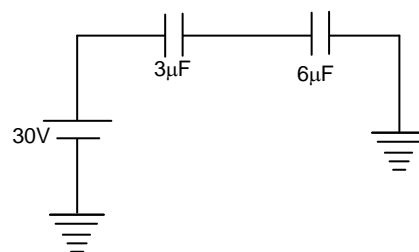
3. A arc PQ with centre at O and infinitely long wire having linear charge density  $\lambda$  are lying in the same plane. The minimum amount of work to be done to move a point charge  $q_0$  from point P to Q through circular path PQ of radius  $a$  is equal to:

(A)  $\frac{q_0^2}{2\pi\epsilon_0} \ln\left(\frac{2}{3}\right)$  (B)  $\frac{q_0\lambda}{2\pi\epsilon_0} \ln\left(\frac{2}{3}\right)$   
 (C)  $\frac{q_0\lambda}{2\pi\epsilon_0} \ln\left(\frac{3}{2}\right)$  (D)  $\frac{q_0^2}{2\pi\epsilon_0} \ln\left(\frac{3}{2}\right)$



4. In the circuit shown, change stored in capacitor of capacitance  $3\mu\text{F}$  is:

(A) zero (B)  $40\ \mu\text{C}$   
 (C)  $60\ \mu\text{C}$  (D)  $90\ \mu\text{C}$



5. A metallic wire is folded to form a square loop of side  $a$ . It carries a current  $i$  and is kept perpendicular to a uniform magnetic field  $B$ . If the shape of the loop is changed from square to an equilateral triangle without changing the length of the wire and current, the amount of work done in doing so is

(A)  $Bia^2 \left(1 - \frac{4\sqrt{3}}{9}\right)$  (B)  $Bia^2 \left(1 - \frac{\sqrt{3}}{9}\right)$   
 (C)  $\frac{2}{3}Bia^2$  (D) zero

6. A capacitor is charged and then made to discharge through a resistance. The time constant is  $\tau$ . In what time will the potential difference across the capacitor decrease by 10%?
- (A)  $\tau \ln(0.1)$  (B)  $\tau \ln(0.9)$   
(C)  $\tau \ln(10/9)$  (D)  $\tau \ln(11/10)$

(Assertion – Reason Type)

This section contains 3 reasoning type questions. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.

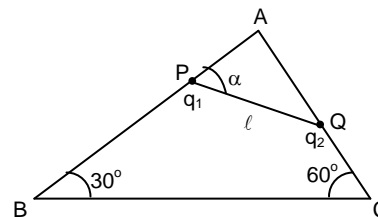
7. **Statement-1**  
At a point in space, the electric field points towards north. In the region surrounding this point the rate of change of potential will be zero along the east and west..
- Statement-2**  
Electric field due to a charge is the field all around the charge.
- (A) **Statement-1** is true, **Statement-2** is true, **Statement-2** is a correct explanation for **Statement-1**  
(B) **Statement-1** is true, **Statement-2** is true, **Statement-2** is not a correct explanation for **Statement-1**.  
(C) **Statement-1** is true, **Statement-2** is false.  
(D) **Statement-1** is false, **Statement-2** is true.
8. **Statement-1**  
The capacity of a conductor, under given circumstances, remains constant irrespective of the charge present on it.
- Statement-2**  
Capacity depends on size and shape of a conductor and also on the surrounding medium.
- (A) **Statement-1** is true, **Statement-2** is true, **Statement-2** is a correct explanation for **Statement-1**  
(B) **Statement-1** is true, **Statement-2** is true, **Statement-2** is not a correct explanation for **Statement-1**.  
(C) **Statement-1** is true, **Statement-2** is false.  
(D) **Statement-1** is false, **Statement-2** is true.
9. **Statement-1**  
The drift velocity of electrons in a metallic wire will decrease, if the temperature of the wire is increased.
- Statement-2**  
On increasing the temperature conductivity of metallic wire decreases.
- (A) **Statement-1** is true, **Statement-2** is true, **Statement-2** is a correct explanation for **Statement-1**  
(B) **Statement-1** is true, **Statement-2** is true, **Statement-2** is not a correct explanation for **Statement-1**.  
(C) **Statement-1** is true, **Statement-2** is false.  
(D) **Statement-1** is false, **Statement-2** is true.

## (Paragraph Type)

This section contains **2 paragraphs**. Based upon the paragraphs **3 multiple choice questions** have to be answered. Each of these questions has 4 choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

## Paragraph for Question Nos. 10 to 12

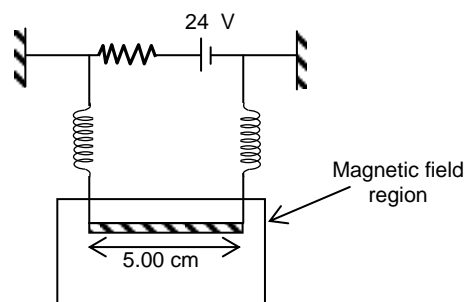
A rigid insulated wire frame in the form of a right angled triangle ABC is set in a vertical plane as shown in the figure. Two beads of equal masses  $m$  each and carrying charges  $q_1$  and  $q_2$  are connected by a cord of length  $\ell$  and can slide without friction on the wires. Suppose the beads are stationary in a particular situation and string PQ makes an angle  $\alpha$  with the wire PA.



10. The value of angle  $\alpha$  is given by  
 (A)  $30^\circ$  (B)  $60^\circ$   
 (C)  $15^\circ$  (D)  $45^\circ$
11. The tension in the cord PQ is given by  
 (A)  $mg + \frac{q_1 q_2}{\ell^2}$  (B)  $mg - \frac{q_1 q_2}{\ell^2}$   
 (C)  $\frac{q_1 q_2}{\ell^2}$  (D)  $mg$
12. The normal reactions on the two beads are  
 (A)  $R_1 = mg$  and  $R_2 = \sqrt{3}mg$  (B)  $R_1 = \sqrt{3}mg$  and  $R_2 = mg$   
 (C)  $R_1 = R_2 = mg$  (D)  $R_1 = R_2 = \sqrt{3}mg$

## Paragraph for Question Nos. 13 to 15

The circuit in figure consists of wires at the top and bottom and identical metal springs as the left and right sides. The wire at the bottom has a mass of 10.0 g and is 5.00 cm long. The wire is hanging as shown in the figure. The springs stretch by 0.500 cm under the weight of the wire and the circuit has a total resistance of 12.0  $\Omega$ . When a horizontal magnetic field is turned on, the springs stretch by an additional 0.300 cm. (Neglect any magnetic attraction between different loops of the springs)

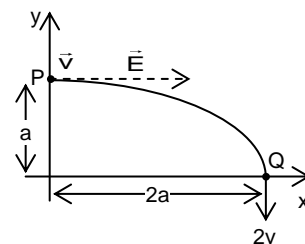


13. From the above statements we can conclude that  
 (A) the magnetic field is directed into the plane of page  
 (B) the magnetic field is directed outward of the plane of the page  
 (C) the magnetic field is toward left in the plane of page  
 (D) the magnetic field is toward right in the plane of page
14. The magnitude of magnetic field, according to above question, is  
 (A) 1.2T (B) 6T  
 (C) 0.6T (D) 12T
15. If gravity is neglected then extension in the spring will  
 (A) increase (B) decrease  
 (C) remains constant (D) none of these

**SECTION – B : (Matrix–Match Type)**

This section contains **two questions**, each having **two matching Columns**. Choices for the correct combination of elements from **Column-I** and **Column-II** are given as option (A), (B), (C) and (D) out of which **one or more than one** are correct.

1. A particle of charge  $+q$  and mass  $m$  moving under the influence of a uniform electric field  $E\hat{i}$  and uniform magnetic field  $B\hat{k}$ , follows a trajectory from P to Q as shown in figure. The velocities at P and Q are  $v\hat{i}$  and  $-2v\hat{j}$ .

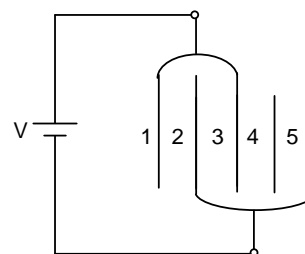


Match the entries of column I with the entries of column II.

Column I		Column II	
(A)	Electric field E equals	(P)	$\frac{mv^2}{qa}$
(B)	If rate of work done by the electric field at P = $b q v$ , then $b =$	(Q)	0
(C)	If rate of work done by both the fields at Q = $c q v$ , then $c =$	(R)	$\frac{3 mv^2}{4 qa}$
(D)	If rate of work done by both the fields at P = $c q v$ , then $c =$	(S)	$\frac{5 mv^2}{4 qa}$

- 2 Match the following

The figure shows five identical parallel plates each of area A and mutual separation d. Medium between the plates is vacuum. The system is connected to a battery of e.m.f. V. then



Column - I		Column - II	
(A)	Charge on plate 2 is	(P)	Zero
(B)	Charge on plate 5 is	(Q)	$\frac{3\epsilon_0 AV}{2d}$
(C)	Charge on plate 3 is	(R)	$-\frac{\epsilon_0 A}{2d} V$
(D)	Charge on plate 4 is	(S)	$-2\frac{\epsilon_0 A}{d} V$

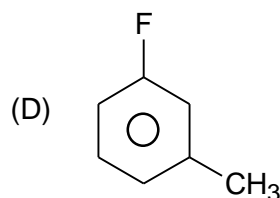
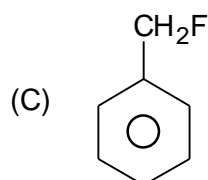
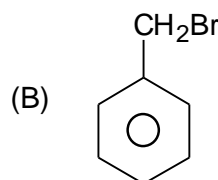
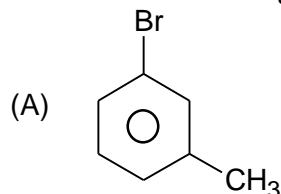
*Space for rough work*

## **PART – II : CHEMISTRY**

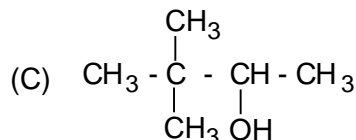
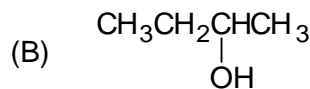
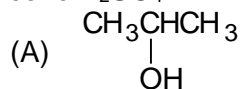
### SECTION – A : (Single Correct Answer Type)

This section contains **6 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 compound is most reactive towards  $\text{OH}^-$  ion through  $\text{S}_{\text{N}}1$  path?

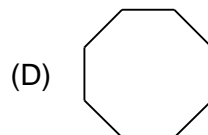
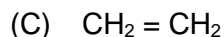
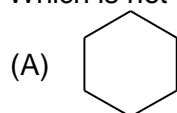


2. Which of the following alcohol forms only one alkene on dehydration reaction with conc.  $\text{H}_2\text{SO}_4$ ?

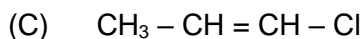
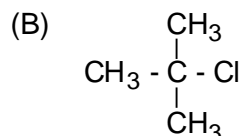
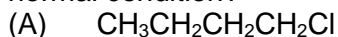


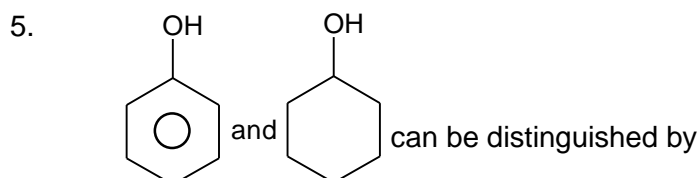
3. 
$$\begin{array}{c} \text{CH}_2\text{COONa} \\ | \\ \text{CH}_2\text{COONa} \end{array} \xrightarrow{\text{Electrolysis}} \text{Product}$$

Which is not formed at all in above reaction?



4. Which of the following compound does not undergo nucleophilic substitution reaction under normal condition?





- (A)  $\text{FeCl}_3$  test (B) Tollen's test  
(C)  $\text{HNO}_2$  test (D) Iodoform test

6. Which of the following has the weakest C – X (carbon to halogen) bond?

- (A)  $\text{CH}_3\text{F}$  (B)  $\text{CH}_3\text{Cl}$   
(C)  $\text{CH}_3\text{Br}$  (D)  $\text{CH}_3\text{I}$

(Assertion – Reason Type)

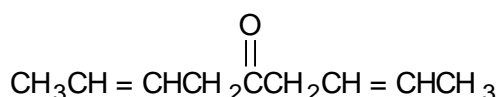
This section contains 3 reasoning type questions. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

7. Assertion:  $\text{CH}_3\text{I}$  is kept in dark bottles.  
Reason : It undergoes photochemical decomposition in presence of light.  
(A) Both Assertion & Reason are true and Reason is a correct explanation for Assertion.  
(B) Both Assertion & Reason are true but Reason is NOT a correct explanation for Assertion.  
(C) Assertion is True, Reason is False.  
(D) Assertion is False, Reason is True.
8. Assertion: Alcohol and ethers are functional isomers.  
Reason: Both contains oxygen atoms.  
(A) Both Assertion & Reason are true and Reason is a correct explanation for Assertion.  
(B) Both Assertion & Reason are true but Reason is NOT a correct explanation for Assertion.  
(C) Assertion is True, Reason is False.  
(D) Assertion is False, Reason is True.
9. Assertion: Formalin is an 60% (V/V) aqueous solution of formic acid.  
Reason: Formic acid contains one carbon atom.  
(A) Both Assertion & Reason are true and Reason is a correct explanation for Assertion.  
(B) Both Assertion & Reason are true but Reason is NOT a correct explanation for Assertion.  
(C) Assertion is True, Reason is False.  
(D) Assertion is False, Reason is True.

(Paragraph Type)

This section contains 2 paragraphs. Based upon the paragraphs 3 multiple choice questions have to be answered. Each of these questions has 4 choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

Paragraph for Question Nos. 10 to 12



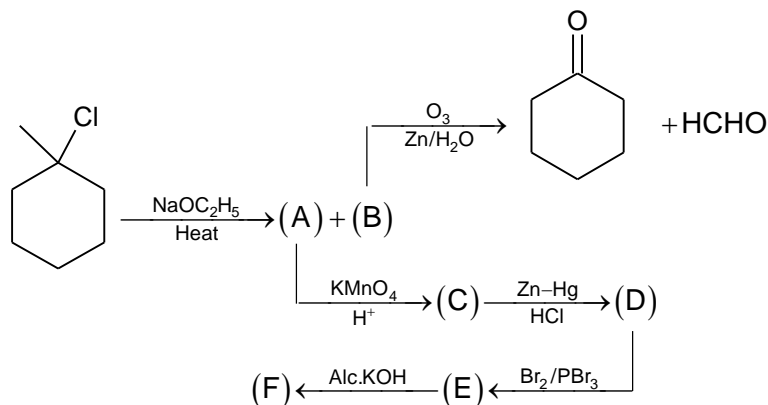
Oxidation of the above compound with hot acidified permanganate solution forms two moles of (P) and one mole of (Q). Heating of (Q) produces the organic compound (R) and  $\text{CO}_2$  gas.

Answer the following questions on the basis of above reactions.

10. Which of the following is (P)?  
(A)  $\text{CH}_3\text{CHO}$  (B)  $\text{CH}_3\text{COOH}$   
(C)  $\text{CH}_2=\text{CH}_2$  (D)  $\text{CH}_3\text{CH}_2\text{OH}$

11. Compound(R) is:  
 (A)  $\text{CH}_3\text{COCH}_3$  (B)  $\text{CH}_3\text{OCH}_3$   
 (C)  $\text{CH}_3\underset{\text{OH}}{\text{CH}}\text{CH}_3$  (D)  $\text{CH}_3\text{CH}_2\text{CHO}$
12. How many pi-bond(s) is/are present in (P)?  
 (A) 1 (B) 2  
 (C) 3 (D) zero

## Paragraph for Question Nos. 13 to 15



Answer the following questions on the basis of above write up.

13. Which of the following statement is correct for the compound(E)?  
 (A) It is a vicinal bromide (B) It is an  $\alpha$ -bromo acid  
 (C) It is a  $\beta$ -bromo acid (D) It reacts with HCl to form acid chloride
14. Which of the following is 'F'?  
 (A)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\underset{\text{OH}}{\text{CH}}\text{COOH}$  (B)  $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_2\text{COOK}$   
 (C)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}=\text{CH}-\text{COOK}$  (D)  $\text{CH}_3\text{CH}_2\text{CH}_2\underset{\text{OH}}{\text{CH}}\text{CH}_2\text{COOK}$
15. Compound(C) is a/an  
 (A) hydroxyl acid (B) keto acid  
 (C) unsubstituted acid (D) bromo acid



**SECTION – B : (Matrix–Match Type)**

This section contains **two questions**, each having **two matching Columns**. Choices for the correct combination of elements from **Column-I** and **Column-II** are given as option (A), (B), (C) and (D) out of which **one or more than one** are correct.

1. Match the reaction mechanisms mentioned for alkyl monochlorides mentioned in Column-I with their properties and others mentioned in Column-II.

Column – I		Column – II	
(A)	$S_N1$	(P)	Reaction intermediate(s) are formed
(B)	$S_N2$	(Q)	Major stereochemical change is inversion for chiral reactants
(C)	$E_1$	(R)	Major stereochemical change is racemisation for chiral reactants
(D)	$E_2$	(S)	Alkenes are formed

2. Match the compounds in each option as mentioned in Column-I with their distinction tests mentioned in Column-II.

Column – I		Column – II	
(A)	$CH_3CHO$ and $CH_3COCH_3$	(P)	Tollen's test
(B)	$C_6H_5CHO$ and $HCHO$	(Q)	Fehling's test
(C)	$(CH_3)_3COH$ and $C_2H_5OH$	(R)	Iodoform test
(D)	$C_6H_5OH$ and $CH_3CHO$	(S)	Lucas test

*Space for rough work*

## **PART – III : MATHEMATICS**

### SECTION – A : (Single Correct Answer Type)

This section contains **6 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE is correct**.

1. If the curves  $\frac{x^2}{a^2} + \frac{y^2}{4} = 1$  and  $y^3 = 16x$  intersect at right angles then  $a^2 =$ 

(A) 1 (B) 4/3  
(C) 4/5 (D) 5/4
2. If  $f(x) = 0$  be a quadratic equation such that  $f(-\pi) = f(\pi) = 0$  and  $f\left(\frac{\pi}{2}\right) = \frac{-3\pi^2}{4}$ , then  $\lim_{x \rightarrow -\pi} \frac{f(x)}{\sin(\sin x)}$  is equal to

(A) 0 (B)  $\pi$   
(C)  $2\pi$  (D) None
3. Range of  $f(x) = \sin^{-1} x + \cos^{-1} x + \tan^{-1} x + \sec^{-1} x$  is

(A)  $\left[\frac{3\pi}{4}, \frac{5\pi}{4}\right]$  (B)  $\left(\frac{3\pi}{4}, \frac{5\pi}{4}\right)$   
(C)  $\left\{\frac{3\pi}{4}, \frac{5\pi}{4}\right\}$  (D)  $\{-1, 1\}$
4. Let  $f(x) = x^3 + x^2$  and  $g(x)$  be the inverse of  $f(x)$ , then the value of  $g'(2) =$ 

(A)  $\frac{1}{3}$  (B)  $\frac{1}{4}$   
(C)  $\frac{1}{5}$  (D)  $\frac{1}{6}$
5. Let  $f$  be a function satisfy  $f(xy) = \frac{f(x)}{y}$  for all positive real numbers  $x$  and  $y$  if  $f(30) = 20$  then  $f(40) =$ 

(A) 10 (B) 15  
(C) 20 (D) 25
6. If  $\lim_{x \rightarrow \infty} \left(1 + \frac{a}{x} + \frac{b}{x^2}\right)^{2x} = e^2$ , then

(A)  $a = 1, b = 2$  (B)  $a = 2, b = 1$   
(C)  $a = 1, b \in \mathbb{R}$  (D) none of these

## (Assertion – Reason Type)

This section contains **3 reasoning type questions**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

7. Let  $f(x) = [\cos x + \sin x]$ ,  $0 < x < 2\pi$  where  $[x]$  denotes G.I.F  
 Assertion:  $f(x)$  is discontinuous at 5 points.  
 Reason: For  $x = \frac{\pi}{2}, \frac{3\pi}{4}, \pi, \frac{5\pi}{4}, \frac{3\pi}{2}$ , right hand limit is not equal to left hand limit.
- (A) If both **assertion** and **reason** are true and **reason** is the correct explanation of **assertion**.  
 (B) If both **assertion** and **reason** are true but **reason** is not the correct explanation of **assertion**.  
 (C) If **assertion** is true but **reason** is false.  
 (D) If **assertion** is false but **reason** is true.
8. Assertion : Function  $f(x) = x^2 + \tan^{-1} x$  is a none – periodic function.  
 Reason: The sum of two non – periodic function is always non – periodic.
- (A) If both **assertion** and **reason** are true and **reason** is the correct explanation of **assertion**.  
 (B) If both **assertion** and **reason** are true but **reason** is not the correct explanation of **assertion**.  
 (C) If **assertion** is true but **reason** is false.  
 (D) If **assertion** is false but **reason** is true.
9.  $f(x) = [x] \cos \left( \left[ \frac{2x-1}{2} \right] \pi \right)$  where  $[.]$  denotes the greatest integer function,  
 Assertion:  $f(x)$  is discontinuous at  $x = \frac{n}{2}, n \in I - \{1\}$   
 Reason: If the domain of  $f(x)$  is  $x \in R - (-1, 1)$  then the domain of the function  $f \left( [\sin x] \cos \frac{x}{[x-1]} \right)$  (where  $[.]$  denotes the G.I.F.) is  $x \in \phi$ .
- (A) If both **assertion** and **reason** are true and **reason** is the correct explanation of **assertion**.  
 (B) If both **assertion** and **reason** are true but **reason** is not the correct explanation of **assertion**.  
 (C) If **assertion** is true but **reason** is false.  
 (D) If **assertion** is false but **reason** is true.

## (Paragraph Type)

This section contains **2 paragraphs**. Based upon the paragraphs **3 multiple choice questions** have to be answered. Each of these questions has 4 choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

## Paragraph for Question Nos. 10 to 12

Let a function is defined as  $f(x) = \begin{cases} [x], & -2 \leq x \leq -\frac{1}{2} \\ 2x^2 - 1 & -\frac{1}{2} < x \leq 2 \end{cases}$ , where  $[.]$  denotes greatest integer function.

Answer the following question by using the above information

10. The number of points of discontinuity of  $f(x)$  is  
 (A) 1 (B) 2  
 (C) 3 (D) None of these

11. The function  $f(x-1)$  is discontinuous at the points  
 (A)  $-1, -\frac{1}{2}$  (B)  $-\frac{1}{2}, 1$   
 (C)  $0, \frac{1}{2}$  (D)  $0, 1$
12. Number of points where  $|f(x)|$  is not differentiable is  
 (A) 1 (B) 2  
 (C) 3 (D) 4

**Paragraph for Question Nos. 13 to 15**

If a continuous function  $f$  defined on the real line  $R$ , assumes positive and negative values in  $R$  then the equation  $f(x) = 0$  has a root in  $R$ . For example, if it is known that a continuous function  $f$  on  $R$  is positive at some point and its minimum value is negative then the equation  $f(x) = 0$  has a root in  $R$ .

13. The line  $y = x$  meets  $y = ke^x$  for  $k \leq 0$  at  
 (A) no point (B) one point  
 (C) two point (D) more than two points
14. The positive value of  $k$  for which  $ke^x - x = 0$  has only one root is  
 (A)  $\frac{1}{e}$  (B) 1  
 (C)  $e$  (D)  $\log_e 2$
15. For  $k > 0$ , the set of all values of 'k' for which  $ke^x - x = 0$  has tow distinct roots is  
 (A)  $\left(0, \frac{1}{e}\right)$  (B)  $\left(\frac{1}{e}, 1\right)$   
 (C)  $\left(\frac{1}{e}, \infty\right)$  (D)  $(0, 1)$

**SECTION – B : (Matrix–Match Type)**

This section contains **two questions**, each having **two matching Columns**. Choices for the correct combination of elements from **Column-I** and **Column-II** are given as option (A), (B), (C) and (D) out of which **one or more than one** are correct.

1. Match the following

Column-I		Column-II	
(A)	The function $f(x) = \frac{x}{(1+x^2)}$ decreases in the interval	(P)	$(-\infty, -1)$
(B)	The function $f(x) = \tan^{-1} x - x$ decreases in the interval	(Q)	$(-\infty, 0)$
(C)	The function $f(x) = x - e^x + \tan\left(\frac{2\pi}{7}\right)$ increases in the interval	(R)	$(0, \infty)$
(D)	The function $f(x) = e^x + e^{-x}$ increases in the interval	(S)	$(1, \infty)$
		(T)	$(-\infty, \infty)$

2 Consider  $f(x) = \frac{a \cos x + bx \sin x - 6}{x^4}$  and  $\lim_{x \rightarrow 0} f(x)$  is finite ( $a, b \in \mathbb{R}$ )

Column A		Column B	
(A)	Value of a	(P)	-1/4
(B)	Value of b	(Q)	6
(C)	$\lim_{x \rightarrow 0} f(x)$ for above values of a and b is	(R)	3
(D)	If $f(0) = c$ then c equal to	(S)	$\frac{b-a}{12}$

*Space for rough work*

# FIITJEE INTERNAL TEST

**BATCH: Two Yr CRP (1820)**

**QP Code:**

**PAPER II (PHASE – IV)**

**ANSWERS**

## PHYSICS (PART-I)

- |          |       |                 |       |      |
|----------|-------|-----------------|-------|------|
| 1. D     | 2. B  | <u>Part – A</u> | 3. C  | 4. C |
| 5. A     | 6. C  | 7. B            | 8. A  |      |
| 9. A     | 10. B | 11. A           | 12. B |      |
| 13. B    | 14. C | 15. B           |       |      |
|          |       | <u>Part – B</u> |       |      |
| 1. A → R | B → R | C → Q           | D → R |      |
| 2. A → S | B → R | C → Q           | D → P |      |

## CHEMISTRY (PART-II)

- |           |       |                 |         |      |
|-----------|-------|-----------------|---------|------|
| 1. B      | 2. A  | <u>Part – A</u> | 3. B    | 4. C |
| 5. A      | 6. D  | 7. A            | 8. B    |      |
| 9. D      | 10. B | 11. A           | 12. A   |      |
| 13. B     | 14. C | 15. B           |         |      |
|           |       | <u>Part – C</u> |         |      |
| 1. A → PR | B → Q | C → PS          | D → S   |      |
| 2. A → PQ | B → Q | C → RS          | D → PQR |      |

## MATHEMATICS (PART-III)

- |           |           |                 |        |      |
|-----------|-----------|-----------------|--------|------|
| 1. B      | 2. C      | <u>Part – A</u> | 3. C   | 4. C |
| 5. B      | 6. C      | 7. C            | 8. B   |      |
| 9. B      | 10. B     | 11. C           | 12. C  |      |
| 13. B     | 14. A     | 15. A           |        |      |
|           |           | <u>Part – B</u> |        |      |
| 1. A → PS | B → PQRST | C → PQ          | D → RS |      |
| 2. A → Q  | B → R     | C → P           | D → S  |      |