

## PHYSICS, CHEMISTRY & MATHEMATICS

Pattern - CPT-1

QP Code:

PAPER - 2

Time Allotted: 3 Hours

Maximum Marks: 183

- 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** 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 Only One Part.

- (i) **Part-A (01-07)** – Contains seven (07) multiple choice questions which have **One or More** correct answer.  
*Full Marks: +4* If only the bubble(s) corresponding to all the correct options(s) is (are) darkened.  
*Partial Marks: +1* For darkening a bubble corresponding to **each correct option**, provided NO incorrect option is darkened.  
*Zero Marks: 0* If none of the bubbles is darkened.  
**Negative Marks: -1 In all other cases.**  
For example, if **(A), (C) and (D)** are all the correct options for a question, darkening all these three will result in **+4 marks**; darkening only **(A) and (D)** will result in **+2 marks**; and darkening **(A) and (B)** will result in **-1 marks**, as a wrong option is also darkened.
- (ii) **Part-A (08-14)** – Contains seven (07) multiple choice questions which have ONLY ONE CORRECT answer  
Each question carries **+3 marks** for correct answer and **-1 marks** for wrong answer.
- (iii) **Part-A (15-18)** - This section contains Two paragraphs. Based on each paragraph, there are Two multiple choice questions. Each question has only one correct answer and carries **+3 marks** for the correct answer and **-1 marks** for wrong answer.

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

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

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

BATCHES – NWCMSA122A1-PT1

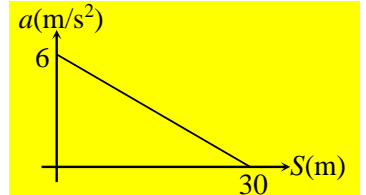
# **SECTION-1 : PHYSICS**

## **PART – A**

### **(Multi Correct Choice Type)**

This section contains 7 **multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONE OR MORE** may be correct.

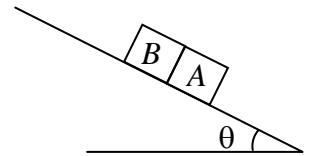
1. A train starts from rest at  $S = 0$  and is subjected to acceleration as shown



- (A) Change in velocity at the end of 10 m displacement is 50 m/s.
- (B) Velocity of the train for  $S = 10$  m is 10 m/s.
- (C) The maximum velocity attained by train is not greater than 14 m/s
- (D) The maximum velocity of the train is between 15 m/s and 16 m/s.

1. **BC**

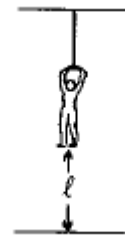
2. Two blocks having same mass are placed on rough incline plane and the coefficient of friction between A and incline is  $\mu_1 = 1.0$  and between block B and incline is  $\mu_2 = \frac{1}{\sqrt{3}}$ . As the inclination of the plane ' $\theta$ ' with respect to horizontal increases. Choose the correct answers(s).



- (A) there is no contact force between block A and B for  $\theta \leq 30^\circ$
- (B) there is no contact force between blocks A and B for  $\theta \leq 45^\circ$
- (C) both the blocks either move together or they both remain at rest
- (D) they starts moving at an angle  $\theta = \tan^{-1}\left(\frac{\mu_1 + \mu_2}{2}\right)$

2. **ACD**

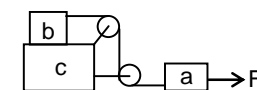
3. One end of a light rope is tied directly to the ceiling. A man of mass  $m$  initially at rest on the ground starts climbing (slowly) the rope without slipping upto a height  $\ell$  which is quite large in comparison to the dimension of man. From the time he starts at rest on the ground to the time he is hanging at rest at a height  $\ell$ . Then



- (A) work done on man by rope is zero.
- (B) work done by gravity is  $-mg\ell$ .
- (C) work done by man is  $mg\ell$ .
- (D) work done by man is zero.

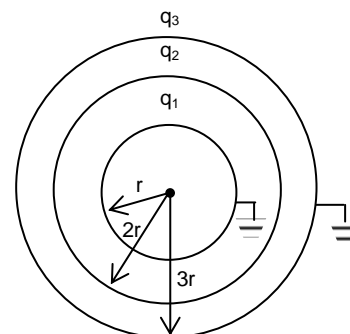
3. **ABC**

4. Three blocks a, b, and c of masses 10 kg, 10 kg and 20 kg are arranged as shown in figure. All the surfaces are frictionless and string is inextensible. Pulleys are light. A constant force  $F = 20 \text{ N}$  is applied on block a as shown. Pulleys and string are light. Part of the string connecting both pulleys is vertical and part of the strings connecting pulleys with blocks a and b are horizontal.
- (A) Acceleration of blocks a is  $0.5 \text{ m/s}^2$ .  
 (B) Acceleration of block b is 1.  
 (C) Tension in the string is 10 N.  
 (D) Acceleration of block c is 0.5



4. **BC**

5. Three concentric conducting spherical shells have radii  $r$ ,  $2r$  and  $3r$  and charges  $q_1$ ,  $q_2$  and  $q_3$  respectively. Innermost and outermost shells are earthed as shown in figure. Select the correct alternative (s)



- (A)  $q_1 + q_3 = -q_2$   
 (B)  $q_1 = -\frac{q_2}{4}$   
 (C)  $\frac{q_3}{q_1} = 3$   
 (D)  $\frac{q_3}{q_2} = -\frac{1}{3}$

5. **ABC**

6. Four identical particles, each having mass  $m$  and charge  $q$ , are placed at the vertices of a square of side  $\ell$ . All the particle are free to move without any friction and released simultaneously from rest. Then

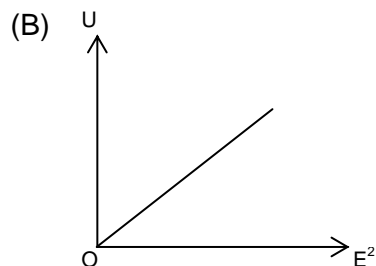
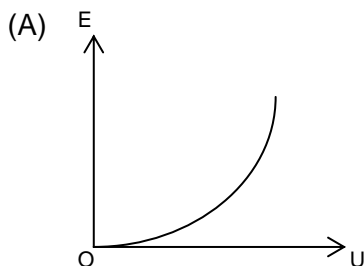
- (A) At all instant, the particles remain at vertices of square whose edge length is charging  
 (B) the configuration is changing (not remaining square) as the time passes  
 (C) The speed of the particle when all of the particles get displaced by  $\frac{\ell}{\sqrt{2}}$  is

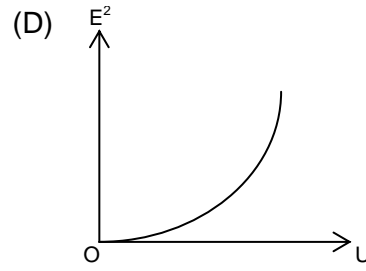
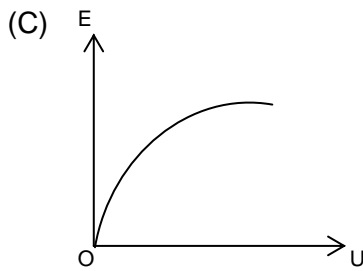
$$\sqrt{\frac{q^2}{8\pi\epsilon_0 m \ell} \left( 2 + \frac{1}{\sqrt{2}} \right)}$$

- (D) Speed of the particle cannot be found

6. **AC**

7. If at distance  $r$  from a positively charged particle electric field strength and energy density are  $E$  and  $U$ , respectively, which of the following graphs is/are correct



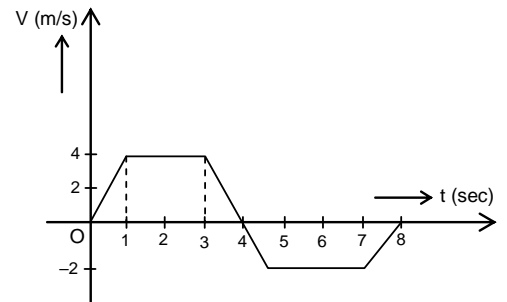


7. **BC**

**(Single Correct Choice Type)**

This section contains **7 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE is correct**.

8. The velocity-time graph of a linear motion is shown in figure. The displacement from the origin after 8 second is



- (A) 5 m
- (B) 16 m
- (C) 8 m
- (D) 6 m

8. **A**

9. A man standing on a road hold his umbrella at  $30^\circ$  with the vertical to keep the rain away. He throws the umbrella and starts running at 10 km/hr. He finds that raindrops are hitting his head vertically, the speed of raindrops with respect to the road will be

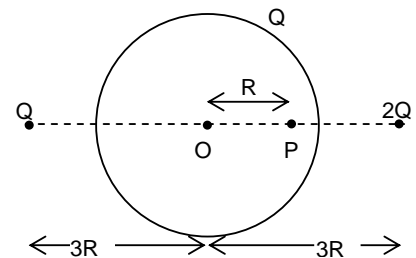
- (A) 10 km/hr
- (B) 20 km/hr
- (C) 30 km/hr
- (D) 40 km/hr

9. **B**

10. A solid conducting sphere of radius  $2R$ , carrying charge  $Q$  is surrounded by two point charge  $Q$  and  $2Q$  as shown in the figure. If the electric field at point  $P$  due to the induced charges on conducting sphere is

is  $\frac{n KQ}{16 R^2}$ ,  $n =$

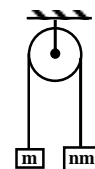
- (A) 5
- (B) 7
- (C) 9
- (D) 11



10. **B**

11. Two blocks of masses  $m$  and  $nm$  are connected by a massless string passing over a frictionless pulley. The value of  $n$  for which both the blocks moves with an acceleration of  $g/10$  is

- (A)  $9/11$
- (B)  $11/9$
- (C) Both (A) and (B)
- (D) None



11. **C**

12. If  $\vec{A} = \vec{B} = \vec{C}$  and  $\frac{d\vec{C}}{dt} = \vec{B} \times \vec{C}$ , find the correct option ( $t$  is the time):

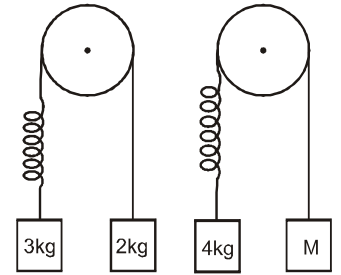
- (A)  $\vec{C}$  does not change with time.
- (B)  $\vec{B}$  does not change with time.

- (C) Magnitude of  $\vec{C}$  does not change with time.
- (D) Magnitude of  $\vec{B}$  does not change with time.

12. **C**

13. In the two systems as shown, acceleration of the blocks is constant. What should be value of mass M so that extensions in two springs (of same spring constant k) is same (in kg)?

- (A)  $\frac{12}{9}$
- (B)  $\frac{12}{5}$
- (C)  $\frac{15}{7}$
- (D)  $\frac{12}{7}$



13. **D**

14. A particle is projected from point A on the ground at an angle  $\theta$  with horizontal. Another particle is projected from point B simultaneously from height  $4H$  above point A with same speed. A and B are in the same vertical plane, where  $H$  is the maximum height attained by the particle A. Both the particles collide at the same time on the ground. Find the angle at which particle B is projected with horizontal:

- (A)  $\theta$  upwards
- (B)  $\theta$  downwards
- (C) Zero
- (D)  $2\theta$  upwards

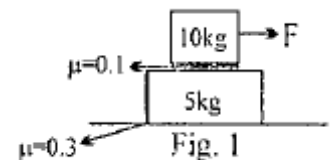
14. **C**

**(Paragraph Type)**

This section contains **2 paragraphs**. Based upon the paragraphs **2 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 no. 15 to 16**

For the arrangement of two blocks shown in figure a force  $F$  is applied on the top block as shown in figure. (take  $g = 10 \text{ m/s}^2$ )



15. When  $F = 2\text{N}$ , the frictional force between 5 kg block and ground is

- (A) 2 N
- (B) 0
- (C) 8 N
- (D) 10 N

15. **A**

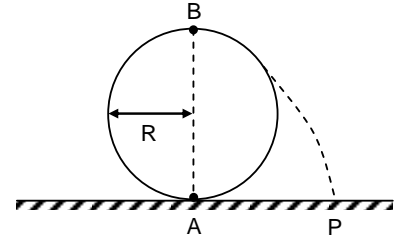
16. The acceleration of 10 kg block when  $F = 30 \text{ N}$

- (A)  $2 \text{ m/s}^2$
- (B)  $3 \text{ m/s}^2$
- (C)  $1 \text{ m/s}^2$
- (D) None of these

16. **A**

## Paragraph for Question no. 17 to 18

A particle slides down the surface of a smooth fixed sphere of radius  $R$  starting from rest at the highest point  $B$ . The particle leaves the sphere at some point and then strikes the horizontal plane through the lowest point  $A$  of the sphere, at a point  $P$  as shown in the figure. The acceleration due to gravity is ( $g = 10 \text{ m/sec}^2$ )



17. What will be range  $AP$  on ground?

(A)  $\frac{5}{27}(\sqrt{5} + 4\sqrt{2})R$

(B)  $\frac{5}{27}(\sqrt{5} - 4\sqrt{2})R$

(C)  $(\sqrt{5} + 4)R$

(D)  $(\sqrt{5} - 4)R$

17. **A**

18. Height from ground at which particle leaves contact with sphere.

(A)  $h = R$

(B)  $h = \frac{2}{3}R$

(C)  $\frac{5}{3}R$

(D)  $\frac{\sqrt{5}R}{2}$

18. **C**

## **SECTION-2 : CHEMISTRY**

### **PART – A**

#### **(Multi Correct Choice Type)**

This section contains 7 **multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONE OR MORE** may be correct.

1. Which of the following atom(s) or group(s) show(s) –I and +R effect when bonded to benzene ring?  
 (A) NO<sub>2</sub> (B) F  
 (C) OH (D) CH<sub>3</sub>

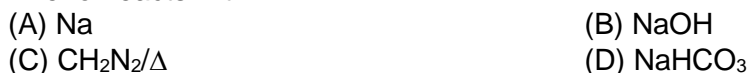
1. **BC**

2. Which of the following compound(s) cannot be prepared by reacting CH<sub>3</sub>C ≡ CH with HgSO<sub>4</sub>/dil.H<sub>2</sub>SO<sub>4</sub>?



2. **BC**

3. Phenol reacts with



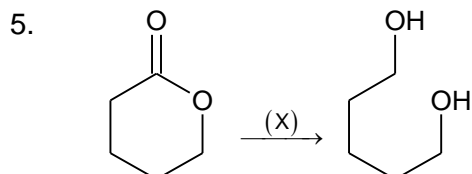
3. **ABC**

4.  $\text{C}_6\text{H}_5\text{CHO} + \text{C}_6\text{H}_5\text{CHO} \xrightarrow{\text{Conc. NaOH}} \text{Product (s)}$

Choose correct statement(s) regarding the above reaction?

- (A) It is an intermolecular redox reaction  
 (B) More than one product is formed in the reaction  
 (C) Alkyl shift takes place in the reaction  
 (D) A carbanion intermediate is formed in the reaction

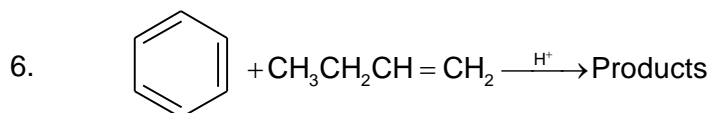
4. **AB**



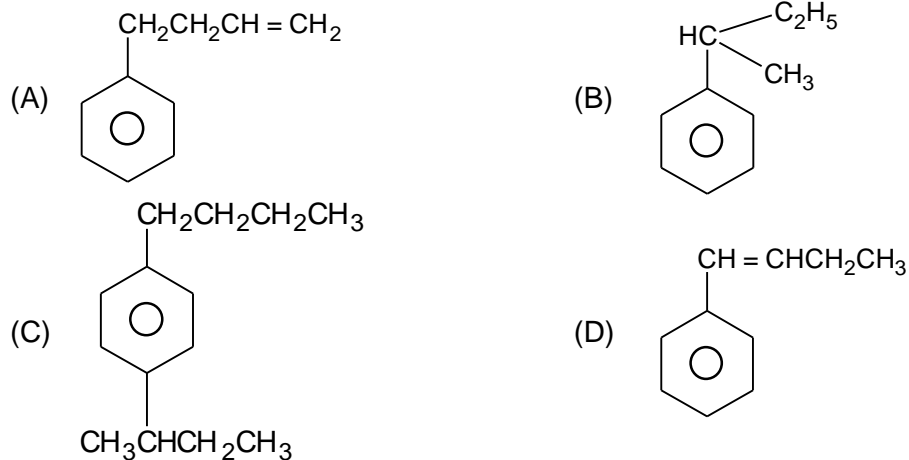
In the above reaction (X) may be

- (A) LiAlH<sub>4</sub> (B) NaBH<sub>4</sub>  
 (C) B<sub>2</sub>H<sub>6</sub> (D) H<sub>2</sub>/Ni

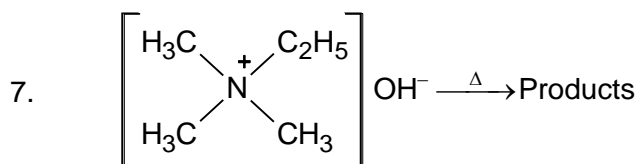
5. **ACD**



Which of the following is/are not the product of above reaction?



6 AD



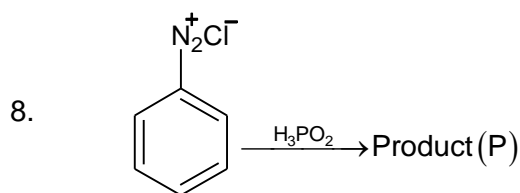
Product(s) of above reaction is/are

- (A)  $\text{C}_2\text{H}_4$  (B)  $\text{C}_2\text{H}_5\text{OH}$   
 (C)  $(\text{CH}_3)_3\text{N}$  (D)  $\text{CH}_4$

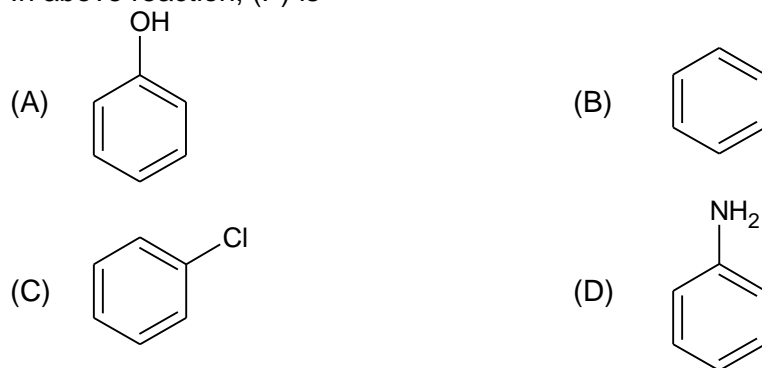
7. AC

**(Single Correct Choice Type)**

This section contains 7 multiple choice questions. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE is correct.**

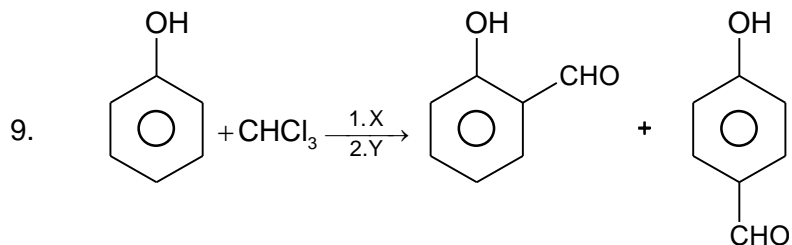


In above reaction, (P) is



8. B



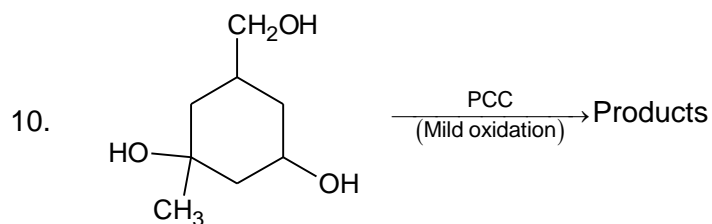


X, Y in the above reaction are respectively

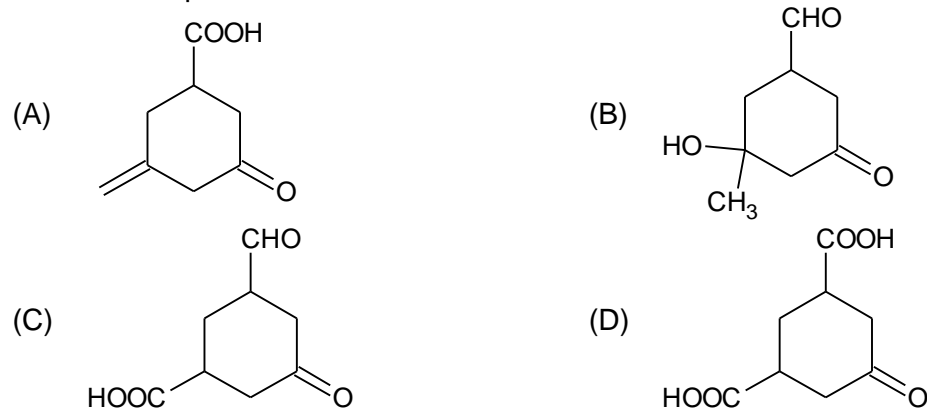
- (A) NaOH and KOH  
(C) KOH and HCHO

- (B) NaOH and HCl  
(D) HCl and KOH

9. **B**

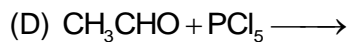
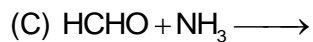
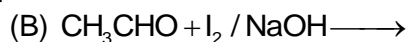
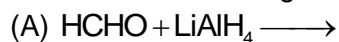


The oxidized product of above reaction is:



10. **B**

11. Which of the following reaction forms urotropine?



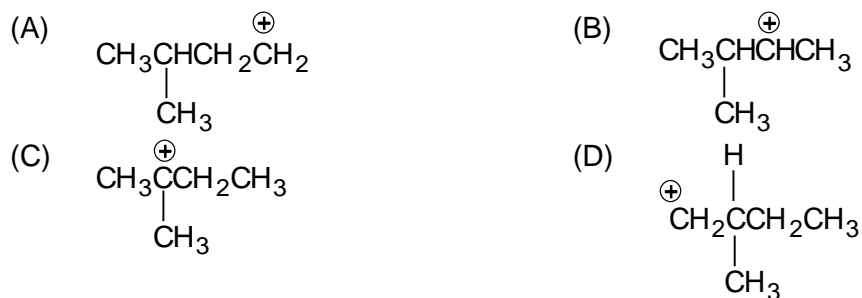
11. **C**

12. The electronegativity of an element is expressed as  

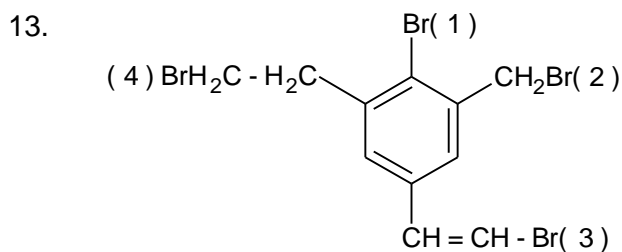
$$\text{Electronegativity} = \frac{\text{Ionization energy} + |\text{Electron affinity}|}{2}$$

This is postulated by

- (A) Pauling (B) Gay-Lussacs  
 (C) Mulliken (D) Mendleves



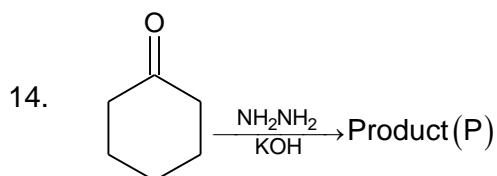
12. **C**



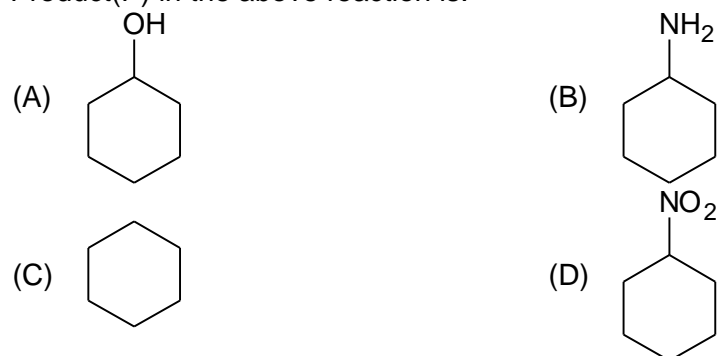
Which bromine atom in the above molecule can be easily substituted by a nucleophile?

- (A) 1 (B) 2  
 (C) 3 (D) 4

13. **B**



Product(P) in the above reaction is:



14. **C**

**(Paragraph Type)**

This section contains **2 paragraphs**. Based upon the paragraphs **2 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 no. 15 to 16**

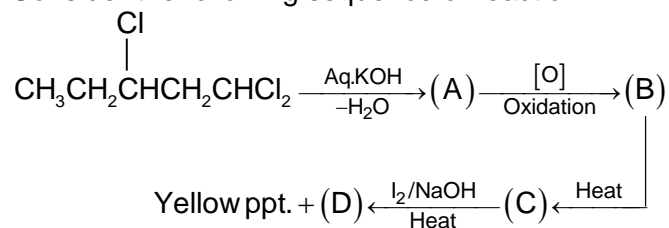
Compound A(C<sub>6</sub>H<sub>10</sub>) on reductive ozonolysis forms two moles of (B) and one mole of (C). Reduction of (B) with LiAlH<sub>4</sub> forms (D), (C) on same reduction forms(E) which is also obtained by the reaction between CH<sub>2</sub> = CH<sub>2</sub> and cold alkaline permanganate solution.

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

15. Which of the following is (B)?  
 (A) CH<sub>3</sub>COOH (B) CH<sub>3</sub>CHO  
 (C) CH<sub>3</sub>CH<sub>2</sub>OH (D) CH<sub>3</sub>CH<sub>3</sub>
15. **B**
16. Oxidation of compound(C) produces  
 (A)  $\begin{array}{c} \text{CH}_2\text{OH} \\ | \\ \text{CH}_2\text{OH} \end{array}$  (B)  $\begin{array}{c} \text{COOH} \\ | \\ \text{COOH} \end{array}$   
 (C)  $\begin{array}{c} \text{CH}_2\text{COOH} \\ | \\ \text{CH}_2\text{COOH} \end{array}$  (D)  $\begin{array}{c} \text{CH}_2\text{CHO} \\ | \\ \text{CH}_2\text{CHO} \end{array}$
16. **B**

**Paragraph for Question no. 17 to 18**

Consider the following sequence of reaction.



Answer the following questions on the basis of above reactions.

17. Which of the following is (A)?  
 (A)  $\begin{array}{c} \text{O} \\ || \\ \text{CH}_3\text{CH}_2\text{CCH}_2\text{COOH} \end{array}$  (B)  $\begin{array}{c} \text{OH} \\ | \\ \text{CH}_3\text{CH}_2\text{CHCH}_2\text{COOH} \end{array}$   
 (C)  $\begin{array}{c} \text{OH} \\ | \\ \text{CH}_3\text{CH}_2\text{CHCH}_2\text{CHO} \end{array}$  (D)  $\begin{array}{c} \text{O} \\ || \\ \text{CH}_3\text{CH}_2\text{CCH}_2\text{CHO} \end{array}$
17. **C**
18. Compound(C) is a/an  
 (A) alcohol (B) aldehyde  
 (C) ketone (D) acid

18. **C**

## **SECTION-3 : MATHEMATICS**

### **PART – A**

#### **(Multi Correct Choice Type)**

This section contains 7 **multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONE OR MORE** may be correct.

1. Consider the function  $f : R \rightarrow R$ ,  $f(x) = |x^3 + 1|$  then  
 (A)  $f$  is many one Function.  
 (B) Range of  $f$  is  $R^+$   
 (C) Inverse of  $f$  is not defined..  
 (D)  $f$  is continuous and differentiable for every  $x \in R$ .

1. **AC**

2. Let  $f$  be the greatest integer function and  $g$  be the modulus functions, then

(A)  $(g \circ f - f \circ g)\left(-\frac{5}{3}\right) = 1$                       (B)  $(f + 2g)(-1) = 1$   
 (C)  $(g \circ f - f \circ g)\left(\frac{5}{3}\right) = 0$                       (D)  $(f + 2g)(1) = 1$

2. **ABC**

3. If  $y = mx + 5$  is a tangent to the curve  $x^3y^3 = ax^3 + by^3$  at  $P(1,2)$ , then:

(A)  $a + b = \frac{18}{5}$                       (B)  $a > b$   
 (C)  $a < b$                       (D)  $a + b = \frac{19}{5}$

3. **BD**

4. Consider the function  $y = f(x)$  satisfying the condition  $f\left(x + \frac{1}{x}\right) = x^2 + \frac{1}{x^2}$  ( $x \neq 0$ ). Then the

(A) domain of  $f(x)$  is  $R$                       (B) domain of  $f(x)$  is  $R - (-2, 2)$   
 (C) range of  $f(x)$  is  $[-2, \infty)$                       (D) range of  $f(x)$  is  $[2, \infty)$

4. **BD**

5. Which of the following functions has/have a removable discontinuity at the indicated point?

(A)  $f(x) = \frac{x^2 - 2x - 8}{x + 2}$  at  $x = -2$                       (B)  $f(x) = \frac{x - 7}{|x - 7|}$  at  $x = 7$   
 (C)  $f(x) = \frac{x^3 + 64}{x + 4}$  at  $x = -4$                       (D)  $f(x) = \frac{3 - \sqrt{x}}{9 - x}$  at  $x = 9$

(Removable discontinuity is where the limit exist but functional value is either not equal to limit or does not exist)

5. **ACD**

6. If  $\lim_{x \rightarrow 0} (1 + x \ln(1 + b^2))^{1/x} = 2b \sin^2 \theta$   $b > 0$ ,  $\theta \in (-\pi, \pi]$  then value of  $\theta$  is / are :
- (A)  $\frac{\pi}{4}$  (B)  $\frac{\pi}{2}$   
 (C)  $-\pi/4$  (D)  $-\pi/2$

6. **B,D**

7. 
$$f(x) = \begin{cases} -x - \pi/2 & x \leq -\pi/2 \\ -\cos x & -\pi/2 < x \leq 0 \\ x - 1 & 0 < x \leq 1 \\ \ln x & x > 1 \end{cases}$$

- (A)  $f(x)$  is continuous at  $x = -\pi/2$  (B)  $f(x)$  is not differentiable at  $x = 0$   
 (C)  $f(x)$  is differentiable at  $x = 1$  (D)  $f(x)$  is differentiable at  $x = -3/2$

7. **A,B,C,D**

### (Single Correct Choice Type)

This section contains **7 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE is correct**.

8. Let  $f: X \rightarrow Y$  if  $f(x) = 2^{x^2-1}$  is bijective then possible set of X and Y are
- (A)  $X = (0, \infty)$ ,  $Y = \left(\frac{1}{2}, \infty\right)$  (B)  $X = (0, \infty)$ ,  $Y = (0, \infty)$   
 (C)  $X = (-\infty, 0)$   $Y = \left(-\infty, -\frac{1}{2}\right)$  (D)  $X = (-\infty, 0)$   $Y = (0, \infty)$

8 **A**

9. If  $f(x) = \begin{cases} x^2 + 3 + \log_{0.5} \log_2 [k + 3], & -1 \leq x < 0 \\ x^2 + 3x + 2, & 0 \leq x \leq 1 \end{cases}$ , (where  $[.]$  denotes the greatest integer function) has minimum value at  $x=0$ , then
- (A)  $k \in [2, 5)$  (B)  $k \in [-2, 1)$   
 (C)  $k \in [-1, 2]$  (D)  $k \in [-1, 2)$

9. **D**

10. The equation  $||x - 2| + a| = 4$  can have four distinct real solutions for x if 'a' belongs to the interval
- (A)  $(-\infty, -4)$  (B)  $(-\infty, 0]$   
 (C)  $[4, \infty)$  (D) none of these

10. **A**

11. The point(s) on the curve  $y^3 + 3x^2 = 12y$  where the tangent is vertical is (are)
- (A)  $\left(\pm \frac{4}{\sqrt{3}}, -2\right)$  (B)  $\left(\pm \sqrt{\frac{11}{3}}, 1\right)$   
 (C)  $(0, 0)$  (D)  $\left(\pm \frac{4}{\sqrt{3}}, 2\right)$

11. **D**
12. If  $y = a \log|x| + bx^2 + x$  has its extremum values at  $x = -1$  and  $x = 2$ , then  
 (A)  $a = 2, b = -1$  (B)  $a = 2, b = \frac{-1}{2}$   
 (C)  $a = -2, b = \frac{1}{2}$  (D) none of these
12. **B**
13. Let  $f : \mathbb{R} \rightarrow \mathbb{R}$  is function which is defined by  $f(x) = \max\{x, x^3\}$ . The number of points on which  $f(x)$  is not differentiable is,  
 (A) 1 (B) 2  
 (C) 3 (D) 4
13. **C**
14. If  $f(x) = \frac{x^2 - 1}{x^2 + 1}$ , for every real number, then minimum value of  $f$  is  $m$ , where  $M + 1$  is  
 (A) 0 (B) 1  
 (C) 2 (D) 3
14. **A**

**(Paragraph Type)**

This section contains **2 paragraphs**. Based upon the paragraphs **2 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 no. 15 to 16**

A cubic  $f(x) = ax^3 + bx^2 + cx + d$  vanishes at  $x = -2$  and has local minimum/maximum at  $x = -1$  and  $x = \frac{1}{3}$  and if  $\int_{-1}^1 f(x) dx = \frac{14}{3}$ .

15. The function  $f(x)$  is  
 (A)  $x^3 + x^2 + x - 2$  (B)  $x^3 - x^2 + x - 2$   
 (C)  $x^3 - x^2 - x + 2$  (D)  $x^3 + x^2 - x + 2$
15. **D**
16.  $f(x)$  decreases in the interval  
 (A)  $\left(-\frac{1}{3}, 1\right)$  (B)  $\left(-\frac{1}{3}, -1\right)$   
 (C)  $\left(-1, \frac{1}{3}\right)$  (D)  $\left(1, \frac{3}{2}\right)$
16. **C**

**Paragraph for Question no. 17 to 18**

If  $f(x)$  and  $g(x)$  be two functions, such that  $f(a)=g(a)=0$  and  $f$  and  $g$  are both differentiable at everywhere in some neighbourhood of point  $a$  except possibly 'a'

Then  $\lim_{x \rightarrow a} \frac{f(x)}{g(x)} = \lim_{x \rightarrow a} \frac{f'(x)}{g'(x)}$ , provided  $f'(a)$  and  $g'(a)$  are not both zero.

On the basis of above information, answer the following questions:

17. The value of  $\lim_{x \rightarrow 0} \frac{\int_0^{x^2} \sin \sqrt{t} dt}{x^3}$  is

- (A) 0 (B)  $\frac{2}{9}$   
(C)  $\frac{1}{3}$  (D)  $\frac{2}{3}$

17. **D**

18. The value of  $\lim_{t \rightarrow 0} \frac{\int_0^t x dx}{t \sin t}$  is

- (A)  $\frac{1}{4}$  (B)  $\frac{1}{3}$   
(C)  $\frac{1}{2}$  (D) 0

18. **C**

# ANSWERS

## **SECTION-1 : PHYSICS**

PART – A

## **Paper – 2 : CHEMISTRY**

PART – A



**SECTION – 3 : MATHEMATICS**  
**PART – A**