FIITJEE – JEE (Main)

BATCHES – Two Year CRP(1921) AB-Lot_PT4

Physics, Chemistry & Mathematics

QP Code:

Time Allotted: 3 Hours **Maximum Marks: 300**

- 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.

Important 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. Each **Section** is further divided into **Two Parts**: **Part-A & B** in the OMR.
5. Rough spaces are provided for rough work inside the question paper. No additional sheets will be provided for rough work.
6. No candidate is allowed to carry any textual material, printed or written, bits of papers, clip boards, log tables, slide rule, calculator, cellular phones, pagers and electronic devices ext. except the Admit Card inside the examination hall / room.

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.
4. **Do not fold or make any stray marks on the Answer Sheet.**

C. Marking Scheme for All Two Parts:

(i) **Part-A (01-20) –** Contains Twenty (20) multiple choice objective questions which have four (4) options each and only one correct option. Each question carries **+4 marks** which will be awarded for every correct answer and **-1 mark** will be deducted for every incorrect answer.

(ii) **Part-B (01-05)** contains five (05) Numerical based questions, the answer of which maybe positive or negative numbers or decimals (e.g. 6.25, 7.00, -0.33, -.30, 30.27, -127.30) and each question carries **+4 marks** for correct answer and **there will be no negative marking.**

Name of the Candidate :_____

Batch :_____ **Date of Examination :**_____

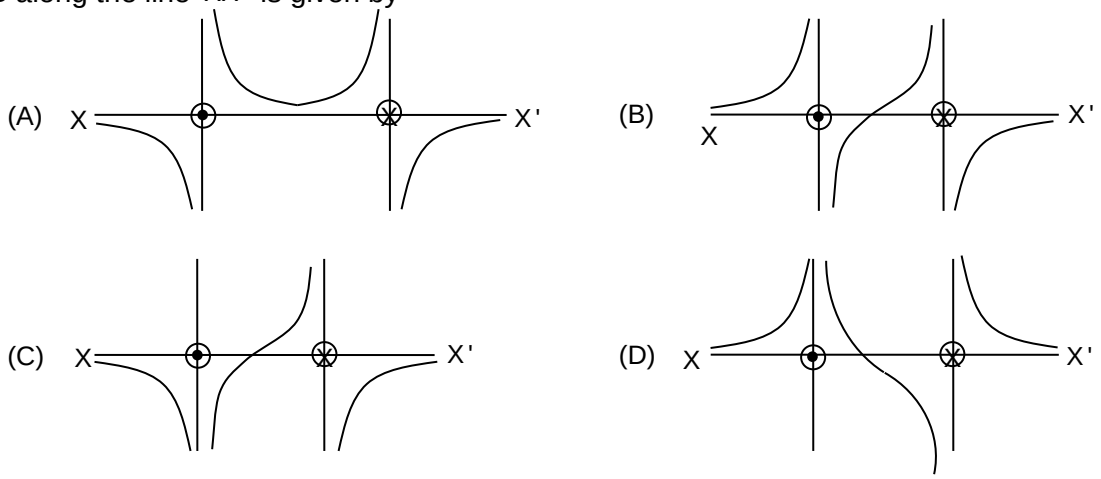
Enrolment Number :_____

SECTION – I: PHYSICS

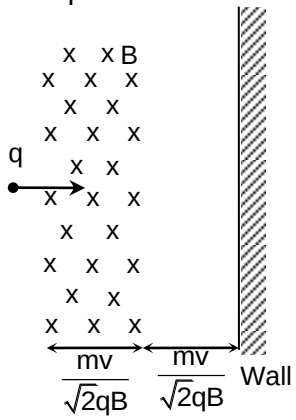
Part – A: Single Correct Answer Type

This section contains **20 multiple choice questions.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE is correct.**

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

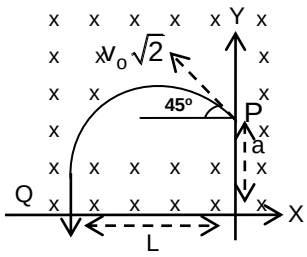


2. A particle of mass m and charge q enters a region of magnetic field (as shown) with speed v. There is a region in which the magnetic field is absent, as shown. The particle after entering the region collides elastically with a rigid wall. Time after which the velocity of particle becomes antiparallel to its initial velocity is



(A) $\frac{m}{2qB}(\pi+4)$ (B) $\frac{m}{qB}(\pi+2)$ (C) $\frac{m}{4qB}(\pi+2)$ (D) $\frac{m}{4qB}(2\pi+3)$

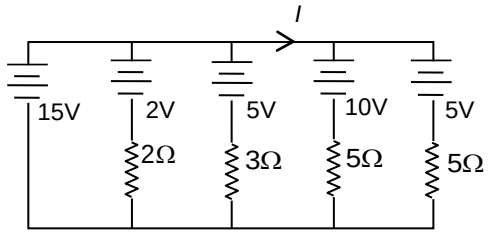
3. A particle of charge (+q) and mass m moving under the influence of uniform electric field $\vec{E}=E_0\hat{j}$ and uniform magnetic field $\vec{B}=-B_0\hat{k}$ follows a trajectory from P to Q as shown in figure. The velocity at P is $\vec{v}=-v_0\hat{i}+v_0\hat{j}$ and velocity at Q is - $\frac{v_0}{\sqrt{2}}\hat{j}$. The magnitude of electric field is given by



(A) $\frac{mv_0^2}{8q_0a}$ (B) $\frac{3mv_0^2}{4qa}$

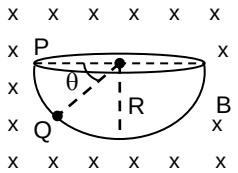
(C) $\frac{7mv_0^2}{8qa}$ (D) $\frac{5mv_0^2}{8qa}$

4. Current shown in figure is



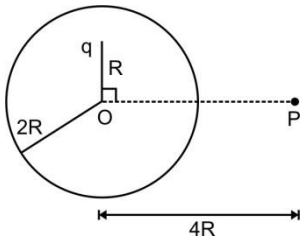
(A) 7 A
(B) 2 A
(C) 5 A
(D) 3 A

5. A charged sphere of mass m and charge – q starts sliding along the surface of a smooth hemispherical bowl, at position P. The region has a transverse uniform magnetic field B. Normal force by the surface of bowl on the sphere at position Q is:



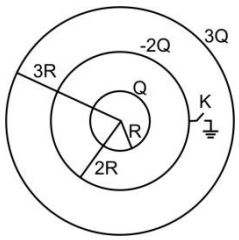
(A) $mg\sin\theta + qB\sqrt{2gR\sin\theta}$
(B) $3mg\sin\theta + qB\sqrt{2gR\sin\theta}$
(C) $mg\sin\theta - qB\sqrt{2gR\sin\theta}$
(D) $3mg\sin\theta - qB\sqrt{2gR\sin\theta}$

6. A point charge q is kept inside a conducting shell of radius 2R at a distance of R from center. Magnitude of field due to induced charges on the inner surface of the shell at point P is

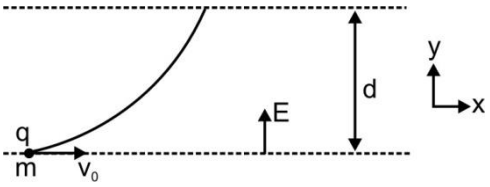


(A) $\frac{Kq}{16R^2}$
(B) 0
(C) $\frac{Kq}{17R^2}$
(D) $\frac{Kq}{4R^2}$

7. Find charge flown from earth when K is switch on.
(A) –Q
(B) Q
(C) 2Q
(D) –3Q

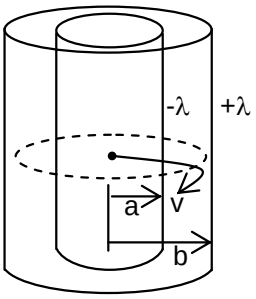


8. Charge q of mass m is projected with velocity v_0 along x-axis in uniform electric field E along y-axis. Radius of curvature of charge when it has travelled distance d along y-axis is ? Neglect gravity and it is given that $\frac{qEd}{m} = 2v_0^2$



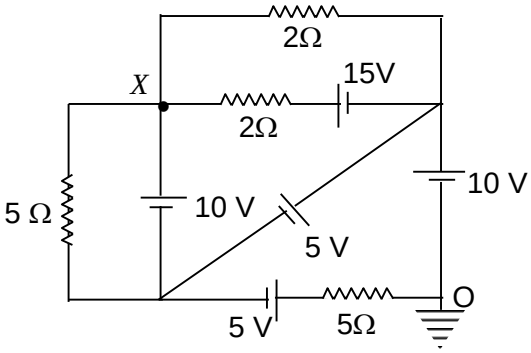
(A) $\frac{v_0^2 m}{qE}\sqrt{5}$
(B) $\frac{v_0^2 m}{2qE}\sqrt{5}$
(C) $\frac{5}{2}\frac{v_0^2 m}{qE}\sqrt{5}$
(D) $\frac{5v_0^2 m}{qE}\sqrt{5}$

9. Figure shows two large cylindrical shells having uniform linear charge densities + λ and - λ. Radius of inner cylinder is 'a' and that of outer cylinder is 'b'. A charged particle of mass m, charge q revolves in a circle of radius r. Then its speed 'v' is : (Neglect gravity and assume the radii of both the cylinders to be very small in comparison to their length)

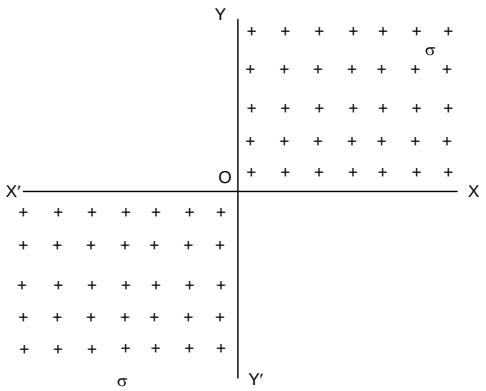


(A) $\sqrt{\frac{\lambda q}{2\pi \in_0 m}}$
(B) $\sqrt{\frac{2\lambda q}{\pi \in_0 m}}$
(C) $\sqrt{\frac{\lambda q}{\pi \in_0 m}}$
(D) $\sqrt{\frac{\lambda q}{4\pi \in_0 m}}$

10. In the circuit shown if point *O* is earthed, the potential of point *X* is equal to
(A) 10 V
(B) 15 V
(C) 25 V
(D) 12.5 V

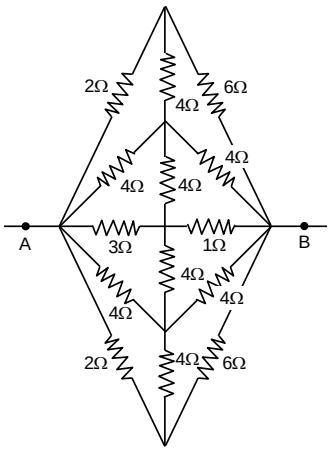


11. Two rectangular infinite charged sheet each has surface charge density σ are placed as shown in figure, then magnitude of electric field at point (0, 0, d) d is small, be
(A) $\frac{\sigma}{\in_o}$
(B) $\frac{\sigma}{2\in_o}$
(C) $\frac{\sigma}{4\in_o}$
(D) none of these

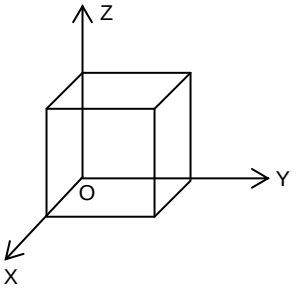


12. If $\vec{E}=\frac{y\hat{i}+x\hat{j}}{x^2+y^2}$ then the shape of electric field line will be
(A) straight line (B) circular (C) parabolic (D) hyperbolic

13. The equivalent resistance between the points A and B is
(A) $\frac{6}{11}\Omega$
(B) $\frac{11}{12}\Omega$
(C) $\frac{44}{35}\Omega$
(D) none of these



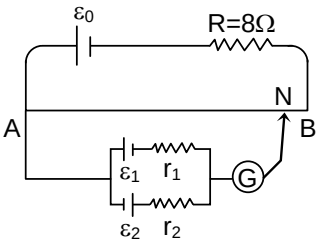
14. The electric field in cubical volume is $\vec{E}=E_0\left(1+\frac{z}{a}\right)\hat{i}+E_0\left(\frac{z}{a}\right)\hat{j}$.
Each edge of cube measured 'd'. The net charge within the cube is
(A) E_0d^2 (B) $E_0\frac{d^3}{a}$
(C) $E_0\frac{a^3}{d}$ (D) zero



15. In a regular polygon of n sides, each corner is at a distance r from the centre. Identical charges are placed at (n – 1) corners. At the centre, the magnitude of intensity is E and the potential is V. The ratio V/E has

(A) r n
(B) r(n – 1)
(C) (n – 1)/r
(D) r(n – 1)/n

16. A battery of emf $\varepsilon_0 = 12V$ is connected across a 4m long uniform wire having resistance 4Ω/m. The cells of small emfs $\varepsilon_1 = 2V$ and $\varepsilon_2 = 4V$ having internal resistance 2Ω and 6Ω respectively are connected as shown in the figure. If galvanometer shows no deflection at the point N, the distance of point N from the point A is equal to:

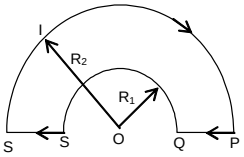


(A) $\frac{1}{6}$m
(B) $\frac{1}{3}$m
(C) 25 cm
(D) 50 cm

17. A wire bent in the form of a regular polygon of n sides, is inscribed in a circle of radius a. If I ampere is the current flowing in the wire, then the magnetic flux density at the centre of the circle is:

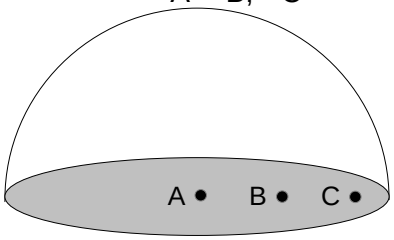
(A) $\frac{\mu_0 i}{2\pi a}\tan\frac{\pi}{n}$
(B) $\frac{\mu_0 ni}{2\pi a}\tan\frac{\pi}{n}$
(C) $\frac{2}{\pi}\frac{ni}{a}\mu_0\tan\frac{\pi}{n}$
(D) $\frac{ni}{2a}\mu_0\tan\frac{\pi}{n}$

18. The wire loop PQRSP formed by joining two semi-circular wires of radii R_1 and R_2 carries a current I as shown in figure. The magnetic moment of the loop is



(A) $\frac{\pi I}{2}\left(R_2^2 - R_1^2\right)$ into the page
(B) $\frac{\pi I}{2}\left(R_1^2 - R_2^2\right)$ into the page
(C) $\frac{\pi I}{2}\left(R_2^2 - R_1^2\right)$ out to the page
(D) $\frac{\pi I}{2}\left(R_2^2 + R_1^2\right)$ out to the page

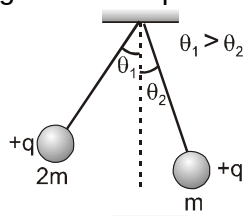
19. Charge Q is uniformly distributed only on curved surface of a thin hemispherical shell. A, B and C are three points on the circular base of hemisphere, such that *A* is the centre. Let the electric potential at points A, B and C be V_A, V_B, V_C respectively. Then



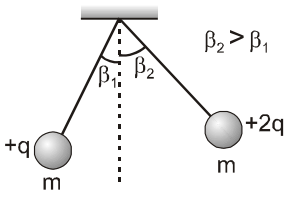
(A) $V_A > V_B > V_C$
(B) $V_C > V_B > V_A$
(C) $V_B > V_A$ and $V_B > V_C$
(D) $V_A = V_B = V_C$

20. If two balls of given masses and charges are released, which of the following is incorrect arrangement in equilibrium?

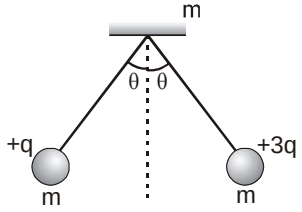
(A)



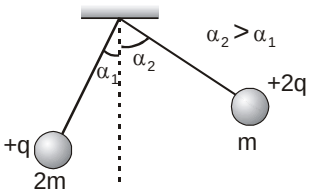
(B)



(C)

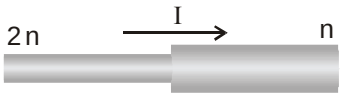


(D)

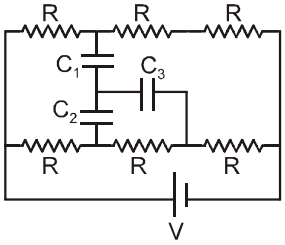


Part – B
Numerical based questions

1. Two cylindrical rods of uniform cross-section area A and 2A, having free electrons per unit volume 2n and n respectively are joined in series. A current I flows through them in steady state. Then the ratio of drift velocity of free electron in left rod to drift velocity of electron in the right rod is $\left(\frac{v_L}{v_R}\right)$ is :

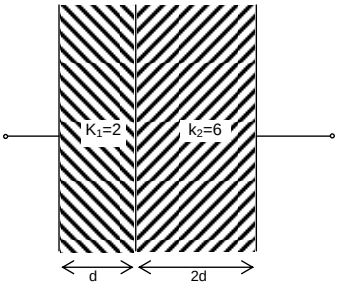


2. In the shown circuit, all three capacitor are identical and have capacitance C μF each. Each resistor has resistance of R Ω. An ideal cell of emf V volts is connected as shown. Then the magnitude of potential difference across capacitor C_3 in steady state is (1/x)V the value of x is.

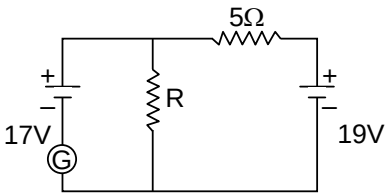


3. Four point charge q, –q, 2Q and Q are placed in order at the corners A, B, C and D of a square. If the field at the mid – point of CD is zero then the value of q/Q upto two decimal places is.

4. A parallel plate capacitor has two layers of dielectrics as shown in figure. This capacitor is connected across a battery, then the ratio of potential difference across the dielectric layers is



5. For what value of R will the current in galvanometer be zero?

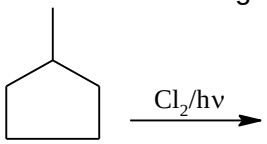


SECTION – II: CHEMISTRY

Part – A: Single Correct Answer Type

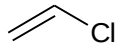
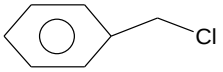
This section contains **20 multiple choice questions.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE is correct.**

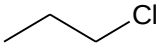
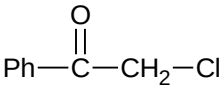
1. Total number of possible products formed during monohalogenation of following compound is

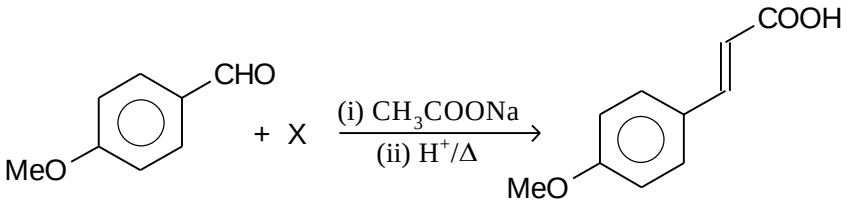


(A) 6 (B) 8
(C) 10 (D) 12

2. Which of the following is most reactive towards S_N2?

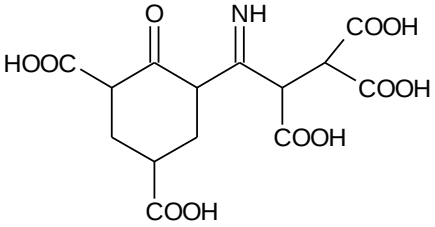
(A)  (B) 

(C)  (D) 

3. 

What is X?
(A) CH_3COOH (B) $BrCH_2 – COOH$
(C) $(CH_3CO)_2O$ (D) CHO – COOH

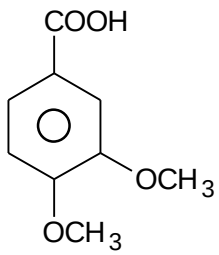
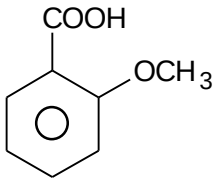
4. Moles of CO_2 released by heating one moles of following compound are

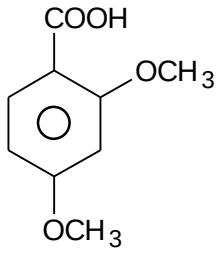


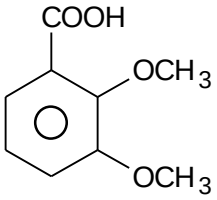
(A) 3 (B) 4
(C) 5 (D) 2

5. Formaldehyde(HCHO) forms two different organic products when reacts with
(A) $LiAlH_4$ (B) conc.NaOH
(C) NH_3 (D) HCN

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

(A)  (B) 

(C) 

(D) 

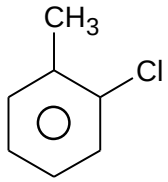
7. The concentration of which of the following species of glycine is maximum at pH = 4?

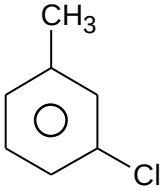
(A) $NH_2 - CH_2 - COOH$ (B) $NH_2 - CH_2 - COO^{\ominus}$

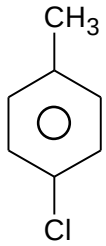
(C) $\overset{\oplus}{N}H_3 - CH_2 - COO^{\ominus}$ (D) $\overset{\oplus}{N}H_3 - CH_2 - COOH$

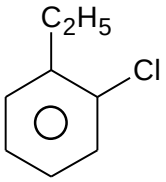
8. $(X) \xrightarrow[Liq.NH_3]{KNH_2}$ Products

Which will form maximum number of monosubstituted products in the above reaction?

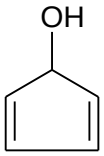
(A) 

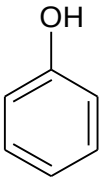
(B) 

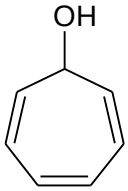
(C) 

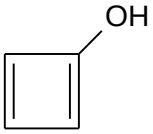
(D) 

9. Which of the following alcohol will form ether easily upon treatment with conc. H_2SO_4?

(A) 

(B) 

(C) 

(D) 

10. Which of the following reaction cannot form pure $CH_3CH_2CH_2NH_2$?

(A) $CH_3CH_2Cl \xrightarrow[(ii)LiAlH_4]{(i)KCN}$ (B) $CH_3CH_2CH_2Cl \xrightarrow{NH_3}$

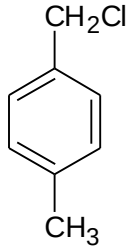
(C) $CH_3CH_2CH_2NO_2 \xrightarrow{LiAlH_4}$ (D) $CH_3CH_2CH_2CONH_2 \xrightarrow{Br_2/KOH}$

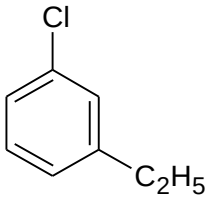
11. Which of the following reagent can convert $CH_3CH_2CONH_2$ to CH_3CH_2CN?

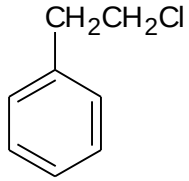
(A) $LiAlH_4$ (B) P_4O_{10}

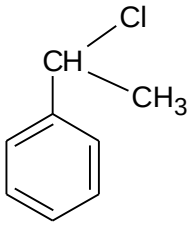
(C) Zn-Hg/conc.HCl (D) NaOH

12. In which of the following compound –I and +R effects are observed?

(A) 

(B) 

(C) 

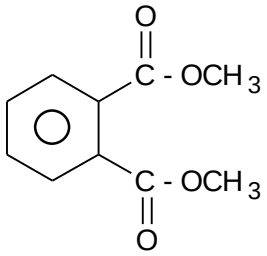
(D) 

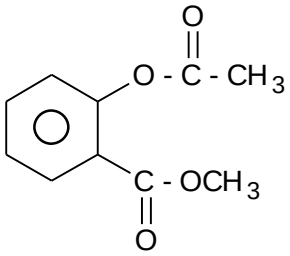
13. Which of the following ether forms only one type of alkyl iodide on treatment with excess of HI?

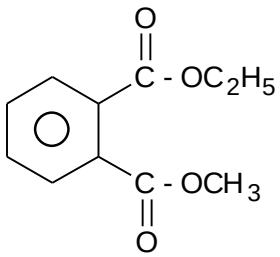
(A) $CH_3OCH_2CH_3$ (B) $CH_3CH_2OCH_2CH_3$

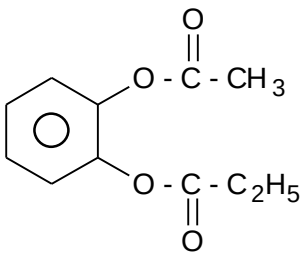
(C) $C_6H_5OCH_2C_6H_5$ (D) $C_6H_5OC_6H_5$

14. Which of the following compound forms salicylic acid on acidic hydrolysis?

(A) 

(B) 

(C) 

(D) 

15. $(CH_3)_3COH \xrightarrow{Cu/300^oC} X \xrightarrow{MnO_4^-/H^+} Y + CO_2 + H_2O$

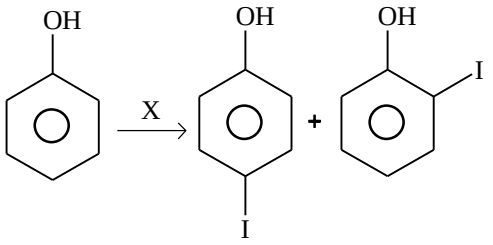
In above reactions, X and Y are

(A) $X = CH_3COOCH_3$ and $Y = CH_3\underset{\displaystyle OH}{\underset{|}{C}}HCH_3$

(B) $X = CH_3CH = CH_2$ and $Y = CH_3\overset{\displaystyle O}{\overset{||}{C}}CH_3$

(C) $X = CH_3\underset{\displaystyle CH_3}{\underset{|}{C}} = CH_2$ and $Y = CH_3\overset{\displaystyle O}{\overset{||}{C}}CH_3$

(D) $X = CH_3\underset{\displaystyle CH_3}{\underset{|}{C}} = CH_2$ and $Y = CH_3CH_2COOH$

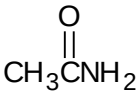
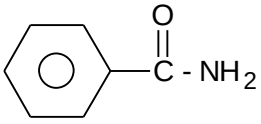
16. 

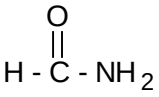
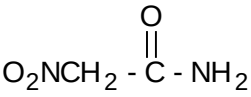
In above reaction 'X" is

(A) ICl (B) KI

(C) I_2 (D) HI

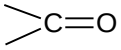
17. Which of the following is most reactive towards CH_3Br in presence of pyridine?

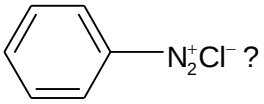
(A)  (B) 

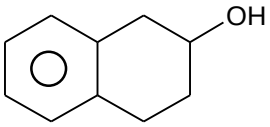
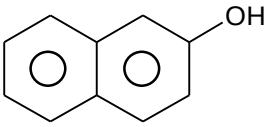
(C)  (D) 

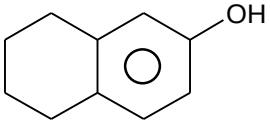
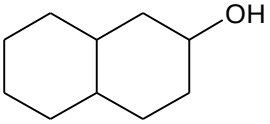
18. Mild oxidation of glucose with Br_2/H_2O ascertains the presence of

(A) 1^o - OH (B) 2^o - OH

(C) –CHO (D) 

19. Which of the following compound forms a colourfull substance when reacts with 

(A)  (B) 

(C)  (D) 

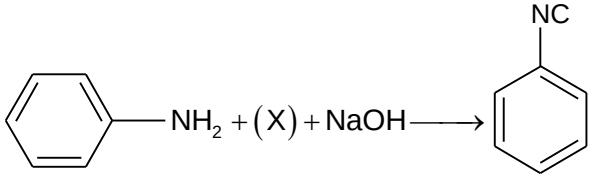
20. $CH_3COOH + C_2H_5COCl \longrightarrow (X) + (Y) \longrightarrow CH_3COCl + C_2H_5COOH$

In above reaction, (Y) is HCl. What is the intermediate(X)?

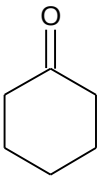
(A) $CH_3COOCOC_2H_5$ (B) $CH_3COOC_2H_5$

(C) $C_2H_5COOCH_3$ (D) CH_3COOCl

Part – B
Numerical based questions

1. 

What is the molar mass of X in g mol^{-1} unit?

2.  $+ CH_3CHO \xrightarrow[\Delta]{\text{dil.NaOH}} \text{Product}$

How many C = O bond(s) is/are present in the product if one mole each of the reactants react with each other?

3. $H_3\overset{\oplus}{N} - CH_2 - \underset{\oplus NH_3}{CH} - COO^- \quad p^{K_{a_1}} = 2$

$p^{K_{a_3}} = 8$

$p^{K_{a_2}} = ?$

If the isoelectric point of above amino acid is 7, what is $p^{K_{a_2}}$?

4. $CH_3CH = NOH \xrightarrow{(CH_3CO)_2O} (P) \xrightarrow{H_2O/H^+} (Q)$

What is the sum of the number of pi-bond(s) present in 'P' and 'Q'?

5. $CH_3COOH + \text{Acid} \xrightarrow{\text{Conc.}H_2SO_4} CH_3NH_2 + CO_2$

How many ionizable hydrogen atom(s) is/are present in the acid used in above reaction?

SECTION – III: MATHEMATICS

Part – A: Single Correct Answer Type

This section contains **20 multiple choice questions.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE is correct.**

1. If $y = 4x - 5$ is a tangent to the curve $y^2 = px^3 + q$ at (2, 3) then
   (A) $p = 2, q = -7$ (B) $p = -2, q = 7$
   (C) $p = -2, q = -7$ (D) $p = 2, q = 7$

2. If $\sin^{-1}x + \sin^{-1}y = \frac{2\pi}{3}$, then $\cos^{-1}x + \cos^{-1}y$ is equal to
   (A) $\frac{2\pi}{3}$ (B) $\frac{\pi}{3}$
   (C) $\frac{\pi}{6}$ (D) π

3. The domain of the function $f(x) = \log_x(x+2)$ is
   (A) $(0, \infty)$ (B) $(-2, \infty)$
   (C) $(0,1) \cup (1, \infty)$ (D) none of these

4. $\int \frac{\cos 2x}{\cos x} dx =$
   (A) $2\sin x + \log(\sec x + \tan x) + C$ (B) $2\sin x - \log(\sec x + \tan x) + C$
   (C) $2\sin x - \log|\sec x + \tan x| + C$ (D) $2\sin x - \log|\sec x - \tan x| + C$

5. $\lim\limits_{x \to \frac{\pi}{3}} \frac{\tan^3 x - 3\tan x}{\cos\left(x + \frac{\pi}{6}\right)} =$
   (A) 24 (B) –24
   (C) $\frac{1}{24}$ (D) $-\frac{1}{24}$

6. The function of $f(x) = \tan^{-1}(\sin x + \cos x)$ is an increasing function in
   (A) $\left(0, \frac{\pi}{2}\right)$ (B) $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$
   (C) $\left(\frac{\pi}{4}, \frac{\pi}{2}\right)$ (D) $\left(-\frac{\pi}{2}, \frac{\pi}{4}\right)$

7. $\lim\limits_{x \to \infty}\left(\frac{x^2}{3x-2} - \frac{x}{3}\right)$ is equal to
   (A) $\frac{1}{3}$ (B) $\frac{2}{3}$
   (C) $\frac{-2}{3}$ (D) $\frac{2}{9}$

8. Let f and g be differentiable function such that $f'(x) = 2g(x)$ and $g'(x) = -f(x)$, and $T(x) = (f(x))^2 - (g(x))^2$. Then $T'(x)$ is equal to

(A) $T(x)$ (B) 0

(C) $2f(x)g(x)$ (D) $6f(x)\,g(x)$

9. If the line y = 1 – x touches the curve $y^2 - y + x = 0$, then the point of contact is

(A) (1, 1) (B) $\left(\frac{1}{2}, \frac{1}{2}\right)$

(C) (0, 1) (D) (1, 0)

10. The range of the function $f(x) = \log_3(5 + 4x - x^2)$ is

(A) $[0, 2]$ (B) $(-\infty, 2]$

(C) $(0, 2)$ (D) none of these

11. $\lim\limits_{x\to 0} \dfrac{\tan x - \sin x}{x^3} =$

(A) $\frac{1}{2}$ (B) $-\frac{1}{2}$

(C) $\frac{2}{3}$ (D) none of these

12. If $f(x) = \begin{cases} x + \alpha, & x < 3 \\ 4, & x = 3 \\ 3x - 5, & x > 3 \end{cases}$ is continuous $x = 3$, then the value of α is

(A) 1 (B) 2

(C) 3 (D) No real values of α is possible

13. If $f'(x) = (x-1)^3(x-2)^4$, then f(x) has

(A) local maximum at x = 1 (B) local maximum at x = 2

(C) local minimum at x = 1 (D) local minimum at x = 2

14. If two positive numbers x and y are such that $x + y = 60$ and xy^3 is maximum, then $(y - x)$ is equal to

(A) 0 (B) 30

(C) 60 (D) None of these

15. The function $f(x) = x(x+3)e^{-x/2}$ satisfies all the conditions of Rolle's theorem on $[-3, 0]$. The value of c which verifies Rolle's theorem, is

(A) 0 (B) –1

(C) –2 (D) 3

16. Which one of the following functions is continuous for all real x but has at least one point where it is not differentiable?

(A) $f(x) = \dfrac{|x|}{x}$ (B) $f(x) = \tan x$

(C) $f(x) = x^{1/3}$ (D) $f(x) = e^{-x}$

17. The function f is differentiable with f(1) = 8 and $f'(1)=\frac{1}{8}$. If f is invertible and $g(x)=f^{-1}(x)$, then

(A) $g'(1)=8$ (B) $g'(1)=\frac{1}{8}$

(C) $g'(8)=8$ (D) $g'(8)=\frac{1}{8}$

18. The derivative of $f(x)=\frac{x^4}{3}-\frac{x^5}{5}$ attains its maximum value of x equal to:

(A) $\frac{4}{3}$ (B) $\frac{5}{3}$

(C) 1 (D) 0

19. If f(x) and g(x) be two given function with all real numbers as their domain, then h(x) = (f(x) + f(-x)) (g(x) – g(-x)). is

(A) always an odd function

(B) an odd function only when both the f and g are odd

(C) an odd function only when f is even and g is odd

(D) none of these

20. Which of the following is correct if $x \in R$?

(A) $\sin^{-1}x+\cos^{-1}x=\frac{\pi}{2}$ (B) $\sin^{-1}\left(\frac{1}{x}\right)=\operatorname{cosec}^{-1}x$

(C) $\sin\left(\sin^{-1}x\right)=x$ (D) None of these

Part – B
Numerical based questions

1. f(x) is a function such that $f''(x)=-f(x)$ and $f'(x)=g(x)$ and $h(x)$ is a function such that $h(x)=(f(x))^2+(g(x))^2$ and h(5) = 11, then the value of the h(10) is

2. 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 $([.] \to \text{G.I.F})$

3. Let $f(x)=\begin{cases} k, & x=3 \\ \frac{2x^3+3x^2-32x+15}{(x-3)}, & x \neq 3 \end{cases}$. The value of k for which $f(x)$ is continuous for all real values of x, is

4. The value of $\cos\left(\frac{1}{2}\cos^{-1}\left(\cos\left(\sin^{-1}\frac{\sqrt{63}}{8}\right)\right)\right)$ is equal to

5. Let $f(x)=\frac{ax^2+bx+c}{x+1}$ such that $\lim\limits_{x\to 0} f(x)=2$ and $\lim\limits_{x\to\infty} f(x)=1$. Find the value of $(a+b+c)$.

Hints & Solutions

Physics

Part-A
Single Correct Choice Type

1.	**A**	2.	**A**	3.	**B**	4.	**D**
5.	**B**	6.	**C**	7.	A	8.	**D**
9.	**A**	10.	**B**	11.	**C**	12.	**D**
13.	**C**	14.	**D**	15.	**B**	16.	**C**
17.	**B**	18.	**B**	19.	**D**	20.	**C**

Part-B
Numerical Answer Type

1.	**1**	2	**4.5**	3	**5.59**	4	**1.5**
5.	**42.5**						

Chemistry

1.	C	2.	D	3.	C	4.	A
5.	B	6.	D	7.	D	8.	B
9.	C	10.	B	11.	B	12.	B
13.	B	14.	B	15.	C	16.	A
17.	B	18.	C	19.	B	20.	A

Part - B

1.	119.5	2.	1	3.	6	4.	3
5.	1						

Mathematics

1.	A	2.	B	3.	C	4.	C
5.	B	6.	D	7.	D	8.	D
9.	C	10.	B	11.	A	12.	A
13.	C	14.	B	15.	C	16.	C
17.	C	18.	C	19.	A	20.	D

Part – B

21.	11	22.	2	23.	**40**	24.	**0.75**
25.	3						