

# WHIZ SEARCH (SAMPLE PAPER)

## CLASS – 12<sup>th</sup> [ENGINEERING]

### Important Instructions:

- This paper contains 45 questions among 4 Sections (Physics, Chemistry, Mathematics and Mental ability & Reasoning).
- All questions are compulsory.
- Sections (Physics, Chemistry and Mathematics) contains 10 questions each.
- Section (Mental ability & Reasoning) contains 15 questions only.
- Each question is allotted **4 marks for correct response**.
- **1 mark will be deducted** for marking incorrect or multiple responses.
- No deduction will be made from total marks for unattempted questions.
- For each question, there is **only 1 correct** response.

**#SECTION# PHYSICS**  
**#PART# SECTION (Maximum Marks: 40)**

(1.) Charges  $2Q$  and  $-Q$  are placed as shown. The point at which electric field intensity is zero will be

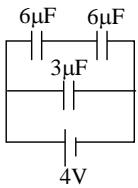


- (a.) somewhere between  $-Q$  and  $2Q$
- (b.) somewhere on the left of  $-Q$
- (c.) somewhere on the right of  $2Q$
- (d.) somewhere on the right bisector of line joining  $-Q$  and  $2Q$

Ans: B

Exp:

(2.) The three capacitors in figure, store a total energy of

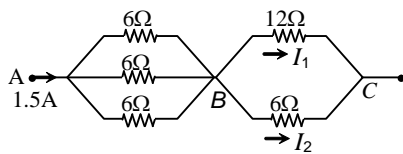


- (a.)  $12 \mu\text{J}$
- (b.)  $36 \mu\text{J}$
- (c.)  $48 \mu\text{J}$
- (d.)  $80 \mu\text{J}$

Ans: C

Exp:

(3.) In the network shown,



- (a.)  $V_{AB} = +3.0 \text{ V}$
- (b.)  $V_{CB} = +6.0 \text{ V}$
- (c.)  $I_1 = 1.5 \text{ A}$
- (d.)  $I_2 = 0.5 \text{ A}$

Ans: A

Exp:

(4.) A charged particle enters a region where a uniform electric field  $E$  and a uniform magnetic field  $B$  exist. If  $E$  and  $B$  are perpendicular to each other and also perpendicular to the velocity  $u$  of the particle, then the particle will move undeviated if  $u$  equals

- (a.) B/E
- (b.) E/B
- (c.) EB
- (d.)  $E^2/B^2$

Ans: B

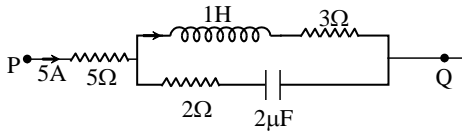
Exp:

- (5.) The angle of dip at a place on the earth gives
- (a.) the horizontal component of the earth's magnetic field
  - (b.) the location of the geographic meridian
  - (c.) the vertical component of the earth's field
  - (d.) the direction of the earth's magnetic field

Ans: D

Exp:

- (6.) In the given circuit, the potential difference between point P and Q in steady state is

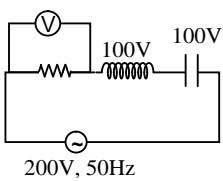


- (a.) 40 V
- (b.) 21 V
- (c.) 18 V
- (d.) 18 V

Ans: A

Exp:

- (7.) In the circuit of figure, what will be the reading of the voltmeter?

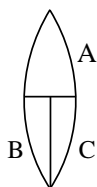


- (a.) 300 V
- (b.) 900 V
- (c.) 200 V
- (d.) 400 V

Ans: C

Exp:

- (8.) A thin, symmetric double-convex lens of power P is cut into three parts A, B and C as shown. The power of



- (a.) A is  $P/2$
- (b.) A is  $2P$
- (c.) B is  $P/2$
- (d.) B is  $P/4$

Ans: D

Exp:

(9.) In a compound microscope, the intermediate image is

- (a.) virtual, erect and magnified
- (b.) real, erect and magnified
- (c.) real, inverted and magnified
- (d.) virtual, erect and reduced

Ans: C

Exp:

(10.) The X-rays coming from an X-ray tube will be

- (a.) monochromatic
- (b.) having all wavelength smaller than a certain minimum wavelength
- (c.) having all wavelength greater than a certain minimum wavelength
- (d.) having all wavelength between certain minimum and maximum wavelengths

Ans: D

Exp:

## #SECTION# CHEMISTRY

### #PART# SECTION (Maximum Marks: 40)

(11.) A certain solute upon dissolution in some solvent undergoes 45% trimerization and 40% dimerization. What is the value of  $\frac{1}{i}$  for this situation:

- (a.) 1
- (b.) 2
- (c.) 0.5
- (d.) 4

Ans: B

Exp:

(12.) Zn Amalgam is prepared by electrolysis of aqueous  $ZnCl_2$  using Hg cathode (9gm.) How much current is to be passed through  $ZnCl_2$  solution for 1000 seconds to prepare a Zn Amalgam with 25% Zn by wt. ( $Zn = 65.4$ )

- (a.) 5.6 amp
- (b.) 7.2 amp
- (c.) 8.85 amp
- (d.) 11.2 amp

Ans: C

Exp:

(13.) A reaction can take place by two paths.  $k_1$  and  $k_2$  are rate constants for the two paths &  $E_1$  and  $E_2$  are their respective activation energies.

At temperature  $T_a$  :  $k_1 > k_2$ ,  $E_1 < E_2$ .

if temperature is raised to  $T_b$ , the rate constants change to  $k_1'$  &  $k_2'$ . Which relation is correct between  $k_1$ ,  $k_2$ ,  $k_1'$  &  $k_2'$  (considering activation energy does not change with temperature).

(a.)  $\frac{k_1'}{k_1} > \frac{k_2'}{k_2}$

(b.)  $\frac{k_1'}{k_1} = \frac{k_2'}{k_2}$

(c.)  $\frac{k_1'}{k_1} < \frac{k_2'}{k_2}$

(d.)  $\frac{k_1'}{k_2'} > \frac{k_1}{k_2}$

Ans: C

Exp:

(14.) The  $\text{pk}_{a_1}$ ,  $\text{pk}_{a_2}$  and  $\text{pk}_{a_3}$  values for the amino acid cysteine  $\left( \text{HS} - \text{CH}_2 - \underset{\text{NH}_2}{\text{CH}} - \text{COOH} \right)$  are

respectively 1.8, 8.3, 10.8. What is isoelectric point of cysteine amino acid?

- (a.) 6.3
- (b.) 9.55
- (c.) 5.05
- (d.) 10.1

Ans: B

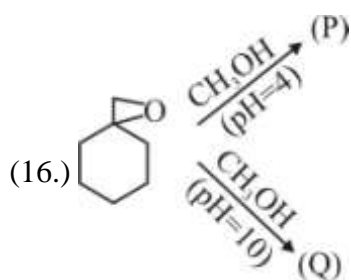
Exp:

(15.)  $[\text{Fe}(\text{H}_2\text{O})_5\text{NO}]\text{SO}_4$  and  $[\text{Cr}(\text{NH}_3)_6](\text{NO}_2)_3$  both are paramagnetic species with 'spin only' magnetic moment of 3.93 B.M. The hybridisation of central metal ions in these species respectively are:

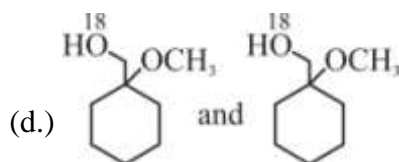
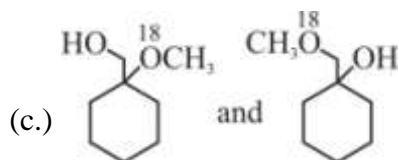
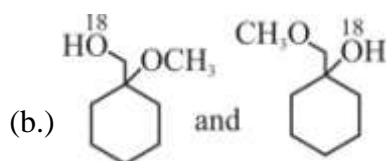
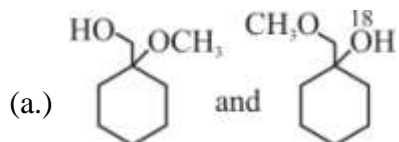
- (a.) both  $\text{sp}^3\text{d}^2$
- (b.) both  $\text{d}^2\text{sp}^3$
- (c.)  $\text{sp}^3\text{d}^2$  and  $\text{d}^2\text{sp}^3$
- (d.)  $\text{d}^2\text{sp}^3$  and  $\text{sp}^3\text{d}^2$

Ans: C

Exp:



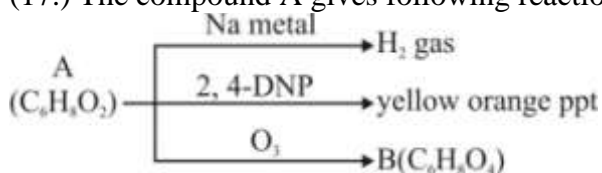
Identify product (P) and (Q) respectively?



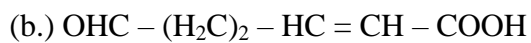
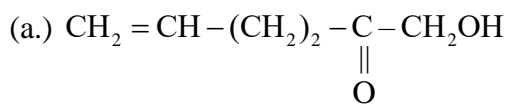
Ans: B

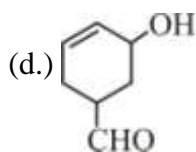
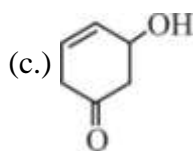
Exp:

(17.) The compound A gives following reactions.



Its structure can be

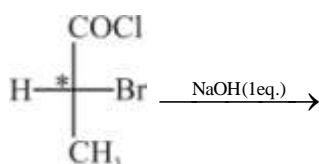




Ans: C

Exp:

(18.) Which statement is correct about the following reaction

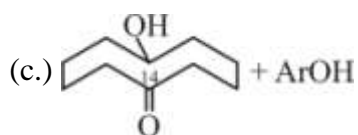
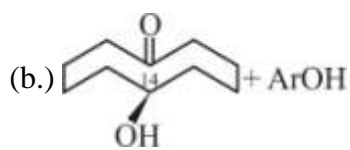
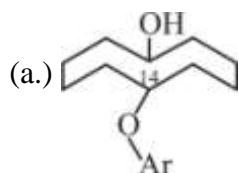
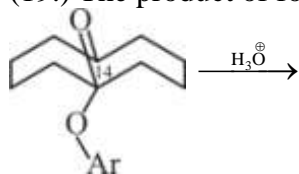


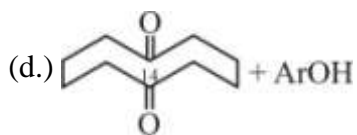
- (a.) There is inversion of configuration at asymmetric C\* atom
- (b.) There is no change of configuration at asymmetric C\* atom
- (c.) There is 100% racemisation at C\* atom
- (d.) % inversion > % retention at C\* atom

Ans: B

Exp:

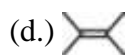
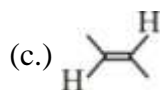
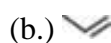
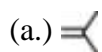
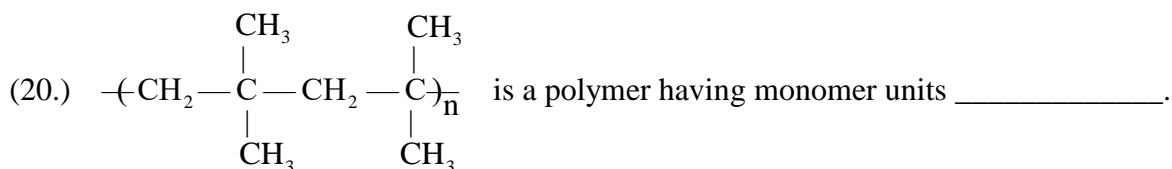
(19.) The product of following reaction is





Ans: C

Exp:



Ans: A

Exp:

## #SECTION# MATHEMATICS

### #PART# SECTION (Maximum Marks: 40)

(21.) The magnitudes of mutually perpendicular forces **a**, **b** and **c** are 2, 10 and 11 respectively. Then the magnitude of its resultant is

(a.) 12

(b.) 15

(c.) 9

(d.) 18

Ans: B

Exp:

(22.) If  $\alpha, \beta, \gamma$  be the angles which a line makes with the positive direction of co-ordinate axes, then  $\sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma =$

(a.) 2

(b.) 1

(c.) 3

(d.) 0

Ans: A

Exp:



(23.) The domain of  $\sin^{-1}\left[\log_3\left(\frac{x}{3}\right)\right]$  is

- (a.) [1, 9]
- (b.) [-1, 9]
- (c.) [-9, 1]
- (d.) [-9, -1]

Ans: A

Exp:

(24.)  $\lim_{x \rightarrow 0} \frac{xe^x - \log(1+x)}{x^2}$  equals

- (a.)  $\frac{2}{3}$
- (b.)  $\frac{1}{3}$
- (c.)  $\frac{1}{2}$
- (d.)  $\frac{3}{2}$

Ans: D

Exp:

(25.) The values of A and B such that the function  $f(x) = \begin{cases} -2 \sin x, & x \leq -\frac{\pi}{2} \\ A \sin x + B, & -\frac{\pi}{2} < x < \frac{\pi}{2} \\ \cos x, & x \geq \frac{\pi}{2} \end{cases}$ , is continuous

everywhere are

- (a.) A = 0, B = 1
- (b.) A = 1, B = 1
- (c.) A = -1, B = 1
- (d.) A = -1, B = 0

Ans: C

Exp:

(26.) The differential equation satisfied by the function  $y = \sqrt{\sin x + \sqrt{\sin x + \sqrt{\sin x + \dots \infty}}}$ , is

- (a.)  $(2y - 1) \frac{dy}{dx} - \sin x = 0$

(b.)  $(2y - 1) \cos x + \frac{dy}{dx} = 0$

(c.)  $(2y - 1) \cos x - \frac{dy}{dx} = 0$

(d.)  $(2y - 1) \frac{dy}{dx} = \cos x$

Ans: D

Exp:

(27.)  $\int (1 + 2x + 3x^2 + 4x^3 + \dots) dx =$

(a.)  $(1 + x)^{-1} + c$

(b.)  $(1 - x)^{-1} + c$

(c.)  $(2 + x)^{-1} + c$

(d.)  $(2 - x)^{-1} + c$

Ans: B

Exp:

(28.)  $\int_0^{\pi/2} \frac{x + \sin x}{1 + \cos x} dx =$

(a.)  $-\log 2$

(b.)  $\log 2$

(c.)  $\frac{\pi}{2}$

(d.) 0

Ans: C

Exp:

(29.) The solution of the differential equation  $x^2 \frac{dy}{dx} = x^2 + xy + y^2$  is

(a.)  $\tan^{-1} \left( \frac{y}{x} \right) = \log x + c$

(b.)  $\tan^{-1} \left( \frac{y}{x} \right) = -\log x + c$

(c.)  $\sin^{-1} \left( \frac{y}{x} \right) = \log x + c$

(d.)  $\tan^{-1} \left( \frac{x}{y} \right) = \log x + c$

Ans: A

Exp:

(30.) If A and B are two events of a random experiment  $P(A) = 0.25$ ,  $P(B) = 0.5$  and  $P(A \cap B) = 0.15$ , then  $P(A \cap \bar{B}) =$

- (a.) 0.1
- (b.) 0.35
- (c.) 0.15
- (d.) 0.6

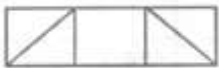
Ans: A

Exp:

## #SECTION# MENTAL ABILITY & REASONING

### #PART# SECTION 1 (Maximum Marks: 60)

(31.) How many quadrilaterals are there in the following figure?



- (a.) 11
- (b.) 8
- (c.) 2
- (d.) 4

Ans: A

Exp:

(32.) Find the wrong term 9, 11, 15, 23, 39, 70, 135

- (a.) 23
- (b.) 39
- (c.) 70
- (d.) 135

Ans: C

Exp:

(33.) A watch reads 4 : 30. If the minute - hand points to East, in which direction does the hour-hand point ?

- (a.) North-East
- (b.) South-East
- (c.) North-West
- (d.) North

Ans: A

Exp:

(34.) The time in the clock is 4 : 46, what is the mirror image ?

- (a.) 7 : 24
- (b.) 7 : 14
- (c.) 7 : 14
- (d.) 7 : 24

Ans: B

Exp:

(35.) Neelam, who is Rohit's daughter, says to Indu, "Your mother Reeta is the younger sister of my father, who is the third child of Sohanji. " How is Sohanji related to Indu ?

- (a.) Maternal-uncle
- (b.) Grandfather
- (c.) Father
- (d.) Father-in-law

Ans: B

Exp:

(36.) If the seventh day of month is three days earlier than Friday, what day will it be one the nineteenth day of the month ?

- (a.) Sunday
- (b.) Monday
- (c.) Wednesday
- (d.) Friday

Ans: A

Exp:

(37.) Sum of the Proper divisors of 100.

- (a.) 217
- (b.) 216
- (c.) 116
- (d.) 117

Ans: B

Exp:

(38.) Sanjay went 70 metres in the East before turning to his right. He went 10 metres before turning to his right again and went 10 metres from this point. From here he went 90 metres to the North. How far was he from the starting point?

- (a.) 80 metres
- (b.) 100 metres
- (c.) 140 metres
- (d.) 260 metres

Ans: B

Exp:

(39.) If **RAT** = 42 and **CAT** = 57, then **LATE** = ?

- (a.) 60
- (b.) 70

- (c.) 64
- (d.) 74

Ans: B  
Exp:

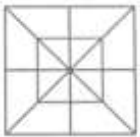
(40.) Which sequence of letter when placed at the blanks one after the other will complete the given letter series ?

abc\_d\_bc\_d\_db\_cda

- (a.) bacdc
- (b.) cdabc
- (c.) dacab
- (d.) dccbd

Ans: C  
Exp:

(41.) Count the number of triangles and squares in the following figure ?



- (a.) 28 triangles, 10 squares
- (b.) 28 triangles, 8 squares
- (c.) 32 triangles, 10 squares
- (d.) 32 triangles, 8 squares.

Ans: C  
Exp:

(42.) Six friends are sitting around a circular table at equal distances from each other. Ramola is sitting two places right of Komolika who is exactly opposite to Anu. Anu is sitting on the immediate left of Pallavi, who is exactly opposite to Mandira, natasha is also sitting at the table.

Which of the following statements is not correct ?

- (a.) Natasha and Ramola are exactly opposite to each other.
- (b.) Mandira and Natasha are at equal distance from Komolika.
- (c.) Angle subtended by Manidra and Natasha is same at the angle subtended by Ramola and Pallavi at the centre of the table.
- (d.) Natasha is on the immediate left of Pallavi.

Ans: D  
Exp:

(43.) Three persons **A**, **B** and **C** are Standing in a queue. There are five persons between **A** and **B** and eight persons between **B** and **C**. If there be three persons ahead of **C** and **21** persons behind **A**, what could be the minimum number of persons in the queue.

- (a.) 41
- (b.) 40
- (c.) 28

(d.) 27

Ans: C

Exp:

(44.) Find the Odd one Out:

(a.)  $9 - 27$

(b.)  $15 - 45$

(c.)  $10 - 30$

(d.)  $20 - 60$

Ans: A

Exp:

(45.) It being given that :  $>$  denotes  $+$ ,  $<$  denotes  $-$ ,  $+$  denotes  $\div$ ,  $-$  denotes  $=$ ,  $=$  denotes 'less than' and  $\times$  denotes 'greater than', find which of the following is a correct statement.

(a.)  $3 + 2 < 4 = 9 + 3 < 1$

(b.)  $3 > 2 > 4 = 18 + 3 < 2$

(c.)  $3 > 2 < 4 \times 8 + 4 < 2$

(d.)  $3 + 2 < 4 \times 9 + 3 < 3$

Ans: C

Exp: