WHIZ SEARCH (SAMPLE PAPER)

# CLASS – 12ᵗʰ [ENGINEERING]

Important Instructions:

- This paper contains 35 questions among 4 Sections (Physics, Chemistry, Mathematics and Mental ability & Reasoning).

- All questions are compulsory.

- Sections (Physics, Chemistry and Mathematics) contains 9 questions each.

- Section (Mental ability & Reasoning) contains 8 questions only.

- Total Time duration of test paper is 60 Minutes 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.
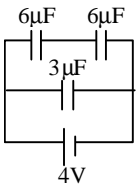
PHYSICS
SECTION (Maximum Marks: 36)

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

–Q   +2Q

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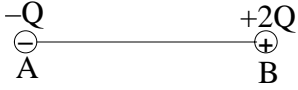
(a.) somewhere between –Q and 2Q
(b.) somewhere on the left of –Q
(c.) somewhere on the right of 2Q
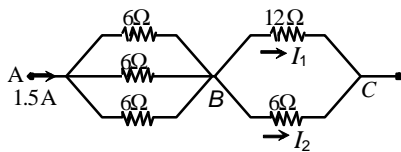(d.) somewhere on the right bisector of line joining –Q and 2Q

ANS: B

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

6μF   6μF
3 μF
4V

(a.) 12 μJ
(b.) 36 μJ
(c.) 48 μJ
(d.) 80 μJ

ANS: C

(3.) In the network shown,

6Ω   12Ω
6Ω $\rightarrow I_1$
A
1.5A   6Ω   B   6Ω   C
$\rightarrow I_2$

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

ANS: A

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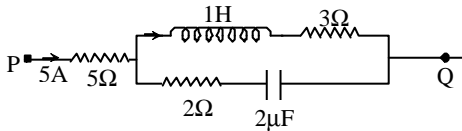(a.) B/E
(b.) E/B
(c.) EB
(d.) E^2/B^2

ANS: B

(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
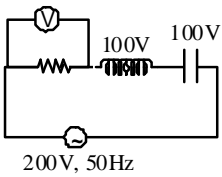(d.) the direction of the earth's magnetic field

ANS: D

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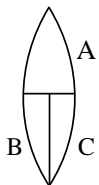

(a.) 40 V
(b.) 21 V
(c.) 18 V
(d.) 18 V

ANS: A

(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

(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

(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

CHEMISTRY
SECTION (Maximum Marks: 36)

(10.) 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

(11.) 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

(12.) 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.) $\dfrac{k_1'}{k_1} > \dfrac{k_2'}{k_2}$

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

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

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

ANS: C

(13.) The pk_{a_1}, pk_{a_2} and pk_{a_3} values for the amino acid cysteine $\left(HS-CH_2-\underset{\underset{NH_2}{|}}{CH}-COOH \right)$ are respectively 1.8, 8.3, 10.8. What is isoelectric point of cysteine amino acid?
(a.) 6.3
(b.) 9.55
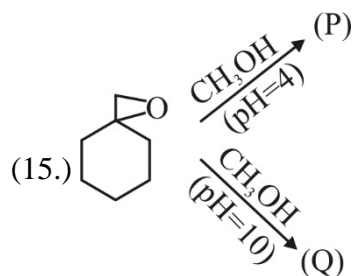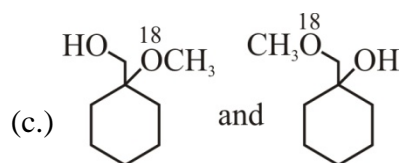(c.) 5.05
(d.) 10.1

ANS: B

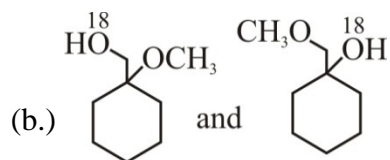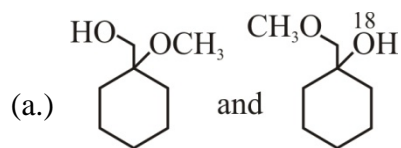(14.) $[Fe(H_2O)_5NO]SO_4$ and $[Cr(NH_3)_6](NO_2)_3$ both are paramagnetic species with 'spin only' magnetic moment of 3.93 B.M. The hybridisation of central metal ions in these species respectively are:
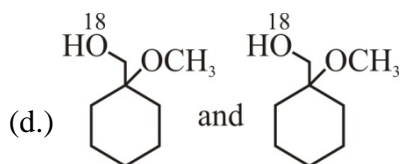(a.) both sp^3d^2
(b.) both d^2sp^3
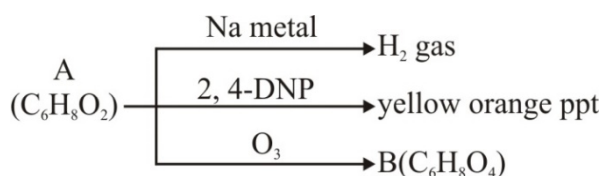(c.) sp^3d^2 and d^2sp^3
(d.) d^2sp^3 and sp^3d^2

ANS: C

(15.)

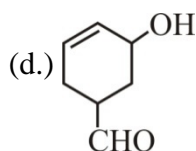Identify product (P) and (Q) respectively?
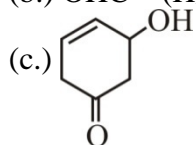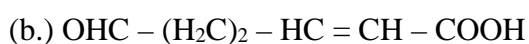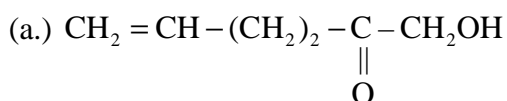
(a.)

and

(b.)

and

(c.)

and

(d.) and

ANS: B

(16.) The compound A gives following reactions.

Its structure can be

(a.) $CH_2 = CH - (CH_2)_2 - \underset{\underset{O}{\|}}{C} - CH_2OH$

(b.) OHC – $(H_2C)_2$ – HC = CH – COOH

(c.)

(d.)

ANS: C

(17.) Which statement is correct about the following reaction
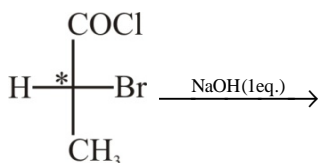
(a.) There is inversion of configuration at asymmetric C* atom
(b.) There is no change of configuration at asymmetric C* atom
(c.) There is 100% racemisation at C* atom
(d.) % inversion > % retention at C* atom

ANS: B

(18.) The product of following reaction is

$\xrightarrow{H_3\overset{\oplus}{O}}$

(a.)

(b.)

 + ArOH

(c.)

 + ArOH

(d.)

 + ArOH
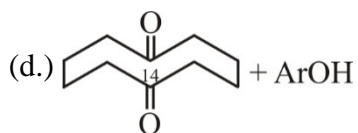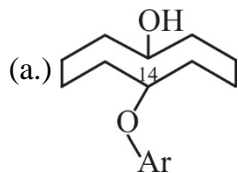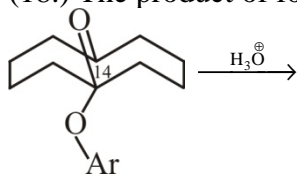
ANS: C

MATHEMATICS
SECTION (Maximum Marks: 36)

(19.) The magnitudes of mutually perpendicular forces **a, b** and **c** are 2, 10 and 11 respectively. Then the magnitude of its resultant is
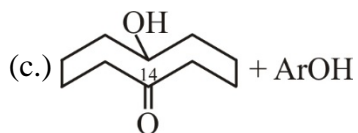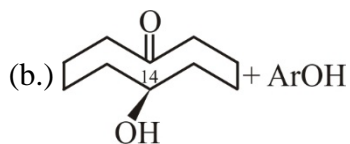(a.) 12
(b.) 15
(c.) 9
(d.) 18

ANS: B

(20.) If α, β, γ 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

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

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

ANS: A

(22.) $\lim\limits_{x\to 0}\dfrac{xe^x - \log(1+x)}{x^2}$ equals

(a.) $\dfrac{2}{3}$

(b.) $\dfrac{1}{3}$

(c.) $\dfrac{1}{2}$

(d.) $\dfrac{3}{2}$

ANS: D

(23.) The values of A and B such that the function $f(x) = \begin{cases} -2\sin x, & x \le -\dfrac{\pi}{2} \\[2mm] A\sin x + B, & -\dfrac{\pi}{2} < x < \dfrac{\pi}{2} \\[2mm] \cos x, & x \ge \dfrac{\pi}{2} \end{cases}$, 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

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

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

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

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

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

ANS: D

(25.) $\displaystyle\int (1+2x+3x^2+4x^3+......)\,dx =$

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

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

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

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

ANS: B

(26.) $\displaystyle\int_0^{\pi/2} \dfrac{x+\sin x}{1+\cos x}\,dx =$

(a.) $-\log 2$

(b.) $\log 2$

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

(d.) 0

ANS: C

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

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

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

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

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

ANS: A

MENTAL ABILITY & REASONING
SECTION (Maximum Marks: 32)

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

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

ANS: A

(29.) Find the wrong term 9, 11, 15, 23, 39, 70, 135
(a.) 23
(b.) 39
(c.) 70
(d.) 135

ANS: C

(30.) 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

(31.) 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

(32.) Neelam, who is Rohit's daugher, 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

(33.) 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

(34.) Sum of the Proper divisors of 100.
(a.) 217
(b.) 216
(c.) 116
(d.) 117

ANS: B

(35.) 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