

## JEE 2023 Session-1 24th Jan to 1st Feb 2023

Application No	
Candidate Name	
Roll No	
Test Date	24/01/2023
Test Time	9:00 AM - 12:00 PM
Subject	B TECH

### Section : Physics Section A

**Q.1** From the photoelectric effect experiment, following observations are made. Identify which of these are correct.

- A. The stopping potential depends only on the work function of the metal.
- B. The saturation current increases as the intensity of incident light increases.
- C. The maximum kinetic energy of a photo electron depends on the intensity of the incident light.
- D. Photoelectric effect can be explained using wave theory of light.

Choose the correct answer from the options given below:

- Options**
1. A, B, D only
  2. B, C only
  3. B only
  4. A, C, D only

Question Type : **MCQ**

Question ID : **7155051453**

Option 1 ID : **7155054370**

Option 2 ID : **7155054371**

Option 3 ID : **7155054369**

Option 4 ID : **7155054372**

Status : **Answered**

Chosen Option : **3**

**Q.2** Given below are two statements :

**Statement I :** If the Brewster's angle for the light propagating from air to glass is  $\theta_B$ , then the Brewster's angle for the light propagating from glass to air is  $\frac{\pi}{2} - \theta_B$

**Statement II :** The Brewster's angle for the light propagating from glass to air is  $\tan^{-1}(\mu_g)$  where  $\mu_g$  is the refractive index of glass.

In the light of the above statements, choose the **correct** answer from the options given below:

- Options**
1. Statement I is true but Statement II is false
  2. Both Statement I and Statement II are false
  3. Both Statement I and Statement II are true
  4. Statement I is false but Statement II is true

Question Type : **MCQ**

Question ID : **7155051454**

Option 1 ID : **7155054375**

Option 2 ID : **7155054374**

Option 3 ID : **7155054373**

Option 4 ID : **7155054376**

Status : **Not Answered**

Chosen Option : **--**

**Q.3** Given below are two statements : one is labelled as **Assertion A** and the other is labelled as **Reason R**

**Assertion A** : Photodiodes are preferably operated in reverse bias condition for light intensity measurement.

**Reason R** : The current in the forward bias is more than the current in the reverse bias for a  $p-n$  junction diode.

In the light of the above statements, choose the **correct** answer from the options given below:

- Options
1. **A** is false but **R** is true
  2. **A** is true but **R** is false
  3. Both **A** and **R** are true but **R** is **NOT** the correct explanation of **A**
  4. Both **A** and **R** are true and **R** is the correct explanation of **A**

Question Type : **MCQ**

Question ID : **7155051451**

Option 1 ID : **7155054364**

Option 2 ID : **7155054363**

Option 3 ID : **7155054362**

Option 4 ID : **7155054361**

Status : **Answered**

Chosen Option : **4**

**Q.4** A circular loop of radius  $r$  is carrying current  $I$  A. The ratio of magnetic field at the center of circular loop and at a distance  $r$  from the center of the loop on its axis is:

- Options
1.  $1:3\sqrt{2}$
  2.  $2\sqrt{2}:1$
  3.  $1:\sqrt{2}$
  4.  $3\sqrt{2}:2$

Question Type : **MCQ**

Question ID : **7155051458**

Option 1 ID : **7155054389**

Option 2 ID : **7155054390**

Option 3 ID : **7155054391**

Option 4 ID : **7155054392**

Status : **Answered**

Chosen Option : **3**

**Q.5** In  $\vec{E}$  and  $\vec{K}$  represent electric field and propagation vectors of the EM waves in vacuum, then magnetic field vector is given by:

( $\omega$  - angular frequency):

- Options
1.  $\vec{K} \times \vec{E}$
  2.  $\frac{1}{\omega}(\vec{K} \times \vec{E})$
  3.  $\omega(\vec{K} \times \vec{E})$
  4.  $\omega(\vec{E} \times \vec{K})$

Question Type : **MCQ**

Question ID : **7155051455**

Option 1 ID : **7155054379**

Option 2 ID : **7155054380**

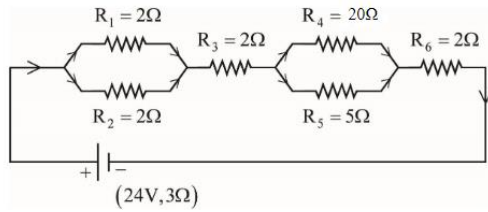
Option 3 ID : **7155054377**

Option 4 ID : **7155054378**

Status : **Answered**

Chosen Option : **3**

- Q.6** As shown in the figure, a network of resistors is connected to a battery of 24V with an internal resistance of  $3\Omega$ . The currents through the resistors  $R_4$  and  $R_5$  are  $I_4$  and  $I_5$  respectively. The values of  $I_4$  and  $I_5$  are:



Options

1.  $I_4 = \frac{8}{5} \text{ A}$  and  $I_5 = \frac{2}{5} \text{ A}$
2.  $I_4 = \frac{6}{5} \text{ A}$  and  $I_5 = \frac{24}{5} \text{ A}$
3.  $I_4 = \frac{2}{5} \text{ A}$  and  $I_5 = \frac{8}{5} \text{ A}$
4.  $I_4 = \frac{24}{5} \text{ A}$  and  $I_5 = \frac{6}{5} \text{ A}$

Question Type : **MCQ**

Question ID : **7155051459**

Option 1 ID : **7155054394**

Option 2 ID : **7155054395**

Option 3 ID : **7155054393**

Option 4 ID : **7155054396**

Status : **Answered**

Chosen Option : **3**

- Q.7** If two charges  $q_1$  and  $q_2$  are separated with distance 'd' and placed in a medium of dielectric constant K. What will be the equivalent distance between charges in air for the same electrostatic force?

Options

1.  $1.5d\sqrt{k}$
2.  $2d\sqrt{k}$
3.  $d\sqrt{k}$
4.  $k\sqrt{d}$

Question Type : **MCQ**

Question ID : **7155051460**

Option 1 ID : **7155054398**

Option 2 ID : **7155054399**

Option 3 ID : **7155054397**

Option 4 ID : **7155054400**

Status : **Answered**

Chosen Option : **1**

**Q.8** The maximum vertical height to which a man can throw a ball is 136 m. The maximum horizontal distance upto which he can throw the same ball is:

- Options**
1. 192 m
  2. 272 m
  3. 136 m
  4. 68 m

Question Type : **MCQ**

Question ID : **7155051443**

Option 1 ID : **7155054332**

Option 2 ID : **7155054331**

Option 3 ID : **7155054329**

Option 4 ID : **7155054330**

Status : **Not Answered**

Chosen Option : --

**Q.9** Given below are two statements :

**Statement I :** The temperature of a gas is  $-73^{\circ}\text{C}$ . When the gas is heated to  $527^{\circ}\text{C}$ , the root mean square speed of the molecules is doubled.

**Statement II :** The product of pressure and volume of an ideal gas will be equal to translational kinetic energy of the molecules.

In the light of the above statements, choose the **correct** answer from the options given below:

- Options**
1. Statement I is true but Statement II is false
  2. Statement I is false but Statement II is true
  3. Both Statement I and Statement II are true
  4. Both Statement I and Statement II are false

Question Type : **MCQ**

Question ID : **7155051449**

Option 1 ID : **7155054355**

Option 2 ID : **7155054356**

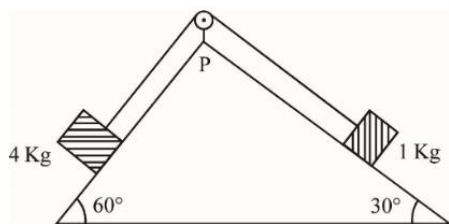
Option 3 ID : **7155054353**

Option 4 ID : **7155054354**

Status : **Not Answered**

Chosen Option : --

**Q.10** As per given figure, a weightless pulley P is attached on a double inclined frictionless surfaces. The tension in the string (massless) will be (if  $g = 10 \text{ m/s}^2$ )



Options

1.  $4(\sqrt{3} + 1)N$
2.  $(4\sqrt{3} + 1)N$
3.  $4(\sqrt{3} - 1)N$
4.  $(4\sqrt{3} - 1)N$

Question Type : MCQ

Question ID : 7155051445

Option 1 ID : 7155054339

Option 2 ID : 7155054338

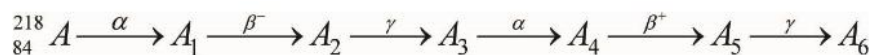
Option 3 ID : 7155054340

Option 4 ID : 7155054337

Status : Not Answered

Chosen Option : --

**Q.11** Consider the following radioactive decay process



The mass number and the atomic number of  $A_6$  are given by:

Options

1. 210 and 82
2. 210 and 80
3. 211 and 80
4. 210 and 84

Question Type : MCQ

Question ID : 7155051452

Option 1 ID : 7155054365

Option 2 ID : 7155054366

Option 3 ID : 7155054368

Option 4 ID : 7155054367

Status : Answered

Chosen Option : 1

**Q.12** The weight of a body at the surface of earth is 18 N. The weight of the body at an altitude of 3200 km above the earth's surface is (given, radius of earth  $R_e = 6400$  km):

- Options**
1. 9.8 N
  2. 19.6 N
  3. 4.9 N
  4. 8 N

Question Type : **MCQ**

Question ID : **7155051446**

Option 1 ID : **7155054344**

Option 2 ID : **7155054342**

Option 3 ID : **7155054341**

Option 4 ID : **7155054343**

Status : **Not Answered**

Chosen Option : --

**Q.13** A conducting circular loop of radius  $\frac{10}{\sqrt{\pi}}$  cm is placed perpendicular to a uniform magnetic field of 0.5 T. The magnetic field is decreased to zero in 0.5 s at a steady rate. The induced emf in the circular loop at 0.25 s is:

- Options**
1. **emf = 5 mV**
  2. **emf = 10 mV**
  3. **emf = 1 mV**
  4. **emf = 100 mV**

Question Type : **MCQ**

Question ID : **7155051456**

Option 1 ID : **7155054384**

Option 2 ID : **7155054383**

Option 3 ID : **7155054382**

Option 4 ID : **7155054381**

Status : **Answered**

Chosen Option : **1**

**Q.14** Two long straight wires P and Q carrying equal current 10A each were kept parallel to each other at 5 cm distance. Magnitude of magnetic force experienced by 10 cm length of wire P is  $F_1$ . If distance between wires is halved and currents on them are doubled, force  $F_2$  on 10 cm length of wire P will be:

- Options**
1.  $\frac{F_1}{10}$
  2.  $\frac{F_1}{8}$
  3.  $10 F_1$
  4.  $8 F_1$

Question Type : **MCQ**

Question ID : **7155051457**

Option 1 ID : **7155054388**

Option 2 ID : **7155054387**

Option 3 ID : **7155054386**

Option 4 ID : **7155054385**

Status : **Not Answered**

Chosen Option : --

**Q.15** Given below are two statements :

**Statement I:** An elevator can go up or down with uniform speed when its weight is balanced with the tension of its cable.

**Statement II:** Force exerted by the floor of an elevator on the foot of a person standing on it is more than his/her weight when the elevator goes down with increasing speed.

In the light of the above statements, choose the **correct** answer from the options given below:

- Options**
1. Statement I is false but Statement II is true
  2. Statement I is true but Statement II is false
  3. Both Statement I and Statement II are true
  4. Both Statement I and Statement II are false

Question Type : **MCQ**

Question ID : **7155051444**

Option 1 ID : **7155054336**

Option 2 ID : **7155054335**

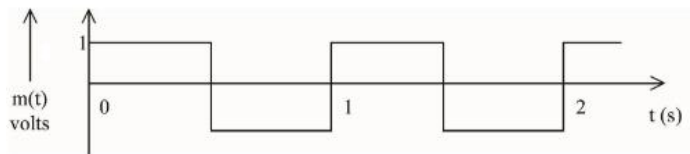
Option 3 ID : **7155054333**

Option 4 ID : **7155054334**

Status : **Answered**

Chosen Option : **3**

**Q.16** A modulating signal is a square wave, as shown in the figure.



If the carrier wave is given as  $c(t) = 2 \sin(8\pi t)$  volts, the modulation index is:

- Options**
1.  $\frac{1}{4}$
  2.  $\frac{1}{2}$
  3.  $\frac{1}{3}$
  4.  $\frac{1}{3}$

Question Type : **MCQ**

Question ID : **7155051450**

Option 1 ID : **7155054357**

Option 2 ID : **7155054358**

Option 3 ID : **7155054359**

Option 4 ID : **7155054360**

Status : **Not Answered**

Chosen Option : **--**



**Q.17** A travelling wave is described by the equation

$$y(x, t) = [0.05 \sin (8x - 4t)] \text{ m}$$

The velocity of the wave is : [all the quantities are in SI unit]

- Options
1.  $0.5 \text{ ms}^{-1}$
  2.  $2 \text{ ms}^{-1}$
  3.  $8 \text{ ms}^{-1}$
  4.  $4 \text{ ms}^{-1}$

Question Type : MCQ

Question ID : 7155051442

Option 1 ID : 7155054327

Option 2 ID : 7155054328

Option 3 ID : 7155054325

Option 4 ID : 7155054326

Status : Answered

Chosen Option : 2

**Q.18** A 100 m long wire having cross-sectional area  $6.25 \times 10^{-4} \text{ m}^2$  and Young's modulus is  $10^{10} \text{ Nm}^{-2}$  is subjected to a load of 250 N, then the elongation in the wire will be:

- Options
1.  $6.25 \times 10^{-6} \text{ m}$
  2.  $6.25 \times 10^{-3} \text{ m}$
  3.  $4 \times 10^{-3} \text{ m}$
  4.  $4 \times 10^{-4} \text{ m}$

Question Type : MCQ

Question ID : 7155051447

Option 1 ID : 7155054345

Option 2 ID : 7155054346

Option 3 ID : 7155054348

Option 4 ID : 7155054347

Status : Answered

Chosen Option : 1

**Q.19** 1 g of a liquid is converted to vapour at  $3 \times 10^5 \text{ Pa}$  pressure . If 10% of the heat supplied is used for increasing the volume by  $1600 \text{ cm}^3$  during this phase change, then the increase in internal energy in the process will be:

- Options
1.  $4.32 \times 10^8 \text{ J}$
  2. 4800 J
  3. 4320 J
  4. 432000 J

Question Type : MCQ

Question ID : 7155051448

Option 1 ID : 7155054351

Option 2 ID : 7155054349

Option 3 ID : 7155054352

Option 4 ID : 7155054350

Status : Not Answered

Chosen Option : --



## Q.20 Match List I with List II

LIST I		LIST II	
A.	Planck's constant (h)	I.	$[M^1 L^2 T^{-2}]$
B.	Stopping potential (Vs)	II.	$[M^1 L^1 T^{-1}]$
C.	Work function ( $\phi$ )	III.	$[M^1 L^2 T^{-1}]$
D.	Momentum (p)	IV.	$[M^1 L^2 T^{-3} A^{-1}]$

Choose the correct answer from the options given below:

- Options 1. A-III, B-IV, C-I, D-II  
 2. A-I, B-III, C-IV, D-II  
 3. A-II, B-IV, C-III, D-I  
 4. A-III, B-I, C-II, D-IV

Question Type : MCQ

Question ID : 7155051441

Option 1 ID : 7155054324

Option 2 ID : 7155054321

Option 3 ID : 7155054322

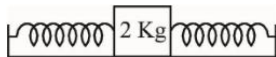
Option 4 ID : 7155054323

Status : Answered

Chosen Option : 1

## Section : Physics Section B

Q.21



A block of a mass 2 kg is attached with two identical springs of spring constant 20 N/m each. The block is placed on a frictionless surface and the ends of the springs are attached to rigid supports (see figure). When the mass is displaced from its equilibrium position, it executes a simple harmonic motion. The time period of oscillation is  $\frac{\pi}{\sqrt{x}}$  in SI unit. The value of x is \_\_\_\_\_.

Given --

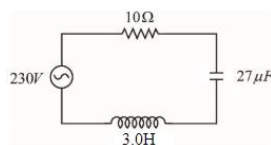
Answer :

Question Type : SA

Question ID : 7155051461

Status : Not Answered

Q.22 In the circuit shown in the figure, the ratio of the quality factor and the band width is \_\_\_\_\_ s.



Given --

Answer :

Question Type : SA

Question ID : 7155051468

Status : Not Answered

**Q.23** Vectors  $a\hat{i} + b\hat{j} + \hat{k}$  and  $2\hat{i} - 3\hat{j} + 4\hat{k}$  are perpendicular to each other when  $3a + 2b = 7$ , the ratio of  $a$  to  $b$  is  $\frac{x}{2}$ . The value of  $x$  is \_\_\_\_\_.

Given **13**

Answer :

Question Type : SA

Question ID : 7155051462

Status : Answered

**Q.24** A hole is drilled in a metal sheet. At  $27^\circ\text{C}$ , the diameter of hole is 5 cm. When the sheet is heated to  $177^\circ\text{C}$ , the change in the diameter of hole is  $d \times 10^{-3}$  cm. The value of  $d$  will be \_\_\_\_\_ if coefficient of linear expansion of the metal is  $1.6 \times 10^{-5}/^\circ\text{C}$ .

Given **12.05**

Answer :

Question Type : SA

Question ID : 7155051465

Status : Answered

**Q.25** Assume that protons and neutrons have equal masses. Mass of a nucleon is  $1.6 \times 10^{-27}$  kg and radius of nucleus is  $1.5 \times 10^{-15} \text{ A}^{1/3}$  m. The approximate ratio of the nuclear density and water density is  $n \times 10^{13}$ . The value of  $n$  is \_\_\_\_\_.

Given --

Answer :

Question Type : SA

Question ID : 7155051466

Status : Not Answered

**Q.26** A spherical body of mass 2 kg starting from rest acquires a kinetic energy of 10000 J at the end of 5<sup>th</sup> second. The force acted on the body is \_\_\_\_\_ N.

Given **40**

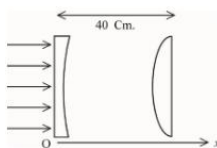
Answer :

Question Type : SA

Question ID : 7155051463

Status : Answered

**Q.27** As shown in the figure, a combination of a thin plano concave lens and a thin plano convex lens is used to image an object placed at infinity. The radius of curvature of both the lenses is 30 cm and refraction index of the material for both the lenses is 1.75. Both the lenses are placed at distance of 40 cm from each other. Due to the combination, the image of the object is formed at distance  $x =$  \_\_\_\_\_ cm, from concave lens.



Given **25**

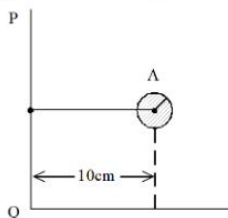
Answer :

Question Type : SA

Question ID : 7155051467

Status : Answered

**Q.28** Solid sphere A is rotating about an axis PQ. If the radius of the sphere is 5 cm then its radius of gyration about PQ will be  $\sqrt{x}$  cm. The value of  $x$  is \_\_\_\_\_.



Given --  
Answer :

Question Type : SA  
Question ID : 7155051464  
Status : Not Answered

**Q.29** A stream of a positively charged particles having  $\frac{q}{m} = 2 \times 10^{11} \frac{C}{kg}$  and velocity  $\vec{v}_0 = 3 \times 10^7 \hat{i} \text{ m/s}$  is deflected by an electric field  $1.8 \hat{j} \text{ kV/m}$ . The electric field exists in a region of 10 cm along  $x$  direction. Due to the electric field, the deflection of the charge particles in the  $y$  direction is \_\_\_\_\_ mm.

Given --  
Answer :

Question Type : SA  
Question ID : 7155051470  
Status : Not Answered

**Q.30** A hollow cylindrical conductor has length of 3.14 m, while its inner and outer diameters are 4 mm and 8 mm respectively. The resistance of the conductor is  $n \times 10^{-3} \Omega$ . If the resistivity of the material is  $2.4 \times 10^{-8} \Omega \text{m}$ . The value of  $n$  is \_\_\_\_\_.

Given 0.05  
Answer :

Question Type : SA  
Question ID : 7155051469  
Status : Answered

#### Section : Chemistry Section A

**Q.31** The magnetic moment of a transition metal compound has been calculated to be 3.87 B.M. The metal ion is

- Options
1.  $V^{2+}$
  2.  $Ti^{2+}$
  3.  $Cr^{2+}$
  4.  $Mn^{2+}$

Question Type : MCQ  
Question ID : 7155051480  
Option 1 ID : 7155054448  
Option 2 ID : 7155054447  
Option 3 ID : 7155054449  
Option 4 ID : 7155054450  
Status : Answered  
Chosen Option : 2

**Q.32 Assertion A :** Hydrolysis of an alkyl chloride is a slow reaction but in the presence of NaI, the rate of the hydrolysis increases.

**Reason R :** I<sup>-</sup> is a good nucleophile as well as a good leaving group.

In the light of the above statements, choose the **correct** answer from the options given below

**Options** 1. **A** is true but **R** is false

2.

Both **A** and **R** are true but **R** is **NOT** the correct explanation of **A**

3. **A** is false but **R** is true

4.

Both **A** and **R** are true and **R** is the correct explanation of **A**

Question Type : **MCQ**

Question ID : **7155051485**

Option 1 ID : **7155054469**

Option 2 ID : **7155054468**

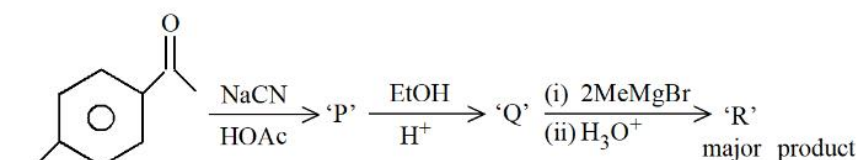
Option 3 ID : **7155054470**

Option 4 ID : **7155054467**

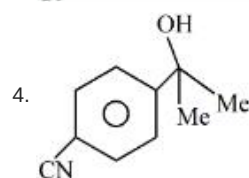
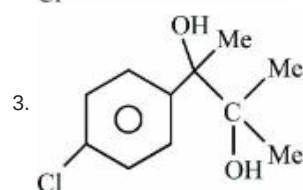
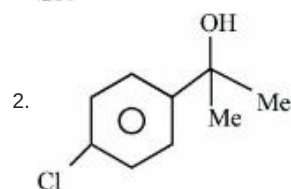
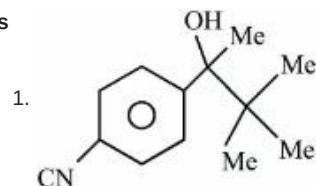
Status : **Answered**

Chosen Option : **3**

**Q.33** 'R' formed in the following sequence of reactions is :



**Options**



Question Type : **MCQ**

Question ID : **7155051488**

Option 1 ID : **7155054482**

Option 2 ID : **7155054481**

Option 3 ID : **7155054479**

Option 4 ID : **7155054480**

Status : **Answered**

Chosen Option : **4**

**Q.34 Statement I :** For colloidal particles, the values of colligative properties are of small order as compared to values shown by true solutions at same concentration.

**Statement II :** For colloidal particles, the potential difference between the fixed layer and the diffused layer of same charges is called the electrokinetic potential or zeta potential.

In the light of the above statements, choose the correct answer from the options given below

- Options
1. Both Statement I and Statement II are false
  2. Statement I is true but Statement II is false
  3. Statement I is false but Statement II is true
  4. Both Statement I and Statement II are true

Question Type : **MCQ**

Question ID : **7155051473**

Option 1 ID : **7155054420**

Option 2 ID : **7155054421**

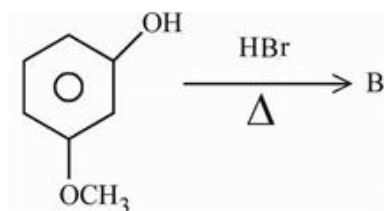
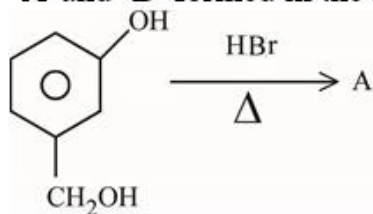
Option 3 ID : **7155054422**

Option 4 ID : **7155054419**

Status : **Not Answered**

Chosen Option : --

Q.35 'A' and 'B' formed in the following set of reactions are:



Options

1. A = , B =
2. A = , B =
3. A = , B =
4. A = , B =

Question Type : MCQ

Question ID : 7155051486

Option 1 ID : 7155054471

Option 2 ID : 7155054474

Option 3 ID : 7155054473

Option 4 ID : 7155054472

Status : Answered

Chosen Option : 1

**Q.36** Given below are two statements:

**Statement I :** Noradrenaline is a neurotransmitter.

**Statement II :** Low level of noradrenaline is not the cause of depression in human.

In the light of the above statements, choose the correct answer from the options given below

- Options**
1. Statement I is correct but Statement II is incorrect
  2. Both Statement I and Statement II are incorrect
  3. Both Statement I and Statement II are correct
  4. Statement I is incorrect but Statement II is correct

Question Type : MCQ

Question ID : 7155051490

Option 1 ID : 7155054489

Option 2 ID : 7155054488

Option 3 ID : 7155054487

Option 4 ID : 7155054490

Status : Answered

Chosen Option : 1

**Q.37** Reaction of BeO with ammonia and hydrogen fluoride gives A which on thermal decomposition gives BeF<sub>2</sub> and NH<sub>4</sub>F. What is 'A' ?

- Options**
1. (NH<sub>4</sub>)BeF<sub>3</sub>
  2. (NH<sub>4</sub>)Be<sub>2</sub>F<sub>5</sub>
  3. H<sub>3</sub>NBeF<sub>3</sub>
  4. (NH<sub>4</sub>)<sub>2</sub>BeF<sub>4</sub>

Question Type : MCQ

Question ID : 7155051477

Option 1 ID : 7155054435

Option 2 ID : 7155054438

Option 3 ID : 7155054437

Option 4 ID : 7155054436

Status : Answered

Chosen Option : 1

**Q.38** Order of Covalent bond;

- A. KF > KI ; LiF > KF
- B. KF < KI ; LiF > KF
- C. SnCl<sub>4</sub> > SnCl<sub>2</sub> ; CuCl > NaCl
- D. LiF > KF ; CuCl < NaCl
- E. KF < KI ; CuCl > NaCl

Choose the correct answer from the options given below:

- Options**
1. B, C, E only
  2. C, E only
  3. B, C only
  4. A, B only

Question Type : MCQ

Question ID : 7155051471

Option 1 ID : 7155054414

Option 2 ID : 7155054413

Option 3 ID : 7155054412

Option 4 ID : 7155054411

Status : Answered

Chosen Option : 3



**Q.39** Which of the following is true about freons?

- Options
1. All radicals are called freons
  2. These are chlorofluorocarbon compounds
  3. These are radicals of chlorine and chlorine monoxide
  4. These are chemicals causing skin cancer

Question Type : **MCQ**

Question ID : **7155051481**

Option 1 ID : **7155054454**

Option 2 ID : **7155054451**

Option 3 ID : **7155054452**

Option 4 ID : **7155054453**

Status : **Answered**

Chosen Option : **2**

**Q.40** An ammoniacal metal salt solution gives a brilliant red precipitate on addition of dimethylglyoxime. The metal ion is:

- Options
1.  $\text{Cu}^{2+}$
  2.  $\text{Fe}^{2+}$
  3.  $\text{Ni}^{2+}$
  4.  $\text{Co}^{2+}$

Question Type : **MCQ**

Question ID : **7155051489**

Option 1 ID : **7155054486**

Option 2 ID : **7155054483**

Option 3 ID : **7155054485**

Option 4 ID : **7155054484**

Status : **Answered**

Chosen Option : **4**

**Q.41** Which of the Phosphorus oxoacid can create silver mirror from  $\text{AgNO}_3$  solution?

- Options
1.  $\text{H}_4\text{P}_2\text{O}_5$
  2.  $\text{H}_4\text{P}_2\text{O}_7$
  3.  $(\text{HPO}_3)_n$
  4.  $\text{H}_4\text{P}_2\text{O}_6$

Question Type : **MCQ**

Question ID : **7155051479**

Option 1 ID : **7155054443**

Option 2 ID : **7155054446**

Option 3 ID : **7155054444**

Option 4 ID : **7155054445**

Status : **Not Answered**

Chosen Option : **--**

## Q.42 Match List I with List II

LIST I		LIST II	
A.	Chlorophyll	I.	$\text{Na}_2\text{CO}_3$
B.	Soda ash	II.	$\text{CaSO}_4$
C.	Dentistry, Ornamental work	III.	$\text{Mg}^{2+}$
D.	Used in white washing	IV.	$\text{Ca}(\text{OH})_2$

Choose the correct answer from the options given below:

Options 1. A-III, B-IV, C-I, D-II

2. A-II, B-III, C-IV, D-I

3. A-III, B-I, C-II, D-IV

4. A-II, B-I, C-III, D-IV

Question Type : MCQ

Question ID : 7155051478

Option 1 ID : 7155054441

Option 2 ID : 7155054440

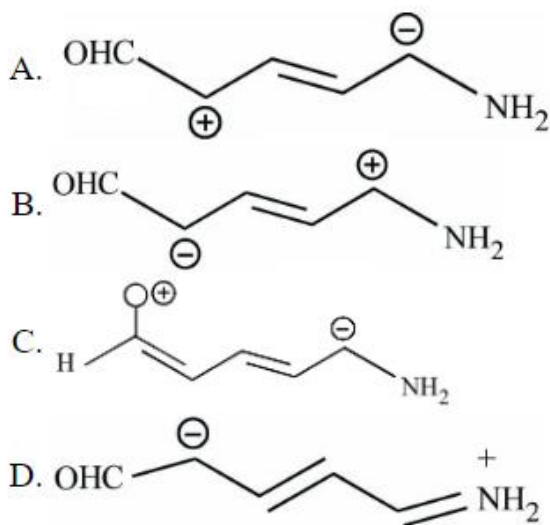
Option 3 ID : 7155054442

Option 4 ID : 7155054439

Status : Answered

Chosen Option : 1

## Q.43 Increasing order of stability of the resonance structures is:



Choose the correct answer from the options given below:

Options 1. C, D, B, A

2. D, C, A, B

3. D, C, B, A

4. C, D, A, B

Question Type : MCQ

Question ID : 7155051483

Option 1 ID : 7155054460

Option 2 ID : 7155054462

Option 3 ID : 7155054459

Option 4 ID : 7155054461

Status : Not Answered

Chosen Option : --

## Q.44 Match List I with List II

LIST I		LIST II	
A.	Reverberatory furnace	I.	Pig Iron
B.	Electrolytic cell	II.	Aluminum
C.	Blast furnace	III.	Silicon
D.	Zone Refining furnace	IV.	Copper

Choose the correct answer from the options given below:

Options 1. A-I, B-IV, C-II, D-III

2. A-I, B-III, C-II, D-IV

3. A-IV, B-II, C-I, D-III

4. A-III, B-IV, C-I, D-II

Question Type : MCQ

Question ID : 7155051475

Option 1 ID : 7155054428

Option 2 ID : 7155054429

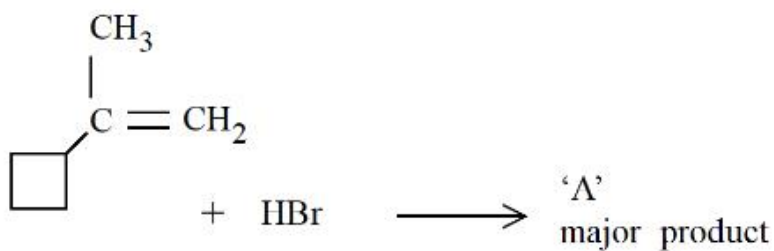
Option 3 ID : 7155054427

Option 4 ID : 7155054430

Status : Answered

Chosen Option : 1

Q.45 In the following given reaction, 'A' is



Options

- 1.
- 2.
- 3.
- 4.

Question Type : MCQ

Question ID : 7155051484

Option 1 ID : 7155054463

Option 2 ID : 7155054464

Option 3 ID : 7155054466

Option 4 ID : 7155054465

Status : Answered

Chosen Option : 2

Q.46 Decreasing order of the hydrogen bonding in following forms of water is correctly represented by

- A. Liquid water
- B. Ice
- C. Impure water

Choose the correct answer from the options given below:

- Options
1.  $A > B > C$
  2.  $C > B > A$
  3.  $A = B > C$
  4.  $B > A > C$

Question Type : MCQ

Question ID : 7155051476

Option 1 ID : 7155054431

Option 2 ID : 7155054433

Option 3 ID : 7155054434

Option 4 ID : 7155054432

Status : Answered

Chosen Option : 4

**Q.47** The primary and secondary valencies of cobalt respectively in  $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$  are:

- Options**
1. 3 and 5
  2. 2 and 8
  3. 3 and 6
  4. 2 and 6

Question Type : **MCQ**

Question ID : **7155051482**

Option 1 ID : **7155054456**

Option 2 ID : **7155054457**

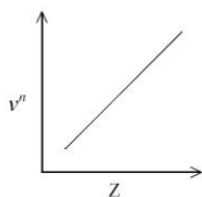
Option 3 ID : **7155054458**

Option 4 ID : **7155054455**

Status : **Answered**

Chosen Option : **1**

**Q.48** It is observed that characteristic X-ray spectra of elements show regularity. When frequency to the power "n" i.e.  $\nu^n$  of X-rays emitted is plotted against atomic number "Z", following graph is obtained.



The value of "n" is

- Options**
1. 2
  2.  $\frac{1}{2}$
  3. 3
  4. 1

Question Type : **MCQ**

Question ID : **7155051474**

Option 1 ID : **7155054424**

Option 2 ID : **7155054426**

Option 3 ID : **7155054425**

Option 4 ID : **7155054423**

Status : **Answered**

Chosen Option : **2**

**Q.49** In the depression of freezing point experiment

- A. Vapour pressure of the solution is less than that of pure solvent
- B. Vapour pressure of the solution is more than that of pure solvent
- C. Only solute molecules solidify at the freezing point
- D. Only solvent molecules solidify at the freezing point

Choose the most appropriate answer from the options given below:

**Options** 1. A and D only

2. A and C only

3. A only

4. B and C only

Question Type : **MCQ**

Question ID : **7155051472**

Option 1 ID : **7155054418**

Option 2 ID : **7155054416**

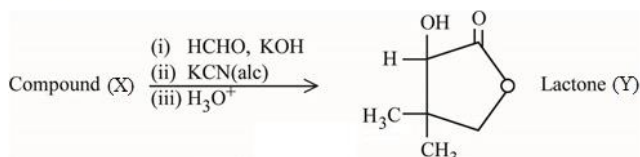
Option 3 ID : **7155054415**

Option 4 ID : **7155054417**

Status : **Answered**

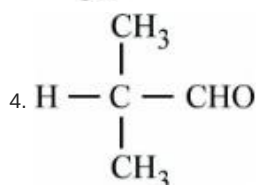
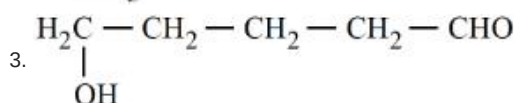
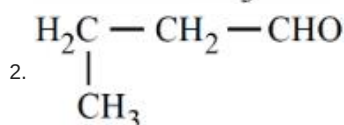
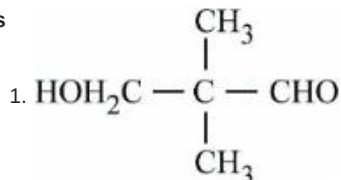
Chosen Option : **3**

**Q.50** Compound (X) undergoes following sequence of reactions to give the Lactone (Y).



Compound (X) is

**Options**



Question Type : **MCQ**

Question ID : **7155051487**

Option 1 ID : **7155054475**

Option 2 ID : **7155054478**

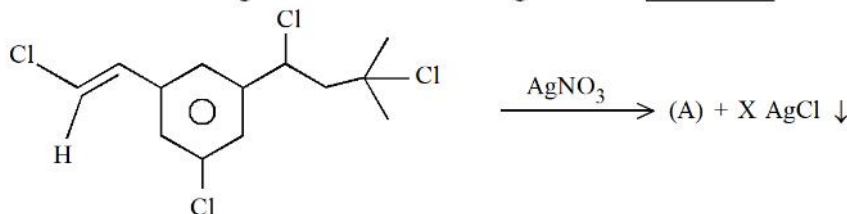
Option 3 ID : **7155054476**

Option 4 ID : **7155054477**

Status : **Not Answered**

Chosen Option : **--**

**Q.51** Number of moles of AgCl formed in the following reaction is \_\_\_\_\_



Given --  
Answer :

Question Type : SA  
Question ID : 7155051500  
Status : Not Answered

**Q.52** 5 g of NaOH was dissolved in deionized water to prepare a 450 mL stock solution. What volume (in mL) of this solution would be required to prepare 500 mL of 0.1 M solution? \_\_\_\_\_

Given: Molar Mass of Na, O and H is 23, 16 and 1  $\text{g mol}^{-1}$  respectively

Given --  
Answer :

Question Type : SA  
Question ID : 7155051491  
Status : Not Answered

**Q.53** The number of correct statement/s from the following is \_\_\_\_\_

- A. Larger the activation energy, smaller is the value of the rate constant.
- B. The higher is the activation energy, higher is the value of the temperature coefficient.
- C. At lower temperatures, increase in temperature causes more change in the value of  $k$  than at higher temperature
- D. A plot of  $\ln k$  vs  $\frac{1}{T}$  is a straight line with slope equal to  $-\frac{E_a}{R}$

Given 2  
Answer :

Question Type : SA  
Question ID : 7155051497  
Status : Answered

**Q.54** At 298 K, a 1 litre solution containing 10 mmol of  $\text{Cr}_2\text{O}_7^{2-}$  and 100 mmol of  $\text{Cr}^{3+}$  shows a pH of 3.0.

Given:  $\text{Cr}_2\text{O}_7^{2-} \rightarrow \text{Cr}^{3+}$ ;  $E^\circ = 1.330\text{V}$

and  $\frac{2.303 RT}{F} = 0.059\text{ V}$

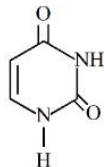
The potential for the half cell reaction is  $x \times 10^{-3}\text{ V}$ . The value of  $x$  is \_\_\_\_\_

Given --  
Answer :

Question Type : SA  
Question ID : 7155051496  
Status : Not Answered



**Q.55** Uracil is a base present in RNA with the following structure. % of N in uracil is \_\_\_\_\_



Given :

Molar mass N =  $14 \text{ g mol}^{-1}$

O =  $16 \text{ g mol}^{-1}$

C =  $12 \text{ g mol}^{-1}$

H =  $1 \text{ g mol}^{-1}$

Given **25**

Answer :

Question Type : **SA**

Question ID : **7155051499**

Status : **Answered**

**Q.56** The dissociation constant of acetic acid is  $x \times 10^{-5}$ . When 25 mL of 0.2 M  $\text{CH}_3\text{COONa}$  solution is mixed with 25 mL of 0.02 M  $\text{CH}_3\text{COOH}$  solution, the pH of the resultant solution is found to be equal to 5. The value of  $x$  is \_\_\_\_\_

Given --

Answer :

Question Type : **SA**

Question ID : **7155051495**

Status : **Not Answered**

**Q.57** For independent processes at 300 K

Process	$\Delta H/\text{kJ mol}^{-1}$	$\Delta S/\text{J K}^{-1}$
A	-25	-80
B	-22	40
C	25	-50
D	22	20

The number of non-spontaneous processes from the following is \_\_\_\_\_

Given **2**

Answer :

Question Type : **SA**

Question ID : **7155051494**

Status : **Answered**

**Q.58** When  $\text{Fe}_{0.93}\text{O}$  is heated in presence of oxygen, it converts to  $\text{Fe}_2\text{O}_3$ . The number of **correct** statement/s from the following is \_\_\_\_\_

A. The equivalent weight of  $\text{Fe}_{0.93}\text{O}$  is Molecular weight  
0.79

B. The number of moles of  $\text{Fe}^{2+}$  and  $\text{Fe}^{3+}$  in 1 mole of  $\text{Fe}_{0.93}\text{O}$  is 0.79 and 0.14 respectively

C.  $\text{Fe}_{0.93}\text{O}$  is metal deficient with lattice comprising of cubic closed packed arrangement of  $\text{O}^{2-}$  ions

D. The % composition of  $\text{Fe}^{2+}$  and  $\text{Fe}^{3+}$  in  $\text{Fe}_{0.93}\text{O}$  is 85% and 15% respectively

Given --

Answer :

Question Type : **SA**

Question ID : **7155051492**

Status : **Not Answered**

**Q.59** If wavelength of the first line of the Paschen series of hydrogen atom is 720 nm, then the wavelength of the second line of this series is \_\_\_\_\_ nm. (Nearest integer)

Given **5832**  
Answer :

Question Type : SA  
Question ID : 7155051493  
Status : Answered

**Q.60** The d-electronic configuration of  $[\text{CoCl}_4]^{2-}$  in tetrahedral crystal field is  $e^m t_2^n$ . Sum of "m" and "number of unpaired electrons" is \_\_\_\_\_

Given **4**  
Answer :

Question Type : SA  
Question ID : 7155051498  
Status : Answered

Section : Mathematics Section A

**Q.61** The value of  $\sum_{r=0}^{22} {}^{22}C_r {}^{23}C_r$  is

- Options
1.  ${}^{44}C_{23}$
  2.  ${}^{44}C_{22}$
  3.  ${}^{45}C_{23}$
  4.  ${}^{45}C_{24}$

Question Type : MCQ  
Question ID : 7155051509  
Option 1 ID : 7155054534  
Option 2 ID : 7155054533  
Option 3 ID : 7155054535  
Option 4 ID : 7155054536  
Status : Answered  
Chosen Option : 3

**Q.62** Let  $f(x) = \begin{cases} x^2 \sin\left(\frac{1}{x}\right) & , x \neq 0 \\ 0 & , x = 0 \end{cases}$

Then at  $x = 0$

- Options
1.  $f'$  is continuous but not differentiable
  2.  $f$  and  $f'$  both are continuous
  3.  $f$  is continuous but  $f'$  is not continuous
  4.  $f$  is continuous but not differentiable

Question Type : MCQ  
Question ID : 7155051513  
Option 1 ID : 7155054550  
Option 2 ID : 7155054551  
Option 3 ID : 7155054552  
Option 4 ID : 7155054549  
Status : Answered  
Chosen Option : 3

**Q.63** Let  $y = y(x)$  be the solution of the differential equation  $x^3 \frac{dy}{dx} + (xy - 1) dx = 0, x > 0$ ,

$$y\left(\frac{1}{2}\right) = 3 - e. \text{ Then } y(1) \text{ is equal to}$$

Options 1. e

2. 1

3.  $2 - e$

4. 3

Question Type : MCQ

Question ID : 7155051508

Option 1 ID : 7155054530

Option 2 ID : 7155054532

Option 3 ID : 7155054529

Option 4 ID : 7155054531

Status : Not Answered

Chosen Option : --

**Q.64** The compound statement  $(\sim (P \wedge Q)) \vee ((\sim P) \wedge Q) \Rightarrow ((\sim P) \wedge (\sim Q))$  is equivalent to

Options 1.  $(\sim Q) \vee P$

2.  $((\sim P) \vee Q) \wedge ((\sim Q) \vee P)$

3.  $(\sim P) \vee Q$

4.  $((\sim P) \vee Q) \wedge (\sim Q)$

Question Type : MCQ

Question ID : 7155051520

Option 1 ID : 7155054579

Option 2 ID : 7155054580

Option 3 ID : 7155054578

Option 4 ID : 7155054577

Status : Not Answered

Chosen Option : --

**Q.65** Let  $\alpha$  be a root of the equation  $(a - c)x^2 + (b - a)x + (c - b) = 0$

where a, b, c are distinct real numbers such that the matrix 
$$\begin{bmatrix} \alpha^2 & \alpha & 1 \\ 1 & 1 & 1 \\ a & b & c \end{bmatrix}$$

is singular. Then, the value of  $\frac{(a-c)^2}{(b-a)(c-b)} + \frac{(b-a)^2}{(a-c)(c-b)} + \frac{(c-b)^2}{(a-c)(b-a)}$  is

Options 1. 9

2. 3

3. 6

4. 12

Question Type : MCQ

Question ID : 7155051506

Option 1 ID : 7155054523

Option 2 ID : 7155054521

Option 3 ID : 7155054522

Option 4 ID : 7155054524

Status : Not Answered

Chosen Option : --

Q.66 The relation  $R = \{(a,b): \gcd(a,b) = 1, 2a \neq b, a, b \in \mathbb{Z}\}$  is :

- Options
1. reflexive but not symmetric
  2. neither symmetric nor transitive
  3. symmetric but not transitive
  4. transitive but not reflexive

Question Type : MCQ

Question ID : 7155051502

Option 1 ID : 7155054505

Option 2 ID : 7155054508

Option 3 ID : 7155054506

Option 4 ID : 7155054507

Status : Answered

Chosen Option : 2

Q.67 Let  $\Omega$  be the sample space and  $A \subseteq \Omega$  be an event.

Given below are two statements :

(S1) : If  $P(A) = 0$ , then  $A = \emptyset$

(S2) : If  $P(A) = 1$ , then  $A = \Omega$

Then

- Options
1. both (S1) and (S2) are false
  2. only (S1) is true
  3. both (S1) and (S2) are true
  4. only (S2) is true

Question Type : MCQ

Question ID : 7155051519

Option 1 ID : 7155054574

Option 2 ID : 7155054575

Option 3 ID : 7155054573

Option 4 ID : 7155054576

Status : Not Answered

Chosen Option : --

Q.68 The distance of the point  $(7, -3, -4)$  from the plane passing through the points  $(2, -3, 1)$ ,  $(-1, 1, -2)$  and  $(3, -4, 2)$  is :

- Options
1.  $4\sqrt{2}$
  2. 5
  3.  $5\sqrt{2}$
  4. 4

Question Type : MCQ

Question ID : 7155051511

Option 1 ID : 7155054543

Option 2 ID : 7155054542

Option 3 ID : 7155054544

Option 4 ID : 7155054541

Status : Not Answered

Chosen Option : --

**Q.69** The distance of the point  $(-1, 9, -16)$  from the plane  $2x + 3y - z = 5$  measured parallel to the line

$$\frac{x+4}{3} = \frac{2-y}{4} = \frac{z-3}{12} \text{ is}$$

- Options
1.  $20\sqrt{2}$
  2. 31
  3. 26
  4.  $13\sqrt{2}$

Question Type : MCQ

Question ID : 7155051516

Option 1 ID : 7155054562

Option 2 ID : 7155054564

Option 3 ID : 7155054563

Option 4 ID : 7155054561

Status : Not Answered

Chosen Option : --

**Q.70** Let  $\vec{u} = \hat{i} - \hat{j} - 2\hat{k}$ ,  $\vec{v} = 2\hat{i} + \hat{j} - \hat{k}$ ,  $\vec{v} \cdot \vec{w} = 2$  and  $\vec{v} \times \vec{w} = \vec{u} + \lambda \vec{v}$ . Then  $\vec{u} \cdot \vec{w}$  is equal to

- Options
1.  $\frac{3}{2}$
  2. 1
  3.  $-\frac{2}{3}$
  4. 2

Question Type : MCQ

Question ID : 7155051517

Option 1 ID : 7155054567

Option 2 ID : 7155054566

Option 3 ID : 7155054565

Option 4 ID : 7155054568

Status : Answered

Chosen Option : 4

**Q.71** Let PQR be a triangle. The points A, B and C are on the sides QR, RP and PQ respectively such

that  $\frac{QA}{AR} = \frac{RB}{BP} = \frac{PC}{CQ} = \frac{1}{2}$ . Then  $\frac{\text{Area}(\Delta PQR)}{\text{Area}(\Delta ABC)}$  is equal to

- Options
1. 4
  2. 2
  3.  $\frac{5}{2}$
  4. 3

Question Type : MCQ

Question ID : 7155051518

Option 1 ID : 7155054572

Option 2 ID : 7155054569

Option 3 ID : 7155054570

Option 4 ID : 7155054571

Status : Answered

Chosen Option : 4

**Q.72** The equation  $x^2 - 4x + [x] + 3 = x[x]$ , where  $[x]$  denotes the greatest integer function, has :

- Options**
1. a unique solution in  $(-\infty, \infty)$
  2. exactly two solutions in  $(-\infty, \infty)$
  3. a unique solution in  $(-\infty, 1)$
  4. no solution

Question Type : **MCQ**

Question ID : **7155051501**

Option 1 ID : **7155054502**

Option 2 ID : **7155054501**

Option 3 ID : **7155054503**

Option 4 ID : **7155054504**

Status : **Not Answered**

Chosen Option : --

**Q.73** Let N denote the number that turns up when a fair die is rolled. If the probability that the system of equations

$$x + y + z = 1$$

$$2x + Ny + 2z = 2$$

$$3x + 3y + Nz = 3$$

has unique solution is  $\frac{k}{6}$ , then the sum of value of k and all possible values of N is

- Options**
1. 21
  2. 19
  3. 18
  4. 20

Question Type : **MCQ**

Question ID : **7155051504**

Option 1 ID : **7155054513**

Option 2 ID : **7155054515**

Option 3 ID : **7155054514**

Option 4 ID : **7155054516**

Status : **Answered**

Chosen Option : 1

**Q.74**  $\tan^{-1}\left(\frac{1+\sqrt{3}}{3+\sqrt{3}}\right) + \sec^{-1}\left(\sqrt{\frac{8+4\sqrt{3}}{6+3\sqrt{3}}}\right)$  is equal to :

- Options**
1.  $\frac{\pi}{3}$
  2.  $\frac{\pi}{6}$
  3.  $\frac{\pi}{4}$
  4.  $\frac{\pi}{2}$

Question Type : **MCQ**

Question ID : **7155051507**

Option 1 ID : **7155054526**

Option 2 ID : **7155054528**

Option 3 ID : **7155054527**

Option 4 ID : **7155054525**

Status : **Answered**

Chosen Option : 1

**Q.75** If A and B are two non-zero  $n \times n$  matrices such that  $A^2 + B = A^2 B$ , then

- Options**
1.  $A^2 B = B A^2$
  2.  $AB = I$
  3.  $A^2 B = I$
  4.  $A^2 = I$  or  $B = I$

Question Type : **MCQ**

Question ID : **7155051505**

Option 1 ID : **7155054519**

Option 2 ID : **7155054520**

Option 3 ID : **7155054517**

Option 4 ID : **7155054518**

Status : **Not Answered**

Chosen Option : --

**Q.76** The area enclosed by the curves  $y^2 + 4x = 4$  and  $y - 2x = 2$  is :

- Options**
1.  $\frac{25}{3}$
  2.  $\frac{22}{3}$
  3.  $\frac{23}{3}$
  4. 9

Question Type : **MCQ**

Question ID : **7155051515**

Option 1 ID : **7155054560**

Option 2 ID : **7155054557**

Option 3 ID : **7155054558**

Option 4 ID : **7155054559**

Status : **Not Answered**

Chosen Option : --

**Q.77** Let a tangent to the curve  $y^2 = 24x$  meet the curve  $xy = 2$  at the points A and B. Then the mid points of such line segments AB lie on a parabola with the

- Options**
1. directrix  $4x = -3$
  2. length of latus rectum  $\frac{3}{2}$
  3. directrix  $4x = 3$
  4. length of latus rectum 2

Question Type : **MCQ**

Question ID : **7155051510**

Option 1 ID : **7155054537**

Option 2 ID : **7155054539**

Option 3 ID : **7155054538**

Option 4 ID : **7155054540**

Status : **Answered**

Chosen Option : 2



Q.78

$$\lim_{t \rightarrow 0} \left( 1^{\frac{1}{\sin^2 t}} + 2^{\frac{1}{\sin^2 t}} + \dots + n^{\frac{1}{\sin^2 t}} \right)^{\sin^2 t} \text{ is equal to}$$

Options

1.  $\frac{n(n+1)}{2}$
2.  $n^2$
3.  $n^2 + n$
4.  $n$

Question Type : MCQ

Question ID : 7155051514

Option 1 ID : 7155054553

Option 2 ID : 7155054555

Option 3 ID : 7155054554

Option 4 ID : 7155054556

Status : Answered

Chosen Option : 1

Q.79 For three positive integers p, q, r,  $x^{pq^2} = y^{qr} = z^{p^2r}$  and  $r = pq + 1$  such that  $3, 3 \log_y x, 3 \log_z y,$

$7 \log_x z$  are in A.P. with common difference  $\frac{1}{2}$ . Then r-p-q is equal to

Options 1. 2

2. -6
3. 6
4. 12

Question Type : MCQ

Question ID : 7155051512

Option 1 ID : 7155054545

Option 2 ID : 7155054547

Option 3 ID : 7155054548

Option 4 ID : 7155054546

Status : Not Answered

Chosen Option : --

Q.80 Let p, q  $\in \mathbb{R}$  and  $(1 - \sqrt{3}i)^{200} = 2^{199}(p + iq)$ ,  $i = \sqrt{-1}$ . Then  $p + q + q^2$  and  $p - q + q^2$  are roots of the equation.

Options

1.  $x^2 - 4x - 1 = 0$
2.  $x^2 + 4x - 1 = 0$
3.  $x^2 - 4x + 1 = 0$
4.  $x^2 + 4x + 1 = 0$

Question Type : MCQ

Question ID : 7155051503

Option 1 ID : 7155054510

Option 2 ID : 7155054511

Option 3 ID : 7155054512

Option 4 ID : 7155054509

Status : Not Answered

Chosen Option : --

Section : Mathematics Section B

Q.81

The value of  $\frac{8}{\pi} \int_0^{\frac{\pi}{2}} \frac{(\cos x)^{2023}}{(\sin x)^{2023} + (\cos x)^{2023}} dx$  is \_\_\_\_\_

Given --  
Answer :

Question Type : SA  
Question ID : 7155051528  
Status : Not Answered

**Q.82** Let a tangent to the curve  $9x^2 + 16y^2 = 144$  intersect the coordinate axes at the points A and B. Then, the minimum length of the line segment AB is \_\_\_\_\_

Given --  
Answer :

Question Type : SA  
Question ID : 7155051521  
Status : Not Answered

Q.83

The value of  $12 \int_0^3 |x^2 - 3x + 2| dx$  is \_\_\_\_\_

Given --  
Answer :

Question Type : SA  
Question ID : 7155051527  
Status : Not Answered

**Q.84** A boy needs to select five courses from 12 available courses, out of which 5 courses are language courses. If he can choose at most two language courses, then the number of ways he can choose five courses is \_\_\_\_\_

Given **350**  
Answer :

Question Type : SA  
Question ID : 7155051525  
Status : Answered

**Q.85** The number of 9 digit numbers, that can be formed using all the digits of the number 123412341 so that the even digits occupy only even places, is \_\_\_\_\_

Given **2880**  
Answer :

Question Type : SA  
Question ID : 7155051522  
Status : Answered

**Q.86** Let  $\lambda \in \mathbb{R}$  and let the equation E be  $|x|^2 - 2|x| + |\lambda - 3| = 0$ . Then the largest element in the set  $S = \{x + \lambda : x \text{ is an integer solution of E}\}$  is \_\_\_\_\_

Given --  
Answer :

Question Type : SA  
Question ID : 7155051526  
Status : Not Answered

**Q.87** The 4<sup>th</sup> term of GP is 500 and its common ratio is  $\frac{1}{m}$ ,  $m \in \mathbb{N}$ . Let  $S_n$  denote the sum of the first  $n$  terms of this GP. If  $S_6 > S_5 + 1$  and  $S_7 < S_6 + \frac{1}{2}$ , then the number of possible values of  $m$  is \_\_\_\_\_

Given --  
Answer :

Question Type : SA  
Question ID : 7155051523  
Status : Not Answered

**Q.88** Suppose  $\sum_{r=0}^{2023} r^2 {}^{2023}C_r = 2023 \times \alpha \times 2^{2022}$ . Then the value of  $\alpha$  is \_\_\_\_\_

Given --  
Answer :

Question Type : SA  
Question ID : 7155051524  
Status : Not Answered

**Q.89** Let  $C$  be the largest circle centred at  $(2,0)$  and inscribed in the ellipse  $\frac{x^2}{36} + \frac{y^2}{16} = 1$ .

If  $(1, \alpha)$  lies on  $C$ , then  $10\alpha^2$  is equal to \_\_\_\_\_

Given --  
Answer :

Question Type : SA  
Question ID : 7155051529  
Status : Not Answered

**Q.90** The shortest distance between the lines  $\frac{x-2}{3} = \frac{y+1}{2} = \frac{z-6}{2}$  and  $\frac{x-6}{3} = \frac{1-y}{2} = \frac{z+8}{0}$  is equal to \_\_\_\_\_

Given --  
Answer :

Question Type : SA  
Question ID : 7155051530  
Status : Not Answered

Continued From Previous Issue ...

## ALPHABET

### (III) RELATIVE DISTANCE BETWEEN PAIRS OF LETTERS

In this type of questions you are required to ascertain the relative positions of letters of English alphabet and the relative distance between two letters in term of number of letters present in between the two letters in the keyword as well as in the English alphabet. Thus, you are required to find out such pairs of letters in the given word which do have as many letters between them in the word as in the alphabet.

Now consider the following examples :

- How many such pairs of letters are there in the word CHRONICLE each of which has as many letters between them in the word as in the English alphabet ?  
(1) None (2) One  
(3) Two (4) Three  
(5) More than three

[Indian Bank PO Exam, 2010]

Answer : (4) C H R O N I C L E

- How many such pairs of letters are there in the word PRATICLE each of which has as many letters between them in the word as in the English alphabet ?  
(1) None (2) One  
(3) Two (4) Three  
(5) More than three

Answer : (3) P R A T I C L E

[Oriental Bank of Commerce Clerk Exam, 2010]

- How many such pairs of letters are there in the word ENABLING, each of which has as many letters between them in the word as in the English alphabet ?  
(1) None (2) One  
(3) Two (4) Three  
(5) More than three

[Haryana Gramin Bank Officer Exam, 2010]

Answer : (5) E N A B L I N G

- How many such pairs of letters are there in the word OVERWHELM each of which has as many letters between them in the word as in the English alphabet ?

- (1) None (2) One  
(3) Two (4) Three  
(5) More than three

[SBI Clerk Exam, 2010]

Answer : (5) O V E R W H E L M

- How many such pairs of letters are there in the word SHOULDER each of which has as many letters between them in the word as in the English alphabet ?  
(1) None (2) One  
(3) Two (4) Three  
(5) More than three

[Gurgaon Gramin Bank Clerk Exam, 2010]

Answer : (3) S H O U L D E R

- How many such pairs of letters are there in the word HOARDINGS each of which has as many letters between them in the word as in the English alphabet ?  
(1) None (2) One  
(3) Two (4) Three  
(5) More than three

[Gurgaon Gramin Bank Officer Exam, 2010]

Answer : (4) H O A R D I N G S

- How many such pairs of letters are there in the word ORGANISED each of which has as many letters between them in the word as in the English alphabet ?  
(1) None (2) One  
(3) Two (4) Three  
(5) More than three

[Punjab National Bank Clerk Exam, 2010]

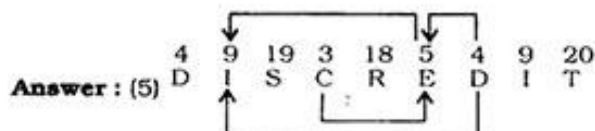
Answer : (3) O R G A N I S E D

- How many such pairs of letters are there in the word DISCREDIT each of which has as many letters between them in the word as in the English alphabet ?  
(1) None (2) One  
(3) Two (4) Three  
(5) More than three

[New India Assurance AO Exam, 2009]



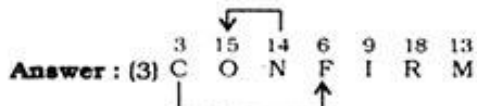
# COMPETITIVE REASONING



9. How many such pairs of letters are there in the word CONFIRM each of which has as many letters between them in the word as in the English alphabet ?

(1) None (2) One  
(3) Two (4) Three  
(5) More than three

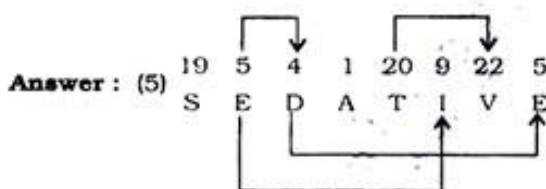
[PNB Specialist Officers' Exam, 2010]



10. How many such pairs of letters are there in the word SEDATIVE each of which has as many letters between them in the word as in the English alphabet ?

(1) None (2) One  
(3) Two (4) Three  
(5) More than three

[Management Aptitude Test, 2010]



11. How many such pairs of letters are there in the word CHARGES each of which has as many letters between them in the word as in the English alphabet ?

(1) None (2) One  
(3) Two (4) Three  
(5) More than three

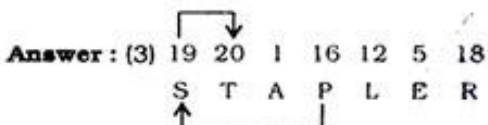
[Common Management Admission Test, 2011]



12. How many such pairs of letters are there in the word STAPLER each of which has as many letters between them in the word as in the English alphabet ?

(1) None (2) One  
(3) Two (4) Three  
(5) More than three

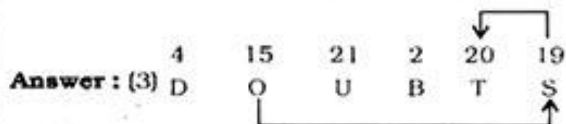
[SBI Specialist Officer Exam, 2009]



13. How many such pairs of letters are in the word DOUBTS each of which has as many letters between them in the word as in the English alphabet ?

(1) None (2) One  
(3) Two (4) Three  
(5) None of these

[Indian Bank Clerk Exam, 2010]



14. How many pairs of letters are there in the words STRAIGHTFORWARD which have number of letters between them in the word equal to the number of letters between them in English alphabet ?

(1) Four (2) Five  
(3) Six (4) Seven

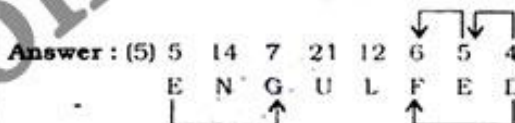
[United India Insurance AO Exam, 2010]



15. How many such pairs of letters are there in the word ENGULFED each of which has as many letters between them in the word as in the English alphabet ?

(1) None (2) One  
(3) Two (4) Three  
(5) More than three

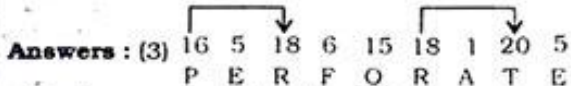
[Union Bank of India Clerk Exam, 2010]



16. How many such pairs of letters are there in the word PERFORATE each of which has as many letters between them in the word as in the English alphabet ?

(1) None (2) One  
(3) Two (4) Three  
(5) More than three

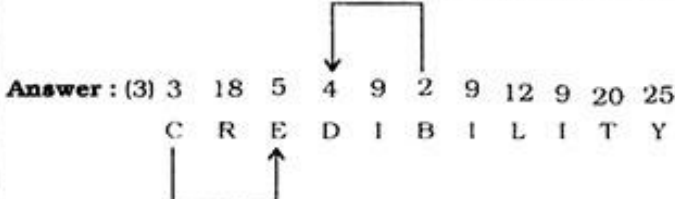
[Bank of India Banking Officer Exam, 2010]



17. How many such pairs of letters are there in the word CREDIBILITY each of which has only one letter between them in the word as also in the alphabet ?

(1) None (2) One  
(3) Two (4) Three  
(5) More than three

[Bank P.O. Exam, 2008]



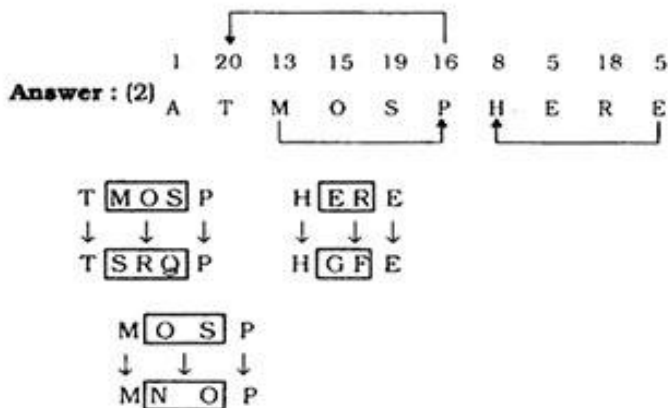
Thus, there are two pairs of such letters.

# COMPETITIVE REASONING

18. How many such pairs of letters are there in the word ATMOSPHERE which have as many letters between them in the word as in the English alphabet?

- (1) Two (2) Three  
(3) Four (4) Five  
(5) None of these

[Bank PO Exam, 2010]

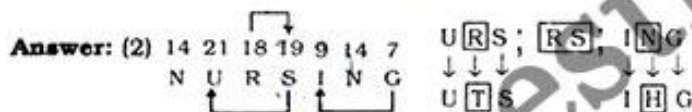


Thus, there are three such pairs of letters.

19. How many such pairs of letters are there in the word 'NURSING' which have as many letters between them in the word as in the alphabet?

- (1) One (2) Three  
(3) Five (4) Six  
(5) None of these

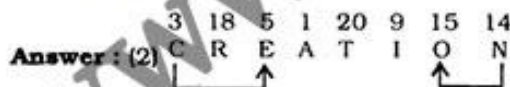
[Bank P.O. Exam, 2010]



Thus, there are three such pairs of letters.

20. How many pairs of letters are there in the word CREATION in which the difference between them is same as in the English alphabet?

- (1) One (2) Two  
(3) Three (4) Four  
(5) None of these



Thus, there are two such pairs of letters : CE and ON

21. How many such pairs of letters are there in the word 'SUBSTANCE' each of which has as many letters between them in the word (in both forward and backward directions) as in the English alphabet?

- (1) None (2) One (3) Two  
(4) Three (5) More than three

[IBPS Specialist Officer CWE, 11.03.2012]

22. How many such pairs of letters are there in the word STREAMING each of which has as many letters between them in the word as in the English alphabet? (in both forward and backward directions)

- (1) None (2) One (3) Two  
(4) Three (5) More than three

[IBPS Bank Clerk CWE, 27.11.2011]

23. How many such pairs of letters are there in the word 'DAREDEVIL' each of which has as many letters between them in the word as in the English alphabet? (in both forward and backward directions)

- (1) None (2) One (3) Two  
(4) Three (5) More than three

[IBPS Bank Clerk CWE, 27.11.2011]

24. How many such pairs of letters are there in the word PRODUCTION each of which has as many letters between them (in both forward and backward directions) in the word, as they have between them in the English alphabetical series?

- (1) None (2) One (3) Two  
(4) Three (5) Four

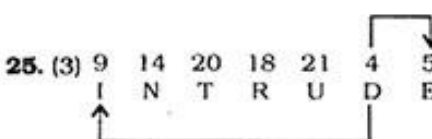
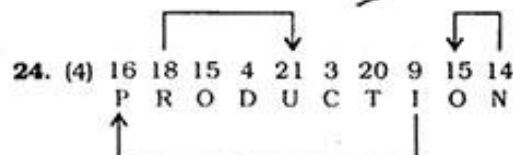
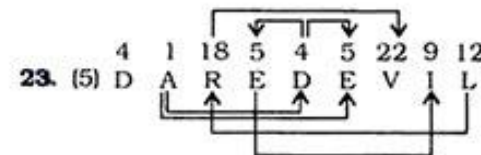
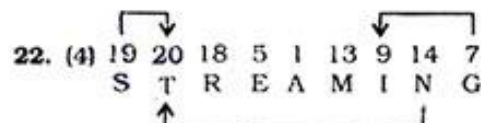
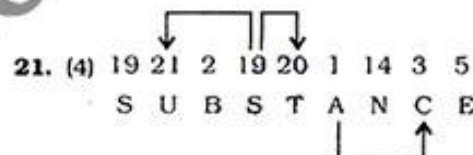
[Central Bank of India Clerk Exam, 2011]

25. How many such pairs of letters are there in the word INTRUDE each of which has as many letters between them in the word (in both forward and backward directions) as they have between them in the English alphabetical order?

- (1) None (2) One (3) Two  
(4) Three (5) Four

[Oriental Bank of Commerce Clerk Exam, 2011]

## EXPLANATIONS



(To be Continued ....)