

Name:

Application No:

Challenges regarding Answer Key

Candidate Details

Application Number :		Roll Number :	
Candidate's Name :		Date of Birth :	
Father's Name :		Mother's Name :	

Claimed Answer Key List

Paper	Question Type	Question ID	Correct Option(s)/ Answers	Option(s) ID for Challenge				
B TECH - Physics Section A	Objective	366694541	3666941624	<input type="checkbox"/> 3666941621	<input type="checkbox"/> 3666941622	<input type="checkbox"/> 3666941623	<input type="checkbox"/> 3666941624	<input type="checkbox"/> None of These
B TECH - Physics Section A	Objective	366694542	3666941625	<input type="checkbox"/> 3666941625	<input type="checkbox"/> 3666941626	<input type="checkbox"/> 3666941627	<input type="checkbox"/> 3666941628	<input type="checkbox"/> None of These
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Claimed Answer Key ListUpload Document

Claimed Answer Key ListUpload Document :

Choose file

No file chosen

In case the candidates want to submit documents in support of challenge of answer key, they should upload the PDF file.

Submit Your Claims



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

Application No	
Candidate Name	
Roll No	
Test Date	31/01/2023
Test Time	9:00 AM - 12:00 PM
Subject	B TECH

## Section : Physics Section A

**Q.1** The maximum potential energy of a block executing simple harmonic motion is 25 J. A is amplitude of oscillation. At  $\frac{A}{2}$ , the kinetic energy of the block is

- Options
1. 12.5 J
  2. 37.5 J
  3. 9.75 J
  4. 18.75 J

Question Type : MCQ

Question ID : 366694552

Option 1 ID : 3666941665

Option 2 ID : 3666941667

Option 3 ID : 3666941668

Option 4 ID : 3666941666

Status : Answered

Chosen Option : 3

**Q.2** Two polaroids A and B are placed in such a way that the pass-axis of polaroids are perpendicular to each other. Now, another polaroid C is placed between A and B bisecting angle between them. If intensity of unpolarized light is  $I_0$  then intensity of transmitted light after passing through polaroid B will be:

- Options
1.  $\frac{I_0}{8}$
  2.  $\frac{I_0}{2}$
  3. Zero
  4.  $\frac{I_0}{4}$

Question Type : MCQ

Question ID : 366694560

Option 1 ID : 3666941698

Option 2 ID : 3666941697

Option 3 ID : 3666941700

Option 4 ID : 3666941699

Status : Answered

Chosen Option : 3

**Q.3** At a certain depth "d " below surface of earth, value of acceleration due to gravity becomes four times that of its value at a height 3R above earth surface. Where R is Radius of earth (Take R = 6400 km). The depth d is equal to

- Options 1. 5260 km  
2. 2560 km  
3. 4800 km  
4. 640 km

Question Type : MCQ

Question ID : 366694548

Option 1 ID : 3666941651

Option 2 ID : 3666941650

Option 3 ID : 3666941652

Option 4 ID : 3666941649

Status : Answered

Chosen Option : 1

**Q.4** 100 balls each of mass m moving with speed v simultaneously strike a wall normally and reflected back with same speed, in time t s. The total force exerted by the balls on the wall is

- Options 1.  $200mv t$   
2.  $\frac{200mv}{t}$   
3.  $\frac{100mv}{t}$   
4.  $\frac{mv}{100 t}$

Question Type : MCQ

Question ID : 366694545

Option 1 ID : 3666941640

Option 2 ID : 3666941638

Option 3 ID : 3666941639

Option 4 ID : 3666941637

Status : Answered

Chosen Option : 1

**Q.5** The initial speed of a projectile fired from ground is u. At the highest point during its motion, the speed of projectile is  $\frac{\sqrt{3}}{2} u$ . The time of flight of the projectile is :

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

Question Type : MCQ

Question ID : 366694546

Option 1 ID : 3666941643

Option 2 ID : 3666941642

Option 3 ID : 3666941641

Option 4 ID : 3666941644

Status : Answered

Chosen Option : 3

**Q.6** A bar magnet with a magnetic moment  $5.0 \text{ Am}^2$  is placed in parallel position relative to a magnetic field of  $0.4 \text{ T}$ . The amount of required work done in turning the magnet from parallel to antiparallel position relative to the field direction is \_\_\_\_\_.

- Options
1.  $4 \text{ J}$
  2.  $2 \text{ J}$
  3. zero
  4.  $1 \text{ J}$

Question Type : MCQ

Question ID : 366694556

Option 1 ID : 3666941683

Option 2 ID : 3666941681

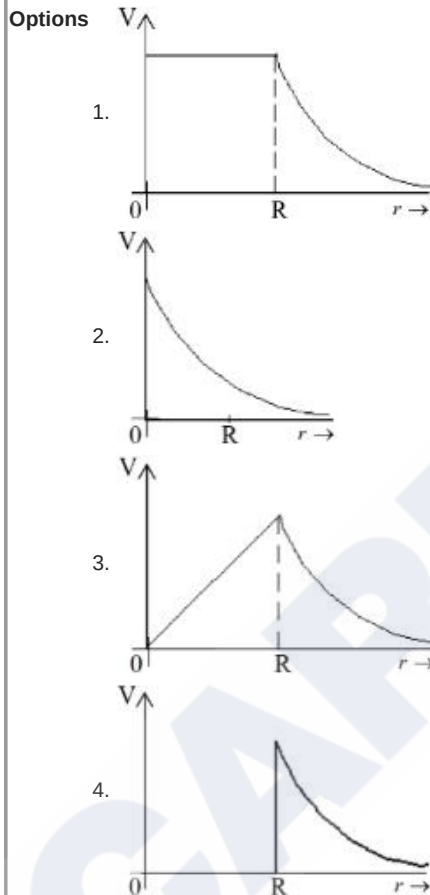
Option 3 ID : 3666941684

Option 4 ID : 3666941682

Status : Answered

Chosen Option : 1

**Q.7** Which of the following correctly represents the variation of electric potential ( $V$ ) of a charged spherical conductor of radius ( $R$ ) with radial distance ( $r$ ) from the center?



Question Type : MCQ

Question ID : 366694555

Option 1 ID : 3666941677

Option 2 ID : 3666941679

Option 3 ID : 3666941678

Option 4 ID : 3666941680

Status : Answered

Chosen Option : 2

Q.8 If  $R$ ,  $X_L$ , and  $X_C$  represent resistance, inductive reactance and capacitive reactance. Then which of the following is dimensionless :

Options

1.  $R \frac{X_L}{X_C}$
2.  $\frac{R}{\sqrt{X_L X_C}}$
3.  $R X_L X_C$
4.  $\frac{R}{X_L X_C}$

Question Type : MCQ

Question ID : 366694547

Option 1 ID : 3666941646

Option 2 ID : 3666941645

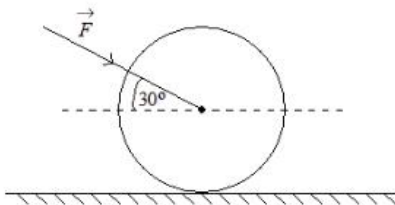
Option 3 ID : 3666941647

Option 4 ID : 3666941648

Status : Not Answered

Chosen Option : --

Q.9 As shown in figure, a 70 kg garden roller is pushed with a force of  $\vec{F} = 200 \text{ N}$  at an angle of  $30^\circ$  with horizontal. The normal reaction on the roller is  
(Given  $g = 10 \text{ m s}^{-2}$ )



- Options
1.  $800\sqrt{2} \text{ N}$
  2.  $800 \text{ N}$
  3.  $600 \text{ N}$
  4.  $200\sqrt{3} \text{ N}$

Question Type : MCQ

Question ID : 366694544

Option 1 ID : 3666941635

Option 2 ID : 3666941634

Option 3 ID : 3666941633

Option 4 ID : 3666941636

Status : Answered

Chosen Option : 3

**Q.10** The effect of increase in temperature on the number of electrons in conduction band ( $n_e$ ) and resistance of a semiconductor will be as:

- Options
1.  $n_e$  increases, resistance decreases
  2.  $n_e$  decreases, resistance increases
  3. Both  $n_e$  and resistance increase
  4. Both  $n_e$  and resistance decrease

Question Type : MCQ

Question ID : 366694542

Option 1 ID : 3666941625

Option 2 ID : 3666941626

Option 3 ID : 3666941628

Option 4 ID : 3666941627

Status : Answered

Chosen Option : 2

**Q.11** A free neutron decays into a proton but a free proton does not decay into neutron. This is because

- Options
1. neutron is a composite particle made of a proton and an electron
  2. neutron has larger rest mass than proton
  3. neutron is an uncharged particle
  4. proton is a charged particle

Question Type : MCQ

Question ID : 366694541

Option 1 ID : 3666941623

Option 2 ID : 3666941624

Option 3 ID : 3666941621

Option 4 ID : 3666941622

Status : Not Answered

Chosen Option : --

**Q.12** The drift velocity of electrons for a conductor connected in an electrical circuit is  $V_d$ . The conductor is now replaced by another conductor with same material and same length but double the area of cross section. The applied voltage remains same. The new drift velocity of electrons will be

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

Question Type : MCQ

Question ID : 366694553

Option 1 ID : 3666941671

Option 2 ID : 3666941669

Option 3 ID : 3666941670

Option 4 ID : 3666941672

Status : Not Answered

Chosen Option : --

**Q.13** The amplitude of  $15 \sin(1000\pi t)$  is modulated by  $10 \sin(4\pi t)$  signal. The amplitude modulated signal contains frequency (ies) of

- A. 500 Hz
- B. 2 Hz
- C. 250 Hz
- D. 498 Hz
- E. 502 Hz

Choose the correct answer from the options given below:

- Options
- 1. B Only
  - 2. A Only
  - 3. A, D and E Only
  - 4. A and B Only

Question Type : MCQ

Question ID : 366694543

Option 1 ID : 3666941630

Option 2 ID : 3666941629

Option 3 ID : 3666941632

Option 4 ID : 3666941631

Status : Answered

Chosen Option : 3

**Q.14** If a source of electromagnetic radiation having power 15 kW produces  $10^{16}$  photons per second, the radiation belongs to a part of spectrum is.  
(Take Planck constant  $h = 6 \times 10^{-34}$  Js)

- Options
- 1. Gamma rays
  - 2. Radio waves
  - 3. Micro waves
  - 4. Ultraviolet rays

Question Type : MCQ

Question ID : 366694558

Option 1 ID : 3666941692

Option 2 ID : 3666941691

Option 3 ID : 3666941690

Option 4 ID : 3666941689

Status : Answered

Chosen Option : 4



**Q.15** Given below are two statements : One is labelled as **Assertion A** and the other is labelled as **Reason R**

**Assertion A** : The beam of electrons show wave nature and exhibit interference and diffraction.

**Reason R** : Davisson Germer Experimentally verified the wave nature of electrons.

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

Options 1.

- Both A and R are correct but R is Not the correct explanation of A
- Both A and R are correct and R is the correct explanation of A
- A is not correct but R is correct
- A is correct but R is not correct

Question Type : MCQ

Question ID : 366694559

Option 1 ID : 3666941694

Option 2 ID : 3666941693

Option 3 ID : 3666941696

Option 4 ID : 3666941695

Status : Answered

Chosen Option : 2

**Q.16** A rod with circular cross-section area  $2 \text{ cm}^2$  and length 40 cm is wound uniformly with 400 turns of an insulated wire. If a current of 0.4 A flows in the wire windings, the total magnetic flux produced inside windings is  $4\pi \times 10^{-6} \text{ Wb}$ . The relative permeability of the rod is

(Given : Permeability of vacuum  $\mu_0 = 4\pi \times 10^{-7} \text{ NA}^{-2}$ )

Options 1. 12.5

2.  $\frac{32}{5}$

3.  $\frac{5}{16}$

4. 125

Question Type : MCQ

Question ID : 366694554

Option 1 ID : 3666941676

Option 2 ID : 3666941675

Option 3 ID : 3666941674

Option 4 ID : 3666941673

Status : Answered

Chosen Option : 4



**Q.17** If 1000 droplets of water of surface tension  $0.07 \text{ N/m}$ , having same radius  $1 \text{ mm}$  each, combine to form a single drop. In the process the released surface energy is-

(Take  $\pi = \frac{22}{7}$ )

- Options 1.  $7.92 \times 10^{-4} \text{ J}$   
 2.  $7.92 \times 10^{-6} \text{ J}$   
 3.  $8.8 \times 10^{-5} \text{ J}$   
 4.  $9.68 \times 10^{-4} \text{ J}$

Question Type : **MCQ**

Question ID : **366694549**

Option 1 ID : **3666941655**

Option 2 ID : **3666941656**

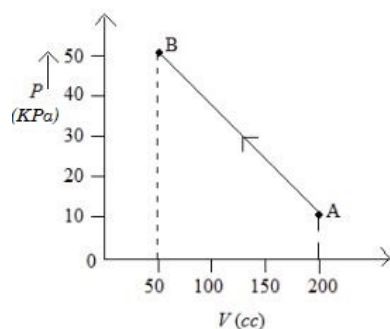
Option 3 ID : **3666941653**

Option 4 ID : **3666941654**

Status : **Answered**

Chosen Option : **1**

**Q.18** The pressure of a gas changes linearly with volume from A to B as shown in figure. If no heat is supplied to or extracted from the gas then change in the internal energy of the gas will be



- Options 1. **-4.5 J**  
 2. **zero**  
 3. **6 J**  
 4. **4.5 J**

Question Type : **MCQ**

Question ID : **366694550**

Option 1 ID : **3666941658**

Option 2 ID : **3666941660**

Option 3 ID : **3666941659**

Option 4 ID : **3666941657**

Status : **Answered**

Chosen Option : **4**

Q.19 The correct relation between  $\gamma = \frac{c_p}{c_v}$  and temperature T is :

- Options
1.  $\gamma \propto T$
  2.  $\gamma \propto T^\circ$
  3.  $\gamma \propto \frac{1}{T}$
  4.  $\gamma \propto \frac{1}{\sqrt{T}}$

Question Type : MCQ

Question ID : 366694551

Option 1 ID : 3666941661

Option 2 ID : 3666941664

Option 3 ID : 3666941662

Option 4 ID : 3666941663

Status : Answered

Chosen Option : 2

Q.20 Spherical insulating ball and a spherical metallic ball of same size and mass are dropped from the same height. Choose the correct statement out of the following {Assume negligible air friction}

- Options
1. Metal ball will reach the earth's surface earlier than the insulating ball
  2. Both will reach the earth's surface simultaneously.
  3. Time taken by them to reach the earth's surface will be independent of the properties of their materials
  4. Insulating ball will reach the earth's surface earlier than the metal ball

Question Type : MCQ

Question ID : 366694557

Option 1 ID : 3666941687

Option 2 ID : 3666941685

Option 3 ID : 3666941688

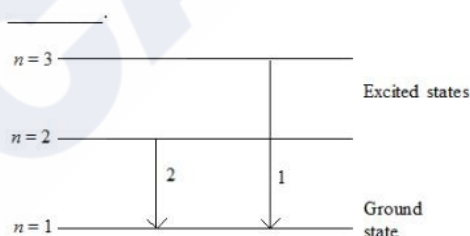
Option 4 ID : 3666941686

Status : Not Answered

Chosen Option : --

#### Section : Physics Section B

Q.21 For hydrogen atom,  $\lambda_1$  and  $\lambda_2$  are the wavelengths corresponding to the transitions 1 and 2 respectively as shown in figure. The ratio of  $\lambda_1$  and  $\lambda_2$  is  $\frac{x}{32}$ . The value of x is



Given --  
Answer :

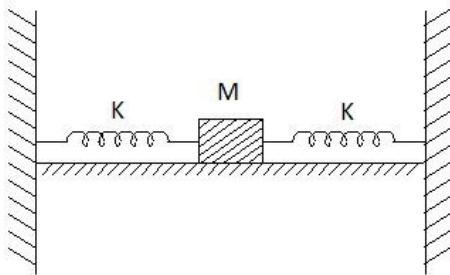
Question Type : SA

Question ID : 366694561

Status : Not Answered



- Q.22** In the figure given below, a block of mass  $M = 490 \text{ g}$  placed on a frictionless table is connected with two springs having same spring constant ( $K = 2 \text{ N m}^{-1}$ ). If the block is horizontally displaced through 'X' m then the number of complete oscillations it will make in  $14\pi$  seconds will be \_\_\_\_\_.



Given **245**  
Answer :

Question Type : **SA**

Question ID : **366694566**

Status : **Answered**

- Q.23** An inductor of  $0.5 \text{ mH}$ , a capacitor of  $20 \text{ }\mu\text{F}$  and resistance of  $20 \text{ }\Omega$  are connected in series with a  $220 \text{ V}$  ac source. If the current is in phase with the emf, the amplitude of current of the circuit is  $\sqrt{x} \text{ A}$ . The value of  $x$  is -

Given **120**  
Answer :

Question Type : **SA**

Question ID : **366694569**

Status : **Answered**

- Q.24** In a medium the speed of light wave decreases to  $0.2$  times to its speed in free space. The ratio of relative permittivity to the refractive index of the medium is  $x : 1$ . The value of  $x$  is \_\_\_\_\_.  
(Given speed of light in free space  $= 3 \times 10^8 \text{ m s}^{-1}$  and for the given medium  $\mu_r = 1$ )

Given --  
Answer :

Question Type : **SA**

Question ID : **366694570**

Status : **Not Answered**

- Q.25** The speed of a swimmer is  $4 \text{ km h}^{-1}$  in still water. If the swimmer makes his strokes normal to the flow of river of width  $1 \text{ km}$ , he reaches a point  $750 \text{ m}$  down the stream on the opposite bank.

The speed of the river water is \_\_\_\_\_  $\text{km h}^{-1}$

Given --  
Answer :

Question Type : **SA**

Question ID : **366694564**

Status : **Not Answered**

- Q.26** A thin rod having a length of 1 m and area of cross-section  $3 \times 10^{-6} \text{ m}^2$  is suspended vertically from one end. The rod is cooled from  $210^\circ\text{C}$  to  $160^\circ\text{C}$ . After cooling, a mass  $M$  is attached at the lower end of the rod such that the length of rod again becomes 1 m. Young's modulus and coefficient of linear expansion of the rod are  $2 \times 10^{11} \text{ N m}^{-2}$  and  $2 \times 10^{-5} \text{ K}^{-1}$ , respectively. The value of  $M$  is \_\_\_\_\_ kg.

(Take  $g = 10 \text{ m s}^{-2}$ )

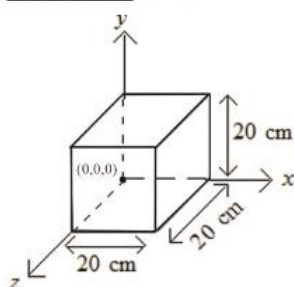
Given --  
Answer :

Question Type : SA

Question ID : 366694565

Status : Not Answered

- Q.27** Expression for an electric field is given by  $\vec{E} = 4000x^2 \hat{i} \frac{\text{V}}{\text{m}}$ . The electric flux through the cube of side 20 cm when placed in electric field (as shown in the figure) is \_\_\_\_\_ V cm.



Given --  
Answer :

Question Type : SA

Question ID : 366694567

Status : Not Answered

- Q.28** A solid sphere of mass 1 kg rolls without slipping on a plane surface. Its kinetic energy is  $7 \times 10^{-3} \text{ J}$ . The speed of the centre of mass of the sphere is \_\_\_\_\_  $\text{cm s}^{-1}$ .

Given --  
Answer :

Question Type : SA

Question ID : 366694562

Status : Not Answered

- Q.29** Two identical cells, when connected either in parallel or in series gives same current in an external resistance  $5 \Omega$ . The internal resistance of each cell will be \_\_\_\_\_  $\Omega$ .

Given 5  
Answer :

Question Type : SA

Question ID : 366694568

Status : Marked For Review



**Q.30** A lift of mass  $M = 500 \text{ kg}$  is descending with speed of  $2 \text{ ms}^{-1}$ . Its supporting cable begins to slip thus allowing it to fall with a constant acceleration of  $2 \text{ ms}^{-2}$ . The kinetic energy of the lift at the end of fall through to a distance of  $6 \text{ m}$  will be \_\_\_\_\_ kJ.

Given --  
Answer :

Question Type : SA  
Question ID : 366694563  
Status : Not Answered

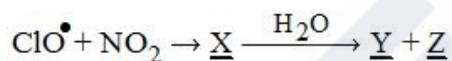
Section : Chemistry Section A

**Q.31** When  $\text{Cu}^{2+}$  ion is treated with KI, a white precipitate, X appears in solution. The solution is titrated with sodium thiosulphate, the compound Y is formed. X and Y respectively are

- Options
1.  $\text{X} = \text{Cu}_2\text{I}_2$        $\text{Y} = \text{Na}_2\text{S}_4\text{O}_5$
  2.  $\text{X} = \text{CuI}_2$        $\text{Y} = \text{Na}_2\text{S}_2\text{O}_3$
  3.  $\text{X} = \text{CuI}_2$        $\text{Y} = \text{Na}_2\text{S}_4\text{O}_6$
  4.  $\text{X} = \text{Cu}_2\text{I}_2$        $\text{Y} = \text{Na}_2\text{S}_4\text{O}_6$

Question Type : MCQ  
Question ID : 366694590  
Option 1 ID : 3666941788  
Option 2 ID : 3666941790  
Option 3 ID : 3666941787  
Option 4 ID : 3666941789  
Status : Not Answered  
Chosen Option : --

**Q.32** Identify X, Y and Z in the following reaction. (Equation not balanced)



- Options
1.  $\text{X} = \text{ClONO}_2$ ,  $\text{Y} = \text{HOCl}$ ,  $\text{Z} = \text{HNO}_3$
  2.  $\text{X} = \text{ClNO}_3$ ,  $\text{Y} = \text{Cl}_2$ ,  $\text{Z} = \text{NO}_2$
  3.  $\text{X} = \text{ClONO}_2$ ,  $\text{Y} = \text{HOCl}$ ,  $\text{Z} = \text{NO}_2$
  4.  $\text{X} = \text{ClNO}_2$ ,  $\text{Y} = \text{HCl}$ ,  $\text{Z} = \text{HNO}_3$

Question Type : MCQ  
Question ID : 366694581  
Option 1 ID : 3666941751  
Option 2 ID : 3666941753  
Option 3 ID : 3666941754  
Option 4 ID : 3666941752  
Status : Answered  
Chosen Option : 1

**Q.33** Which transition in the hydrogen spectrum would have the same wavelength as the Balmer type transition from  $n = 4$  to  $n = 2$  of  $\text{He}^+$  spectrum

- Options
1.  $n = 2$  to  $n = 1$
  2.  $n = 1$  to  $n = 3$
  3.  $n = 1$  to  $n = 2$
  4.  $n = 3$  to  $n = 4$

Question Type : MCQ

Question ID : 366694571

Option 1 ID : 3666941712

Option 2 ID : 3666941713

Option 3 ID : 3666941711

Option 4 ID : 3666941714

Status : Answered

Chosen Option : 2

**Q.34**  $\text{H}_2\text{O}_2$  acts as a reducing agent in

- Options
1.  $2\text{NaOCl} + \text{H}_2\text{O}_2 \rightarrow 2\text{NaCl} + \text{H}_2\text{O} + \text{O}_2$
  2.  $\text{Na}_2\text{S} + 4\text{H}_2\text{O}_2 \rightarrow \text{Na}_2\text{SO}_4 + 4\text{H}_2\text{O}$
  3.  $2\text{Fe}^{2+} + 2\text{H}^+ + \text{H}_2\text{O}_2 \rightarrow 2\text{Fe}^{3+} + 2\text{H}_2\text{O}$
  4.  $\text{Mn}^{2+} + 2\text{H}_2\text{O}_2 \rightarrow \text{MnO}_2 + 2\text{H}_2\text{O}$

Question Type : MCQ

Question ID : 366694576

Option 1 ID : 3666941734

Option 2 ID : 3666941732

Option 3 ID : 3666941731

Option 4 ID : 3666941733

Status : Marked For Review

Chosen Option : 3

**Q.35** The correct order of basicity of oxides of vanadium is

- Options
1.  $\text{V}_2\text{O}_3 > \text{V}_2\text{O}_4 > \text{V}_2\text{O}_5$
  2.  $\text{V}_2\text{O}_5 > \text{V}_2\text{O}_4 > \text{V}_2\text{O}_3$
  3.  $\text{V}_2\text{O}_3 > \text{V}_2\text{O}_5 > \text{V}_2\text{O}_4$
  4.  $\text{V}_2\text{O}_4 > \text{V}_2\text{O}_3 > \text{V}_2\text{O}_5$

Question Type : MCQ

Question ID : 366694579

Option 1 ID : 3666941744

Option 2 ID : 3666941745

Option 3 ID : 3666941746

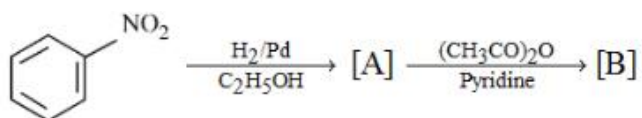
Option 4 ID : 3666941743

Status : Answered

Chosen Option : 4



Q.36



Consider the above reaction and identify the product B.

Options

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

Question Type : MCQ

Question ID : 366694587

Option 1 ID : 3666941776

Option 2 ID : 3666941777

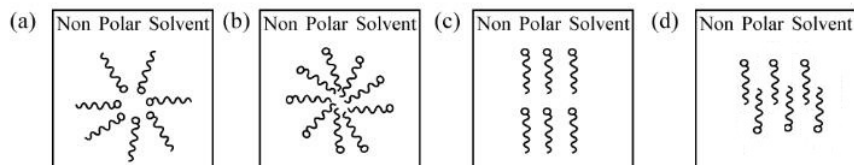
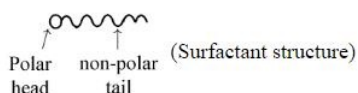
Option 3 ID : 3666941775

Option 4 ID : 3666941778

Status : Answered

Chosen Option : 2

**Q.37** Adding surfactants in non polar solvent, the micelles structure will look like



Options 1. **c**

2. **b**

3. **a**

4. **d**

Question Type : **MCQ**

Question ID : **366694573**

Option 1 ID : **3666941721**

Option 2 ID : **3666941720**

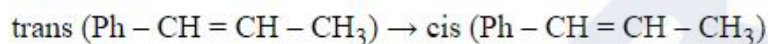
Option 3 ID : **3666941719**

Option 4 ID : **3666941722**

Status : **Answered**

Chosen Option : **2**

**Q.38** Choose the correct set of reagents for the following conversion.



Options 1.  $\text{Br}_2$ , alc•KOH,  $\text{NaNH}_2$ , Na (Liq  $\text{NH}_3$ )

2.  $\text{Br}_2$ , alc•KOH,  $\text{NaNH}_2$ ,  $\text{H}_2$  Lindlar Catalyst

3.  $\text{Br}_2$ , aq•KOH,  $\text{NaNH}_2$ ,  $\text{H}_2$  Lindlar Catalyst

4.  $\text{Br}_2$ , aq•KOH,  $\text{NaNH}_2$ , Na (Liq  $\text{NH}_3$ )

Question Type : **MCQ**

Question ID : **366694583**

Option 1 ID : **3666941759**

Option 2 ID : **3666941761**

Option 3 ID : **3666941762**

Option 4 ID : **3666941760**

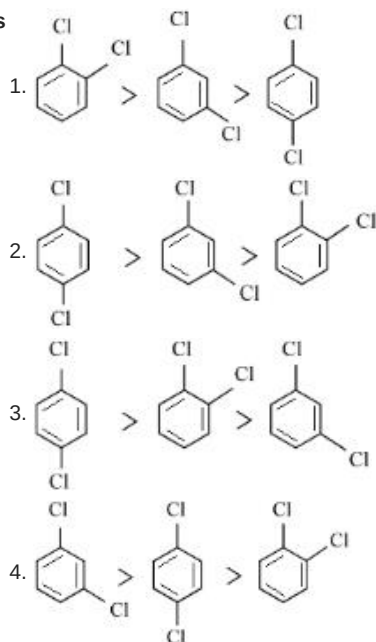
Status : **Answered**

Chosen Option : **2**



**Q.39** The correct order of melting points of dichlorobenzenes is

Options



Question Type : MCQ

Question ID : 366694584

Option 1 ID : 3666941763

Option 2 ID : 3666941766

Option 3 ID : 3666941765

Option 4 ID : 3666941764

Status : Answered

Chosen Option : 4

**Q.40** Which of the following artificial sweeteners has the highest sweetness value in comparison to cane sugar ?

- Options
1. Alitame
  2. Aspartame
  3. Saccharin
  4. Sucralose

Question Type : MCQ

Question ID : 366694588

Option 1 ID : 3666941782

Option 2 ID : 3666941779

Option 3 ID : 3666941780

Option 4 ID : 3666941781

Status : Answered

Chosen Option : 2

Q.41 Cobalt chloride when dissolved in water forms pink colored complex  $X$  which has octahedral geometry. This solution on treating with conc HCl forms deep blue complex,  $Y$  which has a  $Z$  geometry.  $X$ ,  $Y$  and  $Z$ , respectively, are

- Options
1.  $X = [Co(H_2O)_6]^{2+}$ ,  $Y = [CoCl_4]^{2-}$ ,  $Z = \text{Tetrahedral}$
  2.  $X = [Co(H_2O)_6]^{2+}$ ,  $Y = [CoCl_6]^{3-}$ ,  $Z = \text{Octahedral}$
  3.  $X = [Co(H_2O)_6]^{3+}$ ,  $Y = [CoCl_6]^{3-}$ ,  $Z = \text{Octahedral}$
  4.  $X = [Co(H_2O)_4Cl_2]^+$ ,  $Y = [CoCl_4]^{2-}$ ,  $Z = \text{Tetrahedral}$

Question Type : MCQ

Question ID : 366694580

Option 1 ID : 3666941747

Option 2 ID : 3666941750

Option 3 ID : 3666941748

Option 4 ID : 3666941749

Status : Not Answered

Chosen Option : --

Q.42 The methods NOT involved in concentration of ore are

- A. Liquation
- B. Leaching
- C. Electrolysis
- D. Hydraulic washing
- E. Froth floatation

Choose the correct answer from the options given below :

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

Question Type : MCQ

Question ID : 366694575

Option 1 ID : 3666941728

Option 2 ID : 3666941730

Option 3 ID : 3666941729

Option 4 ID : 3666941727

Status : Answered

Chosen Option : 3

Q.43 Which one of the following statements is correct for electrolysis of brine solution ?

- Options
1.  $\text{H}_2$  is formed at anode
  2.  $\text{OH}^-$  is formed at cathode
  3.  $\text{Cl}_2$  is formed at cathode
  4.  $\text{O}_2$  is formed at cathode

Question Type : MCQ

Question ID : 366694577

Option 1 ID : 3666941737

Option 2 ID : 3666941738

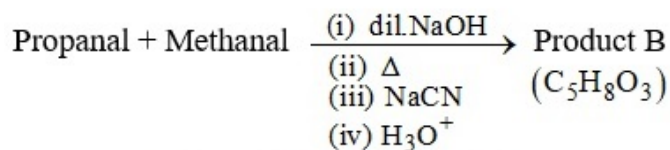
Option 3 ID : 3666941735

Option 4 ID : 3666941736

Status : Answered

Chosen Option : 4

Q.44 Consider the following reaction



The correct statement for product B is. It is

- Options
1. optically active and adds one mole of bromine
  2. optically active alcohol and is neutral
  3. racemic mixture and gives a gas with saturated  $\text{NaHCO}_3$  solution
  4. racemic mixture and is neutral

Question Type : MCQ

Question ID : 366694586

Option 1 ID : 3666941771

Option 2 ID : 3666941774

Option 3 ID : 3666941772

Option 4 ID : 3666941773

Status : Answered

Chosen Option : 2



## Q.45 Match List I with List II

List I	List II
A. XeF <sub>4</sub>	I. See-saw
B. SF <sub>4</sub>	II. Square planar
C. NH <sub>4</sub> <sup>+</sup>	III. Bent T-shaped
D. BrF <sub>3</sub>	IV. Tetrahedral

Choose the correct answer from the options given below :

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

Question Type : MCQ

Question ID : 366694572

Option 1 ID : 3666941716

Option 2 ID : 3666941717

Option 3 ID : 3666941718

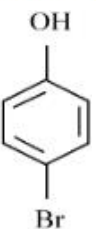
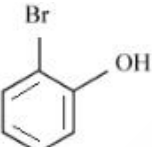
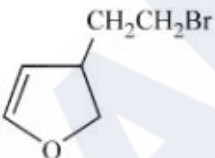
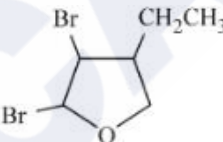
Option 4 ID : 3666941715

Status : Answered

Chosen Option : 4

Q.46 An organic compound 'A' with empirical formula C<sub>6</sub>H<sub>6</sub>O gives sooty flame on burning. Its reaction with bromine solution in low polarity solvent results in high yield of B. B is

Options

1. 
2. 
3. 
4. 

Question Type : MCQ

Question ID : 366694585

Option 1 ID : 3666941770

Option 2 ID : 3666941768

Option 3 ID : 3666941769

Option 4 ID : 3666941767

Status : Answered

Chosen Option : 1

Q.47 A protein 'X' with molecular weight of 70,000 u, on hydrolysis gives amino acids.  
One of these amino acid is

Options

1.  $\text{CH}_3 - \overset{\text{CH}_3}{\underset{\text{NH}_2}{\text{C}}} - \text{CH}_2 - \text{CH}_2\text{COOH}$
2.  $\text{CH}_3 - \overset{\text{CH}_3}{\underset{\text{NH}_2}{\text{CH}}} - \text{CH}_2 - \text{CH} - \text{COOH}$
3.  $\text{CH}_3 - \overset{\text{CH}_3}{\underset{\text{NH}_2}{\text{CH}}} - \text{CH} - \text{CH}_2 - \text{COOH}$
4.  $\text{NH}_2 - \text{CH}_2 - \overset{\text{NH}_2}{\underset{\text{CH}_3}{\text{CH}}} - \text{CH}_2\text{CH}_2\text{COOH}$

Question Type : MCQ

Question ID : 366694589

Option 1 ID : 3666941785

Option 2 ID : 3666941784

Option 3 ID : 3666941783

Option 4 ID : 3666941786

Status : Not Answered

Chosen Option : --

Q.48 The correct increasing order of the ionic radii is

Options

1.  $\text{Ca}^{2+} < \text{K}^+ < \text{Cl}^- < \text{S}^{2-}$
2.  $\text{Cl}^- < \text{Ca}^{2+} < \text{K}^+ < \text{S}^{2-}$
3.  $\text{S}^{2-} < \text{Cl}^- < \text{Ca}^{2+} < \text{K}^+$
4.  $\text{K}^+ < \text{S}^{2-} < \text{Ca}^{2+} < \text{Cl}^-$

Question Type : MCQ

Question ID : 366694574

Option 1 ID : 3666941723

Option 2 ID : 3666941725

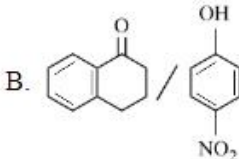
Option 3 ID : 3666941724

Option 4 ID : 3666941726

Status : Answered

Chosen Option : 1

## Q.49 Match items of column I and II

Column I (Mixture of compounds)	Column II (Separation Technique)
A. $\text{H}_2\text{O} / \text{CH}_2\text{Cl}_2$	i. Crystallization
B. 	ii. Differential solvent extraction
C. Kerosene / Naphthalene	iii. Column chromatography
D. $\text{C}_6\text{H}_{12}\text{O}_6 / \text{NaCl}$	iv. Fractional Distillation

Correct match is

- Options 1. A-(i), B-(iii), C-(ii), D-(iv)  
 2. A-(iii), B-(iv), C-(ii), D-(i)  
 3. A-(ii), B-(iv), C-(i), D-(iii)  
 4. A-(ii), B-(iii), C-(iv), D-(i)

Question Type : MCQ

Question ID : 366694582

Option 1 ID : 3666941755

Option 2 ID : 3666941758

Option 3 ID : 3666941757

Option 4 ID : 3666941756

Status : Answered

Chosen Option : 4

Q.50  $\text{Nd}^{2+} =$  \_\_\_\_\_

- Options 1.  $4f^3$   
 2.  $4f^2 6s^2$   
 3.  $4f^4 6s^2$   
 4.  $4f^4$

Question Type : MCQ

Question ID : 366694578

Option 1 ID : 3666941742

Option 2 ID : 3666941741

Option 3 ID : 3666941739

Option 4 ID : 3666941740

Status : Answered

Chosen Option : 4

Section : Chemistry Section B

Q.51 The oxidation state of phosphorus in hypophosphoric acid is + \_\_\_\_\_.

Given --  
 Answer :

Question Type : SA

Question ID : 366694598

Status : Not Answered



**Q.52** The enthalpy change for the conversion of  $\frac{1}{2}\text{Cl}_2(\text{g})$  to  $\text{Cl}^-(\text{aq})$  is  $(-)$  \_\_\_\_\_  
 $\text{kJ mol}^{-1}$  (Nearest integer)

Given :  $\Delta_{\text{dis}} H_{\text{Cl}_{2(\text{g})}}^{\ominus} = 240 \text{ kJ mol}^{-1}$ ,  $\Delta_{\text{eg}} H_{\text{Cl}(\text{g})}^{\ominus} = -350 \text{ kJ mol}^{-1}$ ,

$\Delta_{\text{hyd}} H_{\text{Cl}(\text{g})}^{\ominus} = -380 \text{ kJ mol}^{-1}$

Given --  
 Answer :

Question Type : SA  
 Question ID : 366694593  
 Status : Not Answered

**Q.53** At  $27^{\circ}\text{C}$ , a solution containing 2.5 g of solute in 250.0 mL of solution exerts an osmotic pressure of 400 Pa. The molar mass of the solute is \_\_\_\_\_  $\text{g mol}^{-1}$   
 (Nearest integer)

(Given :  $R = 0.083 \text{ L bar K}^{-1} \text{ mol}^{-1}$ )

Given --  
 Answer :

Question Type : SA  
 Question ID : 366694594  
 Status : Not Answered

**Q.54** The total pressure of a mixture of non-reacting gases X (0.6 g) and Y (0.45 g) in a vessel is 740 mm of Hg. The partial pressure of the gas X is \_\_\_\_\_ mm of Hg.  
 (Nearest Integer)

(Given : molar mass X = 20 and Y = 45  $\text{g mol}^{-1}$ )

Given --  
 Answer :

Question Type : SA  
 Question ID : 366694592  
 Status : Not Answered

**Q.55** The logarithm of equilibrium constant for the reaction  $\text{Pd}^{2+} + 4\text{Cl}^- \rightleftharpoons \text{PdCl}_4^{2-}$  is \_\_\_\_\_  
 (Nearest integer)

Given :  $\frac{2.303RT}{F} = 0.06\text{V}$

$\text{Pd}_{(\text{aq})}^{2+} + 2\text{e}^- \rightleftharpoons \text{Pd}(\text{s}) \quad E^{\ominus} = 0.83\text{V}$

$\text{PdCl}_4^{2-}(\text{aq}) + 2\text{e}^- \rightleftharpoons \text{Pd}(\text{s}) + 4\text{Cl}^-(\text{aq}) \quad E^{\ominus} = 0.65\text{V}$

Given --  
 Answer :

Question Type : SA  
 Question ID : 366694596  
 Status : Not Answered

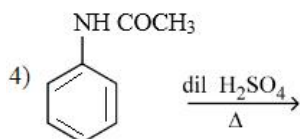
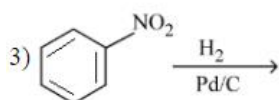
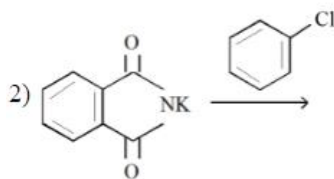
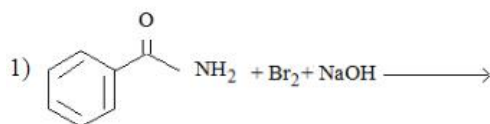
**Q.56** Zinc reacts with hydrochloric acid to give hydrogen and zinc chloride. The volume of hydrogen gas produced at STP from the reaction of 11.5 g of zinc with excess HCl is \_\_\_\_\_ L (Nearest integer)

(Given : Molar mass of Zn is  $65.4 \text{ g mol}^{-1}$  and Molar volume of  $\text{H}_2$  at STP =  $22.7 \text{ L}$ )

Given --  
Answer :

Question Type : SA  
Question ID : 366694591  
Status : Not Answered

**Q.57** How many of the transformations given below would result in aromatic amines ?



Given --  
Answer :

Question Type : SA  
Question ID : 366694600  
Status : Not Answered

**Q.58**  $A \rightarrow B$

The rate constants of the above reaction at 200 K and 300 K are  $0.03 \text{ min}^{-1}$  and  $0.05 \text{ min}^{-1}$  respectively. The activation energy for the reaction is \_\_\_\_\_ J (Nearest integer)

(Given :  $\ln 10 = 2.3$ )

$R = 8.3 \text{ J K}^{-1} \text{ mol}^{-1}$

$\log 5 = 0.70$

$\log 3 = 0.48$

$\log 2 = 0.30$ )

Given 100  
Answer :

Question Type : SA  
Question ID : 366694597  
Status : Answered

**Q.59** On complete combustion, 0.492 g of an organic compound gave 0.792 g of  $\text{CO}_2$ .  
The % of carbon in the organic compound is \_\_\_\_\_ (Nearest integer)

Given --  
Answer :

Question Type : SA  
Question ID : 366694599  
Status : Not Answered

**Q.60** For reaction :  $\text{SO}_2(\text{g}) + \frac{1}{2}\text{O}_2(\text{g}) \rightleftharpoons \text{SO}_3(\text{g})$

$K_p = 2 \times 10^{12}$  at  $27^\circ\text{C}$  and 1 atm pressure. The  $K_c$  for the same reaction is  
\_\_\_\_\_  $\times 10^{13}$ . (Nearest integer)

(Given  $R = 0.082 \text{ L atm K}^{-1} \text{ mol}^{-1}$ )

Given --  
Answer :

Question Type : SA  
Question ID : 366694595  
Status : Not Answered

Section : Mathematics Section A

**Q.61** Let the shortest distance between the lines  $L: \frac{x-5}{-2} = \frac{y-\lambda}{0} = \frac{z+\lambda}{1}, \lambda \geq 0$  and  
 $L_1: x+1=y-1=4-z$  be  $2\sqrt{6}$ . If  $(\alpha, \beta, \gamma)$  lies on L, then which of the following is  
NOT possible ?

- Options
1.  $\alpha - 2\gamma = 19$
  2.  $\alpha + 2\gamma = 24$
  3.  $2\alpha - \gamma = 9$
  4.  $2\alpha + \gamma = 7$

Question Type : MCQ  
Question ID : 366694616  
Option 1 ID : 3666941861  
Option 2 ID : 3666941864  
Option 3 ID : 3666941863  
Option 4 ID : 3666941862  
Status : Answered  
Chosen Option : 2

**Q.62** For all  $z \in \mathbb{C}$  on the curve  $C_1: |z| = 4$ , let the locus of the point  $z + \frac{1}{z}$  be the curve  
 $C_2$ . Then :

- Options
1. the curve  $C_1$  lies inside  $C_2$
  2. the curve  $C_2$  lies inside  $C_1$
  3. the curves  $C_1$  and  $C_2$  intersect at 4 points
  4. the curves  $C_1$  and  $C_2$  intersect at 2 points

Question Type : MCQ  
Question ID : 366694603  
Option 1 ID : 3666941809  
Option 2 ID : 3666941810  
Option 3 ID : 3666941812  
Option 4 ID : 3666941811  
Status : Answered  
Chosen Option : 4



Q.63 (S1)  $(p \Rightarrow q) \vee (p \wedge (\sim q))$  is a tautology

(S2)  $((\sim p) \Rightarrow (\sim q)) \wedge ((\sim p) \vee q)$  is a contradiction.

Then

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

Question Type : MCQ

Question ID : 366694620

Option 1 ID : 3666941880

Option 2 ID : 3666941879

Option 3 ID : 3666941878

Option 4 ID : 3666941877

Status : Answered

Chosen Option : 2

Q.64 Let a circle  $C_1$  be obtained on rolling the circle  $x^2 + y^2 - 4x - 6y + 11 = 0$  upwards 4 units on the tangent T to it at the point (3, 2). Let  $C_2$  be the image of  $C_1$  in T. Let A and B be the centers of circles  $C_1$  and  $C_2$  respectively, and M and N be respectively the feet of perpendiculars drawn from A and B on the x-axis. Then the area of the trapezium AMNB is :

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

Question Type : MCQ

Question ID : 366694613

Option 1 ID : 3666941850

Option 2 ID : 3666941852

Option 3 ID : 3666941849

Option 4 ID : 3666941851

Status : Not Answered

Chosen Option : --

Q.65 If the sum and product of four positive consecutive terms of a G.P., are 126 and 1296, respectively, then the sum of common ratios of all such GPs is

- Options
1. 3
  2. 14
  3.  $\frac{9}{2}$
  4. 7

Question Type : MCQ

Question ID : 366694606

Option 1 ID : 3666941823

Option 2 ID : 3666941821

Option 3 ID : 3666941824

Option 4 ID : 3666941822

Status : Answered

Chosen Option : 2

**Q.66** Let  $R$  be a relation on  $\mathbb{N} \times \mathbb{N}$  defined by  $(a, b) R (c, d)$  if and only if  $ad(b - c) = bc(a - d)$ . Then  $R$  is

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

Question Type : MCQ

Question ID : 366694601

Option 1 ID : 3666941804

Option 2 ID : 3666941803

Option 3 ID : 3666941802

Option 4 ID : 3666941801

Status : Not Answered

Chosen Option : --

**Q.67** A bag contains 6 balls. Two balls are drawn from it at random and both are found to be black. The probability that the bag contains at least 5 black balls is

- Options
1.  $\frac{2}{7}$
  2.  $\frac{5}{7}$
  3.  $\frac{3}{7}$
  4.  $\frac{5}{6}$

Question Type : MCQ

Question ID : 366694618

Option 1 ID : 3666941872

Option 2 ID : 3666941869

Option 3 ID : 3666941871

Option 4 ID : 3666941870

Status : Answered

Chosen Option : 4

**Q.68** Let  $\alpha \in (0, 1)$  and  $\beta = \log_e(1 - \alpha)$ . Let  $P_n(x) = x + \frac{x^2}{2} + \frac{x^3}{3} + \dots + \frac{x^n}{n}$ ,  $x \in (0, 1)$ .

Then the integral  $\int_0^\alpha \frac{t^{50}}{1-t} dt$  is equal to

- Options
1.  $\beta + P_{50}(\alpha)$
  2.  $-(\beta + P_{50}(\alpha))$
  3.  $P_{50}(\alpha) - \beta$
  4.  $\beta - P_{50}(\alpha)$

Question Type : MCQ

Question ID : 366694610

Option 1 ID : 3666941840

Option 2 ID : 3666941837

Option 3 ID : 3666941839

Option 4 ID : 3666941838

Status : Answered

Chosen Option : 2

Q.69 The number of real roots of the equation  $\sqrt{x^2 - 4x + 3} + \sqrt{x^2 - 9} = \sqrt{4x^2 - 14x + 6}$ ,  
is :

- Options
1. 1
  2. 3
  3. 0
  4. 2

Question Type : MCQ

Question ID : 366694602

Option 1 ID : 3666941806

Option 2 ID : 3666941808

Option 3 ID : 3666941805

Option 4 ID : 3666941807

Status : Answered

Chosen Option : 4

Q.70 If the domain of the function  $f(x) = \frac{[x]}{1+x^2}$ , where  $[x]$  is greatest integer  $\leq x$ ,  
is  $[2, 6)$ , then its range is

- Options
1.  $\left(\frac{5}{26}, \frac{2}{5}\right]$
  2.  $\left(\frac{5}{37}, \frac{2}{5}\right]$
  3.  $\left(\frac{5}{37}, \frac{2}{5}\right] - \left\{\frac{9}{29}, \frac{27}{109}, \frac{18}{89}, \frac{9}{53}\right\}$
  4.  $\left(\frac{5}{26}, \frac{2}{5}\right] - \left\{\frac{9}{29}, \frac{27}{109}, \frac{18}{89}, \frac{9}{53}\right\}$

Question Type : MCQ

Question ID : 366694611

Option 1 ID : 3666941841

Option 2 ID : 3666941844

Option 3 ID : 3666941843

Option 4 ID : 3666941842

Status : Answered

Chosen Option : 3



Q.71 For the system of linear equations

$$x + y + z = 6$$

$$\alpha x + \beta y + 7z = 3$$

$$x + 2y + 3z = 14,$$

which of the following is **NOT** true ?

- Options
1. If  $\alpha = \beta$  and  $\alpha \neq 7$ , then the system has a unique solution
  2. If  $\alpha = \beta = 7$ , then the system has no solution
  3. There is a unique point  $(\alpha, \beta)$  on the line  $x + 2y + 18 = 0$  for which the system has infinitely many solutions
  4. For every point  $(\alpha, \beta) \neq (7, 7)$  on the line  $x - 2y + 7 = 0$ , the system has infinitely many solutions

Question Type : MCQ

Question ID : 366694605

Option 1 ID : 3666941817

Option 2 ID : 3666941819

Option 3 ID : 3666941818

Option 4 ID : 3666941820

Status : Answered

Chosen Option : 3

Q.72

The value of  $\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \frac{(2+3\sin x)}{\sin x(1+\cos x)} dx$  is equal to

- Options
1.  $\frac{7}{2} - \sqrt{3} - \log_e \sqrt{3}$
  2.  $-2 + 3\sqrt{3} + \log_e \sqrt{3}$
  3.  $\frac{10}{3} - \sqrt{3} - \log_e \sqrt{3}$
  4.  $\frac{10}{3} - \sqrt{3} + \log_e \sqrt{3}$

Question Type : MCQ

Question ID : 366694609

Option 1 ID : 3666941836

Option 2 ID : 3666941835

Option 3 ID : 3666941833

Option 4 ID : 3666941834

Status : Not Answered

Chosen Option : --

**Q.73** Let  $\vec{a} = 2\hat{i} + \hat{j} + \hat{k}$ , and  $\vec{b}$  and  $\vec{c}$  be two nonzero vectors such that  $|\vec{a} + \vec{b} + \vec{c}| = |\vec{a} + \vec{b} - \vec{c}|$  and  $\vec{b} \cdot \vec{c} = 0$ . Consider the following two statements:

(A)  $|\vec{a} + \lambda\vec{c}| \geq |\vec{a}|$  for all  $\lambda \in \mathbb{R}$ .

(B)  $\vec{a}$  and  $\vec{c}$  are always parallel.

Then,

- Options**
1. only (B) is correct
  2. only (A) is correct
  3. both (A) and (B) are correct
  4. neither (A) nor (B) is correct

Question Type : MCQ

Question ID : 366694617

Option 1 ID : 3666941866

Option 2 ID : 3666941865

Option 3 ID : 3666941867

Option 4 ID : 3666941868

Status : Answered

Chosen Option : 4

**Q.74** A wire of length 20 m is to be cut into two pieces. A piece of length  $l_1$  is bent to make a square of area  $A_1$  and the other piece of length  $l_2$  is made into a circle of area  $A_2$ . If  $2A_1 + 3A_2$  is minimum then  $(\pi l_1) : l_2$  is equal to :

- Options**
1. 4:1
  2. 6:1
  3. 1:6
  4. 3:1

Question Type : MCQ

Question ID : 366694608

Option 1 ID : 3666941832

Option 2 ID : 3666941830

Option 3 ID : 3666941831

Option 4 ID : 3666941829

Status : Answered

Chosen Option : 1

**Q.75** If  $\sin^{-1} \frac{\alpha}{17} + \cos^{-1} \frac{4}{5} - \tan^{-1} \frac{77}{36} = 0$ ,  $0 < \alpha < 13$ , then  $\sin^{-1}(\sin \alpha) + \cos^{-1}(\cos \alpha)$  is equal to

- Options**
1.  $\pi$
  2. 16
  3.  $16 - 5\pi$
  4. 0

Question Type : MCQ

Question ID : 366694619

Option 1 ID : 3666941874

Option 2 ID : 3666941876

Option 3 ID : 3666941875

Option 4 ID : 3666941873

Status : Answered

Chosen Option : 4

**Q.76** If the maximum distance of normal to the ellipse  $\frac{x^2}{4} + \frac{y^2}{b^2} = 1, b < 2$ , from the origin is 1, then the eccentricity of the ellipse is :

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

Question Type : MCQ

Question ID : 366694614

Option 1 ID : 3666941855

Option 2 ID : 3666941853

Option 3 ID : 3666941856

Option 4 ID : 3666941854

Status : Answered

Chosen Option : 3

**Q.77** Let  $A = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 4 & -1 \\ 0 & 12 & -3 \end{pmatrix}$ . Then the sum of the diagonal elements of the matrix  $(A + I)^{11}$  is equal to :

- Options
1. 4097
  2. 6144
  3. 4094
  4. 2050

Question Type : MCQ

Question ID : 366694604

Option 1 ID : 3666941815

Option 2 ID : 3666941816

Option 3 ID : 3666941814

Option 4 ID : 3666941813

Status : Answered

Chosen Option : 3

**Q.78** Let a differentiable function  $f$  satisfy  $f(x) + \int_3^x \frac{f(t)}{t} dt = \sqrt{x+1}, x \geq 3$ . Then  $12f(8)$  is equal to :

- Options
1. 19
  2. 1
  3. 34
  4. 17

Question Type : MCQ

Question ID : 366694612

Option 1 ID : 3666941846

Option 2 ID : 3666941848

Option 3 ID : 3666941845

Option 4 ID : 3666941847

Status : Answered

Chosen Option : 1

Q.79

Let  $y = f(x)$  represent a parabola with focus  $\left(-\frac{1}{2}, 0\right)$  and directrix  $y = -\frac{1}{2}$ .

Then  $S = \left\{x \in \mathbb{R} : \tan^{-1}(\sqrt{f(x)}) + \sin^{-1}(\sqrt{f(x)+1}) = \frac{\pi}{2}\right\}$  :

- Options
1. contains exactly one element
  2. is an infinite set
  3. is an empty set
  4. contains exactly two elements

Question Type : MCQ

Question ID : 366694615

Option 1 ID : 3666941858

Option 2 ID : 3666941860

Option 3 ID : 3666941857

Option 4 ID : 3666941859

Status : Marked For Review

Chosen Option : 1

Q.80

Let  $y = f(x) = \sin^3\left(\frac{\pi}{3}\left(\cos\left(\frac{\pi}{3\sqrt{2}}(-4x^3 + 5x^2 + 1)^{\frac{3}{2}}\right)\right)\right)$ . Then, at  $x = 1$ ,

- Options
1.  $\sqrt{2}y' - 3\pi^2y = 0$
  2.  $2y' + \sqrt{3}\pi^2y = 0$
  3.  $2y' + 3\pi^2y = 0$
  4.  $y' + 3\pi^2y = 0$

Question Type : MCQ

Question ID : 366694607

Option 1 ID : 3666941827

Option 2 ID : 3666941826

Option 3 ID : 3666941828

Option 4 ID : 3666941825

Status : Answered

Chosen Option : 3

Section : Mathematics Section B

Q.81

Let 5 digit numbers be constructed using the digits 0, 2, 3, 4, 7, 9 with repetition allowed, and are arranged in ascending order with serial numbers. Then the serial number of the number 42923 is \_\_\_\_\_.

Given --  
Answer :

Question Type : SA

Question ID : 366694621

Status : Not Answered



**Q.82** Let  $\theta$  be the angle between the planes  $P_1 : \vec{r} \cdot (\hat{i} + \hat{j} + 2\hat{k}) = 9$  and  $P_2 : \vec{r} \cdot (2\hat{i} - \hat{j} + \hat{k}) = 15$ . Let L be the line that meets  $P_2$  at the point  $(4, -2, 5)$  and makes an angle  $\theta$  with the normal of  $P_2$ . If  $\alpha$  is the angle between L and  $P_2$ , then  $(\tan^2 \theta)(\cot^2 \alpha)$  is equal to \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 366694630  
Status : Not Answered

**Q.83** If the variance of the frequency distribution

$x_i$	2	3	4	5	6	7	8
Frequency $f_i$	3	6	16	$\alpha$	9	5	6

is 3, then  $\alpha$  is equal to \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 366694629  
Status : Not Answered

**Q.84** Let  $a_1, a_2, \dots, a_n$  be in A.P. If  $a_5 = 2a_7$  and  $a_{11} = 18$ , then

$12 \left( \frac{1}{\sqrt{a_{10}} + \sqrt{a_{11}}} + \frac{1}{\sqrt{a_{11}} + \sqrt{a_{12}}} + \dots + \frac{1}{\sqrt{a_{17}} + \sqrt{a_{18}}} \right)$  is equal to \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 366694625  
Status : Not Answered

**Q.85** Number of 4-digit numbers that are less than or equal to 2800 and either divisible by 3 or by 11, is equal to \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 366694623  
Status : Not Answered

**Q.86** Let for  $x \in \mathbb{R}$ ,

$$f(x) = \frac{x + |x|}{2} \text{ and } g(x) = \begin{cases} x, & x < 0 \\ x^2, & x \geq 0 \end{cases}$$

Then area bounded by the curve  $y = (f \circ g)(x)$  and the lines  $y = 0$ ,  $2y - x = 15$  is equal to \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 366694626  
Status : Not Answered

Q.87

Let  $\alpha > 0$ , be the smallest number such that the expansion of  $\left(x^{\frac{2}{3}} + \frac{2}{x^3}\right)^{30}$  has a term  $\beta x^{-\alpha}$ ,  $\beta \in \mathbb{N}$ . Then  $\alpha$  is equal to \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 366694624  
Status : Not Answered

Q.88 The remainder on dividing  $5^{99}$  by 11 is \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 366694622  
Status : Not Answered

Q.89

Let  $\vec{a}$  and  $\vec{b}$  be two vectors such that  $|\vec{a}| = \sqrt{14}$ ,  $|\vec{b}| = \sqrt{6}$  and  $|\vec{a} \times \vec{b}| = \sqrt{48}$ .

Then  $(\vec{a} \cdot \vec{b})^2$  is equal to \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 366694627  
Status : Not Answered

Q.90

Let the line  $L: \frac{x-1}{2} = \frac{y+1}{-1} = \frac{z-3}{1}$  intersect the plane  $2x + y + 3z = 16$  at the point

$P$ . Let the point  $Q$  be the foot of perpendicular from the point  $R(1, -1, -3)$  on the line  $L$ . If  $\alpha$  is the area of triangle  $PQR$ , then  $\alpha^2$  is equal to \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 366694628  
Status : Not Answered