<table>
<thead>
<tr>
<th>Candidate Details</th>
<th>Claimed Answer Key List</th>
<th>Upload Document</th>
</tr>
</thead>
<tbody>
<tr>
<td>Father's Name</td>
<td></td>
<td></td>
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<tr>
<td>Roll Number</td>
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</tr>
</tbody>
</table>

**National Testing Agency**

Ministry of Education

Session 1

In case the candidates want to submit documents in support of challenge of answer key, they should upload the PDF file.
Q.1 According to law of equipartition of energy the molar specific heat of a diatomic gas at constant volume where the molecule has one additional vibrational mode is:-

Options
1. \(\frac{3}{2}R\)
2. \(\frac{9}{2}R\)
3. \(\frac{5}{2}R\)
4. \(\frac{7}{2}R\)

Question Type: MCQ
Question ID: 7155051623
Option 1 ID: 7155054872
Option 2 ID: 7155054869
Option 3 ID: 7155054871
Option 4 ID: 7155054870
Status: Answered
Chosen Option: 4

Q.2 The light rays from an object have been reflected towards an observer from a standard flat mirror, the image observed by the observer are:-

A. Real
B. Erect
C. Smaller in size than object
D. Laterally inverted

Choose the most appropriate answer from the options given below:

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

Question Type: MCQ
Question ID: 7155051629
Option 1 ID: 7155054896
Option 2 ID: 7155054894
Option 3 ID: 7155054893
Option 4 ID: 7155054895
Status: Not Attempted and Marked For Review
Chosen Option: --
Q.3 A particle executes simple harmonic motion between \( x = -A \) and \( x = +A \). If time taken by particle
to go from \( x = 0 \) to \( \frac{A}{2} \) is 2 s; then time taken by particle in going from \( \frac{A}{2} \) to \( A \) is

Options
1. 3 s
2. 1.5 s
3. 2 s
4. 4 s

Q.4 Match List I with List II

<table>
<thead>
<tr>
<th>LIST I</th>
<th>LIST II</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Isothermal Process</td>
<td>I. Work done by the gas decreases internal energy</td>
</tr>
<tr>
<td>B. Adiabatic Process</td>
<td>II. No change in internal energy</td>
</tr>
<tr>
<td>C. Isochoric Process</td>
<td>III. The heat absorbed goes partly to increase internal energy and partly to do work</td>
</tr>
<tr>
<td>D. Isobaric Process</td>
<td>IV. No work is done on or by the gas</td>
</tr>
</tbody>
</table>

Choose the correct answer from the options given below:

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

Q.5 The resistance of a wire is 5 \( \Omega \). Its new resistance in ohm if stretched to 5 times of its original length will be:

Options
1. 5
2. 62.5
3. 125
4. 25
Q.6 Consider a block kept on an inclined plane (inclined at 45°) as shown in the figure. If the force required to just push it up the incline is 2 times the force required to just prevent it from sliding down, the coefficient of friction between the block and inclined plane (μ) is equal to:

Options 1. 0.50  
2. 0.33  
3. 0.60  
4. 0.25

Q.7 Match List I with List II

<table>
<thead>
<tr>
<th>LIST I</th>
<th>LIST II</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Young's Modulus (Y)</td>
<td>I. [ML^{-1}T^{-1}]</td>
</tr>
<tr>
<td>B. Co-efficient of Viscosity ((\eta))</td>
<td>II. [ML^{2}T^{-1}]</td>
</tr>
<tr>
<td>C. Planck's Constant ((\hbar))</td>
<td>III. [ML^{-1}T^{-2}]</td>
</tr>
<tr>
<td>D. Work Function ((\phi))</td>
<td>IV. [ML^{2}T^{-2}]</td>
</tr>
</tbody>
</table>

Choose the correct answer from the options given below:

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

Question Type: MCQ
Question ID: 7155051638
Option 1 ID: 7155054931
Option 2 ID: 7155054930
Option 3 ID: 7155054932
Option 4 ID: 7155054929
Status: Not Answered
Chosen Option: --
Q.8 The energy levels of an atom is shown in figure.

Which one of these transitions will result in the emission of a photon of wavelength 124.1nm ?

Given (h = 6.62 x 10^-34 Js)

Options:
1. C
2. B
3. A
4. D

Q.9 Given below are two statements:

Statement I: Stopping potential in photoelectric effect does not depend on the power of the light source.

Statement II: For a given metal, the maximum kinetic energy of the photoelectron depends on the wavelength of the incident light.

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

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

Q.10 A wire of length 1m moving with velocity 8 m/s at right angles to a magnetic field of 2T. The magnitude of induced emf, between the ends of wire will be ________

Options:
1. 16 V
2. 8 V
3. 12 V
4. 20 V
Q.11 The graph between two temperature scales P and Q is shown in the figure. Between upper fixed point and lower fixed point there are 150 equal divisions of scale P and 100 divisions on scale Q. The relationship for conversion between the two scales is given by:

\[ \frac{t_Q}{100} = \frac{t_P - 30}{150} \]

Options
1. \( \frac{t_Q}{100} = \frac{t_P - 30}{150} \)
2. \( \frac{t_Q}{150} = \frac{t_P - 180}{100} \)
3. \( \frac{t_P}{100} = \frac{t_Q - 180}{150} \)
4. \( \frac{t_P}{180} = \frac{t_Q - 40}{100} \)

Question Type: MCQ
Question ID: 7155051635
Option 1 ID: 7155054918
Option 2 ID: 7155054917
Option 3 ID: 7155054919
Option 4 ID: 7155054920
Status: Answered
Chosen Option: 1

Q.12 Every planet revolves around the sun in an elliptical orbit:

A. The force acting on a planet is inversely proportional to square of distance from sun.
B. Force acting on planet is inversely proportional to product of the masses of the planet and the sun.
C. The Centripetal force acting on the planet is directed away from the sun.
D. The square of time period of revolution of planet around sun is directly proportional to cube of semi-major axis of elliptical orbit.

Choose the correct answer from the options given below:

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

Question Type: MCQ
Question ID: 7155051637
Option 1 ID: 7155054927
Option 2 ID: 7155054925
Option 3 ID: 7155054926
Option 4 ID: 7155054928
Status: Answered
Chosen Option: 2
Q.13  Match List I with List II

<table>
<thead>
<tr>
<th>LIST I</th>
<th>LIST II</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Troposphere</td>
<td>I. Approximate 65-75 km over Earth's surface</td>
</tr>
<tr>
<td>B. E- Part of Stratosphere</td>
<td>II. Approximate 300 km over Earth's surface</td>
</tr>
<tr>
<td>C. F₂ - Part of Thermosphere</td>
<td>III. Approximate 10 km over Earth's surface</td>
</tr>
<tr>
<td>D. D- Part of Stratosphere</td>
<td>IV. Approximate 100 km over Earth's surface</td>
</tr>
</tbody>
</table>

Choose the correct answer from the options given below:

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

Q.14  A body of mass is taken from earth surface to the height \( h \) equal to twice the radius of earth \( (R_e) \), the increase in potential energy will be:

\( (g = \text{acceleration due to gravity on the surface of Earth}) \)

Options 1.  \( \frac{3}{2} mgR_e \)  
2.  \( \frac{1}{3} mgR_e \)  
3.  \( \frac{1}{2} mgR_e \)  
4.  \( \frac{2}{3} mgR_e \)
Q.15 For a moving coil galvanometer, the deflection in the coil is 0.05 rad when a current of 10 mA is passed through it. If the torsional constant of suspension wire is $4.0 \times 10^{-3}$ N m rad$^{-1}$, the magnetic field is 0.01 T and the number of turns in the coil is 200, the area of each turn (in cm$^2$) is:

Options 1. 1.0
2. 2.0
3. 1.5
4. 0.5

Q.16 Statement I: When a Si sample is doped with Boron, it becomes P type and when doped by Arsenic it becomes N-type semi conductor such that P-type has excess holes and N-type has excess electrons.

Statement II: When such P-type and N-type semi-conductors, are fused to make a junction, a current will automatically flow which can be detected with an externally connected ammeter.

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

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

Q.17 A point charge of 10 μC is placed at the origin. At what location on the X-axis should a point charge of 40 μC be placed so that the net electric field is zero at $x = 2$ cm on the X-axis?

Options 1. $x = -4$ cm
2. $x = 8$ cm
3. $x = 6$ cm
4. $x = 4$ cm
Q.18  The distance travelled by a particle is related to time t as \( x = 4t^2 \). The velocity of the particle at \( t=5s \) is:

- 20 ms\(^{-1}\)
- 40 ms\(^{-1}\)
- 8 ms\(^{-1}\)
- 25 ms\(^{-1}\)

Question Type : MCQ  
Question ID : 7155051639  
Option 1 ID : 7155054935  
Option 2 ID : 7155054934  
Option 3 ID : 7155054933  
Option 4 ID : 7155054936  
Status : Answered  
Chosen Option : 2

Q.19  Two objects are projected with same velocity 'v' however at different angles \( \alpha \) and \( \beta \) with the horizontal. If \( \alpha = \beta = 90^\circ \), the ratio of horizontal range of the first object to the 2nd object will be:

- 1:1
- 1:2
- 2:1
- 4:1

Question Type : MCQ  
Question ID : 7155051640  
Option 1 ID : 7155054937  
Option 2 ID : 7155054940  
Option 3 ID : 7155054938  
Option 4 ID : 7155054939  
Status : Answered  
Chosen Option : 1
Q.20  Match List I with List II

<table>
<thead>
<tr>
<th>LIST I</th>
<th>LIST II</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Gauss’s Law in Electrostatics</td>
<td>( \oint E \cdot dl = -\frac{d\Phi_B}{dt} )</td>
</tr>
<tr>
<td>B. Faraday’s Law</td>
<td>( \oint B \cdot dA = 0 )</td>
</tr>
<tr>
<td>C. Gauss’s Law in Magnetism</td>
<td>( \oint B \cdot dl = \mu_0 j_v + \mu_0 \epsilon_0 \frac{d\Phi_F}{dt} )</td>
</tr>
<tr>
<td>D. Ampere-Maxwell Law</td>
<td>( \oint E \cdot ds = \frac{q}{\epsilon_0} )</td>
</tr>
</tbody>
</table>

Choose the correct answer from the options given below:

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

---

Section : Physics Section B

Q.21  A series LCR circuit is connected to an AC source of 220 V, 50 Hz. The circuit contains a resistance \( R = 80 \Omega \), an inductor of inductive reactance \( X_L = 70 \Omega \), and a capacitor of capacitive reactance \( X_C = 130 \Omega \). The power factor of circuit is \( \frac{3}{10} \). The value of \( x \) is:

Given --
Answer :

---

Q.22  Two long parallel wires carrying currents 8A and 15A in opposite directions are placed at a distance of 7cm from each other. A point P is at equidistant from both the wires such that the lines joining the point P to the wires are perpendicular to each other. The magnitude of magnetic field at P is \( \ldots \times 10^{-5} \text{T} \).

(Given : \( \sqrt{2} = 1.4 \))

Given --
Answer :

---

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Q.23  A body of mass 1 kg collides head on elastically with a stationary body of mass 3kg. After collision, the smaller body reverses its direction of motion and moves with a speed of 2m/s. The initial speed of the smaller body before collision is \( \text{ms}^{-1} \).

Given--
Answer :

Question Type : SA  
Question ID : 7155051647  
Status : Not Answered

Q.24  A nucleus disintegrates into two smaller parts, which have their velocities in the ratio 3:2. The ratio of their nuclear sizes will be \( \left( \frac{2}{3} \right)^{\frac{1}{3}} \). The value of 'x' is:-

Given--
Answer :

Question Type : SA  
Question ID : 7155051641  
Status : Not Answered

Q.25  If a solid sphere of mass 5kg and a disc of mass 4kg have the same radius. Then the ratio of moment of inertia of the disc about a tangent in its plane to the moment of inertia of the sphere about its tangent will be \( \frac{x}{7} \). The the value of x is _________

Given--
Answer :

Question Type : SA  
Question ID : 7155051648  
Status : Not Answered

Q.26  A capacitor has capacitance 5\( \mu \)F when it's parallel plates are separated by air medium of thickness d. A slab of material of dielectric constant 1.5 having area equal to that of plates but thickness \( \frac{d}{2} \) is inserted between the plates. Capacitance of the capacitor in the presence of slab will be _________ \( \mu \)F.

Given--
Answer :

Question Type : SA  
Question ID : 7155051646  
Status : Not Answered

Q.27  A train blowing a whistle of frequency 320 Hz approaches an observer standing on the platform at a speed of 66 m/s. The frequency observed by the observer will be (given speed of sound = 330 ms^{-1}) _________ Hz.

Given--
Answer :

Question Type : SA  
Question ID : 7155051850  
Status : Not Answered
Q.28 Two cells are connected between points A and B as shown. Cell 1 has emf of 12 V and internal resistance of 3Ω. Cell 2 has emf of 6V and internal resistance of 6 Ω. An external resistor R of 4Ω is connected across A and B. The current flowing through R will be _______ A.

Given--
Answer :

Question Type : SA
Question ID : 7155051645
Status : Not Answered

Q.29 An object is placed on the principal axis of convex lens of focal length 10cm as shown. A plane mirror is placed on the other side of lens at a distance of 20 cm. The image produced by the plane mirror is 5cm inside the mirror. The distance of the object from the lens is _______ cm.

Given--
Answer :

Question Type : SA
Question ID : 7155051642
Status : Not Answered

Q.30 A spherical drop of liquid splits into 1000 identical spherical drops. If \( u_1 \) is the surface energy of the original drop and \( u_2 \) is the total surface energy of the resulting drops, the (ignoring evaporation),

\[
\frac{u_1}{u_2} = \left( \frac{10}{x} \right) 
\]

Then value of x is ________ :

Given--
Answer :

Question Type : SA
Question ID : 7155051649
Status : Not Answered

Section : Chemistry Section A

Q.31 Potassium dichromate acts as a strong oxidizing agent in acidic solution. During this process, the oxidation state changes from

Options 1. + 6 to + 3
2. + 6 to + 2
3. + 3 to + 1
4. + 2 to + 1

Question Type : MCQ
Question ID : 7155051659
Option 1 ID : 7155054985
Option 2 ID : 7155054986
Option 3 ID : 7155054983
Option 4 ID : 7155054984
Status : Not Attempted and Marked For Review
Chosen Option : --
Q.32 Find out the major product from the following reaction.

\[ \text{H}_2\text{SO}_4 \text{ (Concentrated)} \xrightarrow{\Delta} \]

Options

1. 

2. 

3. 

4. 

Question Type: MCQ
Question ID: 7155051665
Option 1 ID: 7155055009
Option 2 ID: 7155055008
Option 3 ID: 7155055010
Option 4 ID: 7155055007
Status: Not Answered
Chosen Option: --
Q.33 Match List I with List II

<table>
<thead>
<tr>
<th>LIST I</th>
<th>LIST II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordination entity</td>
<td>Wavelength of light absorbed in nm</td>
</tr>
<tr>
<td>A. [CoCl(NH₃)₃]²⁻</td>
<td>I. 310</td>
</tr>
<tr>
<td>B. [Co(NH₃)₆]³⁻</td>
<td>II. 475</td>
</tr>
<tr>
<td>C. [Co(CN)₆]³⁻</td>
<td>III. 535</td>
</tr>
<tr>
<td>D. [Cu(H₂O)₄]²⁻</td>
<td>IV. 600</td>
</tr>
</tbody>
</table>

Choose the correct answer from the options given below:

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

Q.34 Statement I: Dipole moment is a vector quantity and by convention it is depicted by a small arrow with tail on the negative centre and head pointing towards the positive centre.

Statement II: The crossed arrow of the dipole moment symbolizes the direction of the shift of charges in the molecules.

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

Options 1. Both Statement I and Statement II are correct
2. Statement I is correct but Statement II is incorrect
3. Both Statement I and Statement II are incorrect
4. Statement I is incorrect but Statement II is correct
Q.35 Which one among the following metals is the weakest reducing agent?

Options
1. Rb
2. Li
3. K
4. Na

Q.36 Match List I with List II

<table>
<thead>
<tr>
<th>LIST I</th>
<th>LIST II</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Cobalt catalyst</td>
<td>I. (H₂ + Cl₂) production</td>
</tr>
<tr>
<td>B. Syngas</td>
<td>II. Water gas production</td>
</tr>
<tr>
<td>C. Nickel catalyst</td>
<td>III. Coal gasification</td>
</tr>
<tr>
<td>D. Brine solution</td>
<td>IV. Methanol production</td>
</tr>
</tbody>
</table>

Choose the correct answer from the options given below:

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

Q.37 Which of the following represents the correct order of metallic character of the given elements?

Options
1. Be < Si < K < Mg
2. K < Mg < Be < Si
3. Be < Si < Mg < K
4. Si < Be < Mg < K

Question Type: MCQ
Question ID: 7155051654
Option 1 ID: 7155054964
Option 2 ID: 7155054965
Option 3 ID: 7155054963
Status: Not Answered
Chosen Option: --
Q.38 Given below are two statements:

Statement I: In froth flotation method a rotating paddle agitates the mixture to drive air out of it.

Statement II: Iron pyrites are generally avoided for extraction of iron due to environmental reasons.

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. Both Statement I and Statement II are true
4. Statement I is false but Statement II is true

Q.39 Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: The alkali metals and their salts impart characteristic colour to reducing flame.

Reason R: Alkali metals can be detected using flame tests.

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

Options
1. A is not correct but R is correct
2. Both A and R are correct and R is the correct explanation of A
3. Both A and R are correct but R is NOT the correct explanation of A
4. A is correct but R is not correct
Q.40  Match List I with List II

<table>
<thead>
<tr>
<th>LIST I (Name of polymer)</th>
<th>LIST II (Uses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Glyptal</td>
<td>I. Flexible pipes</td>
</tr>
<tr>
<td>B. Neoprene</td>
<td>II. Synthetic wool</td>
</tr>
<tr>
<td>C. Acrilan</td>
<td>III. Paints and Lacquers</td>
</tr>
<tr>
<td>D. LDPE</td>
<td>IV. Gaskets</td>
</tr>
</tbody>
</table>

Choose the correct answer from the options given below:

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

Question Type: MCQ  
Question ID: 7155051669  
Option 1 ID: 7155055026  
Option 2 ID: 7155055024  
Option 3 ID: 7155055025  
Option 4 ID: 7155055023  
Status: Answered  
Chosen Option: 2

Q.41  What is the mass ratio of ethylene glycol (C₂H₄O₂, molar mass = 62 g/mol) required for making 500 g of 0.25 molal aqueous solution and 250 mL of 0.25 molal aqueous solution?

Options 1.
1. 3:1
2. 1:2
3. 2:1
4. 1:1

Question Type: MCQ  
Question ID: 7155051651  
Option 1 ID: 7155054954  
Option 2 ID: 7155054951  
Option 3 ID: 7155054953  
Option 4 ID: 7155054952  
Status: Answered  
Chosen Option: 3
Q.42 Match List I with List II

<table>
<thead>
<tr>
<th>LIST I (Amines)</th>
<th>LIST II (pK_a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Aniline</td>
<td>I. 8.25</td>
</tr>
<tr>
<td>B. Ethanamine</td>
<td>II. 8.00</td>
</tr>
<tr>
<td>C. N-Ethylethanolamine</td>
<td>III. 9.38</td>
</tr>
<tr>
<td>D. N, N-Diethylethanolamine</td>
<td>IV. 3.29</td>
</tr>
</tbody>
</table>

Choose the correct answer from the options given below:

1. A-III, B-IV, C-II, D-I
2. A-III, B-II, C-I, D-IV
3. A-III, B-II, C-IV, D-I
4. A-I, B-IV, C-II, D-III
Q.43 ‘A’ in the given reaction is

\[
\text{H} + \text{OH} \quad \xrightarrow{H^+} \quad \text{major}
\]

Options

1. 

2. 

3. 

4. 

---

Question Type: MCQ
Question ID: 7155051666
Option 1 ID: 7155055013
Option 2 ID: 7155055012
Option 3 ID: 7155055014
Option 4 ID: 7155055011
Status: Not Answered
Chosen Option: --
### Q.44 Match List I with List II

<table>
<thead>
<tr>
<th>Isomeric pairs</th>
<th>Type of isomers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propanamine and N-Methylethanimine</td>
<td>I. Metamers</td>
</tr>
<tr>
<td>Hexan-2-one and Hexan-3-one</td>
<td>II. Positional isomers</td>
</tr>
<tr>
<td>Ethanamide and Hydroxyethanimine</td>
<td>III. Functional isomers</td>
</tr>
<tr>
<td>p-nitrophenol and p-nitrophenol</td>
<td>IV. Tautomers</td>
</tr>
</tbody>
</table>

Choose the correct answer from the options given below:

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

---

### Q.45 Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

**Assertion A:** Carbon forms two important oxides - CO and CO₂. CO is neutral whereas CO₂ is acidic in nature

**Reason R:** CO₂ can combine with water in a limited way to form carbonic acid, while CO is sparingly soluble in water

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

- 1. Both A and R are correct and R is the correct explanation of A
- 2. Both A and R are correct but R is NOT the correct explanation of A
- 3. A is not correct but R is correct
- 4. A is correct but R is not correct

---
Q.46 The isomeric deuterated bromide with molecular formula C₂H₅DBr having two chiral carbon atoms is

Options
1. 2 – Bromo – 1 – deuto – 2 – methylpropane
2. 2 – Bromo – 3 – deuterobutane
3. 2 – Bromo – 1 – deuterobutane
4. 2 – Bromo – 2 – deuterobutane

Question Type: MCQ
Question ID: 7155051668
Option 1 ID: 7155055021
Option 2 ID: 7155055020
Option 3 ID: 7155055019
Option 4 ID: 7155055022
Status: Answered
Chosen Option: 4

Q.47 When the hydrogen ion concentration [H⁺] changes by a factor of 1000, the value of pH of the solution decreases by 2 units

Options
1. decreases by 2 units
2. increases by 2 units
3. decreases by 3 units
4. increases by 1000 units

Question Type: MCQ
Question ID: 7155051653
Option 1 ID: 7155054959
Option 2 ID: 7155054962
Option 3 ID: 7155054961
Option 4 ID: 7155054960
Status: Answered
Chosen Option: 3

Q.48 A chloride salt solution acidified with dil HNO₃ gives a curdy white precipitate, [A], on addition of AgNO₃. [A] on treatment with NH₄OH gives a clear solution, B. A and B are respectively

Options
1. H[AgCl₃] & [Ag(NH₃)₂]Cl
2. AgCl & [Ag(NH₃)₂]Cl
3. H[AgCl₃] & (NH₄)[Ag(OH)₂]
4. AgCl & (NH₄)[Ag(OH)₂]

Question Type: MCQ
Question ID: 7155051663
Option 1 ID: 7155055000
Option 2 ID: 7155055001
Option 3 ID: 7155055002
Option 4 ID: 7155054999
Status: Not Attempted and Marked For Review
Chosen Option: --
Q.49

A. Ammonium salts produce haze in atmosphere.
B. Ozone gets produced when atmospheric oxygen reacts with chlorine radicals.
C. Polychlorinated biphenyls act as cleansing solvents.
D. ‘Blue baby’ syndrome occurs due to the presence of excess of sulphate ions in water.

Choose the correct answer from the options given below:

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

Q.50

Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: Butylated hydroxy anisole when added to butter increases its shelf life.

Reason R: Butylated hydroxy anisole is more reactive towards oxygen than food.

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

Options 1. A is not correct but R is correct
2. Both A and R are correct but R is NOT the correct explanation of A
3. Both A and R are correct and R is the correct explanation of A
4. A is correct but R is not correct

Q.51

Number of hydrogen atoms per molecule of a hydrocarbon A having 85.8 % carbon is ______

Given: Molar mass of A = 84 g mol⁻¹

Answer:

Given 12

Answer:
Q.52  Total number of moles of AgCl precipitated on addition of excess of AgNO₃ to one mole each of the following complexes [Co(NH₃)₆Cl₂]Cl₂, [Ni(H₂O)₆]Cl₂, [Pt(NH₃)₂Cl₂] and [Pd(NH₃)₄]Cl₂ is _______.

Given --
Answer : 

Question Type : SA
Question ID : 7155051678
Status : Not Answered

Q.53  The number of pairs of the solutions having the same value of the osmotic pressure from the following is _______.

(Assume 100% ionization)

A. 0.500 M C₂H₅OH (aq) and 0.25 M KBr (aq)
B. 0.100 M K₃[Fe(CN)₆] (aq) and 0.100 M FeSO₄(NH₄)₂SO₄ (aq)
C. 0.05 M K₃[Fe(CN)₆] (aq) and 0.25 M NaCl (aq)
D. 0.15 M NaCl (aq) and 0.1 M BaCl₂ (aq)
E. 0.02 M KCl, MgCl₂, 6H₂O (aq) and 0.05 M KCl (aq)

Given --
Answer : 

Question Type : SA
Question ID : 7155051674
Status : Not Answered

Q.54  Based on the given figure, the number of correct statement/s is/are _______.

[Diagram showing liquid molecules in the surface and bulk]

A. Surface tension is the outcome of equal attractive and repulsive forces acting on the liquid molecule in bulk.
B. Surface tension is due to uneven forces acting on the molecules present on the surface.
C. The molecule in the bulk can never come to the liquid surface.
D. The molecules on the surface are responsible for vapour pressure if the system is a closed system.

Given --
Answer : 

Question Type : SA
Question ID : 7155051671
Status : Not Attempted and Marked For Review

Q.55  28.0 L of CO₂ is produced on complete combustion of 16.8 L gaseous mixture of ethene and methane at 25°C and 1 atm. Heat evolved during the combustion process is ________. kJ.

Given : ΔH° (CH₄) = -74.8 kJ mol⁻¹
ΔH° (C₂H₄) = -1,480 kJ mol⁻¹

Given --
Answer : 

Question Type : SA
Question ID : 7155051673
Status : Not Answered
Q.56 The number of given orbitals which have electron density along the axis is ________

\[ p_z, p_y, p_x, d_{xy}, d_{yz}, d_{xz}, d_{x^2-y^2} \]

Given --
Answer:

Q.57 The number of **incorrect** statement/s from the following is/are ________

A. Water vapours are adsorbed by anhydrous calcium chloride.
B. There is a decrease in surface energy during adsorption.
C. As the adsorption proceeds, \( \Delta H \) becomes more and more negative.
D. Adsorption is accompanied by decrease in entropy of the system.

Given --
Answer:

Q.58 Number of compounds giving (i) red colouration with ceric ammonium nitrate and also (ii) positive iodoform test from the following is ________

Given --
Answer:

Q.59 \( \text{Pt}(s) | \text{I}_2(g) (1 \text{ bar}) | \text{I}^- (aq) (1 \text{ M}) | \text{M}^{2+} (aq), \text{M}^+ (aq) | \text{Pt}(s) \)

The \( E_{\text{cell}} \) for the given cell is 0.1115 V at 298 K when \[ \frac{[\text{M}^+ (aq)]}{[\text{M}^{2+} (aq)]]} = 10^7 \]

The value of \( a \) is ________

Given: \( E^0_{\text{M}^{3+/M^+} = 0.2 \text{ V} \}

\[ 2 \frac{303 \text{RT}}{F} = 0.059V \]

Given: 8.28
Answer:

Question Type: SA
Question ID: 7155051672
Status: Not Attempted and Marked For Review

Question Type: SA
Question ID: 7155051677
Status: Not Answered

Question Type: SA
Question ID: 7155051680
Status: Not Attempted and Marked For Review

Question Type: SA
Question ID: 7155051675
Status: Answered
Q.60 A first order reaction has the rate constant, \( k = 4.6 \times 10^{-3} \text{ s}^{-1} \). The number of correct statement(s) from the following is/are ______

Given: \( \log 3 = 0.48 \)

A. Reaction completes in 1000 s.
B. The reaction has a half-life of 500 s.
C. The time required for 10\% completion is 25 times the time required for 90\% completion.
D. The degree of dissociation is equal to \( (1 - e^{-25}) \)
E. The rate and the rate constant have the same unit.

Given--
Answer : --

Question Type : SA
Question ID : 7155051676
Status : Not Attempted and Marked For Review

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Section : Mathematics Section A

Q.61 The number of numbers, strictly between 5000 and 10000 can be formed using the digits 1, 3, 5, 7, 9 without repetition, is

Options: 1. 12
2. 120
3. 6
4. 72

---

Question Type : MCQ
Question ID : 7155051686
Option 1 ID : 7155055063
Option 2 ID : 7155055064
Option 3 ID : 7155055061
Option 4 ID : 7155055062
Status : Not Answered
Chosen Option : --
Q.62
Let \( A = \begin{bmatrix} 1 & 3 \\ \sqrt{10} & \sqrt{10} \\ -3 & 1 \\ \sqrt{10} & \sqrt{10} \end{bmatrix} \) and \( B = \begin{bmatrix} 1 & -i \\ 0 & 1 \end{bmatrix} \), where \( i = \sqrt{-1} \).

If \( M = A^TBA \), then the inverse of the matrix \( A^2023A^T \) is

Options
1. \( \begin{bmatrix} 1 & -2023i \\ 0 & 1 \end{bmatrix} \)
2. \( \begin{bmatrix} 1 & 2023i \\ 0 & 1 \end{bmatrix} \)
3. \( \begin{bmatrix} 1 & 0 \\ 2023i & 1 \end{bmatrix} \)
4. \( \begin{bmatrix} 1 & 0 \\ -2023i & 1 \end{bmatrix} \)

Q.63
Let \( T \) and \( C \) respectively be the transverse and conjugate axes of the hyperbola \( 16x^2 - y^2 + 64x + 4y + 44 = 0 \). Then the area of the region above the parabola \( x^2 - y + 4 \), below the transverse axis \( T \) and on the right of the conjugate axis \( C \) is:

Options
1. \( 4\sqrt{6} + \frac{28}{3} \)
2. \( 4\sqrt{6} - \frac{28}{3} \)
3. \( 4\sqrt{6} - \frac{44}{3} \)
4. \( 4\sqrt{6} + \frac{44}{3} \)
Q.64 Let \( f(x) = 2x^3 + \lambda, \lambda \in \mathbb{R}, n \in \mathbb{N}, \) and \( f(4) = 133, f(5) = 255. \) Then the sum of all the positive integer divisors of \((f(3) - f(2))\) is

Options 1. 61
   2. 58
   3. 59
   4. 60

Question Type : MCQ
Question ID : 7155051688
Option 1 ID : 7155055072
Option 2 ID : 7155055069
Option 3 ID : 7155055070
Option 4 ID : 7155055071
Status : Not Answered
Chosen Option : --

Q.65 Let A, B, C be \(3 \times 3\) matrices such that A is symmetric and B and C are skew-symmetric.

Consider the statements

(S1) \( A^{13} B^{26} = B^{26} A^{13}\) is symmetric

(S2) \( A^{26} C^{13} = C^{13} A^{26}\) is symmetric

Then,

Options 1. Only S2 is true
   2. Both S1 and S2 are false
   3. Both S1 and S2 are true
   4. Only S1 is true

Question Type : MCQ
Question ID : 7155051685
Option 1 ID : 7155055060
Option 2 ID : 7155055059
Option 3 ID : 7155055057
Option 4 ID : 7155055058
Status : Not Attempted and Marked For Review
Chosen Option : --

Q.66 The shortest distance between the lines \( x + 1 = 2y = -12z \) and \( x - y + 2 = 6z - 6 \) is

Options 1. 2
   2. 3
   3. 5
   4. 3

Question Type : MCQ
Question ID : 7155051695
Option 1 ID : 7155055097
Option 2 ID : 7155055098
Option 3 ID : 7155055099
Option 4 ID : 7155055100
Status : Answered
Chosen Option : 2
Q.67 Let \( \mathbf{a} = \mathbf{i} - \mathbf{j} + \mathbf{k} \), \( \mathbf{b} = 1 \) and \( \mathbf{a} \times \mathbf{b} = \mathbf{i} - \mathbf{j} \).

Then \( \mathbf{a} - 6\mathbf{b} \) is equal to

Options
1. \( 3(\mathbf{i} + \mathbf{j} - \mathbf{k}) \)
2. \( 3(\mathbf{i} - \mathbf{j} - \mathbf{k}) \)
3. \( 3(\mathbf{i} + \mathbf{j} + \mathbf{k}) \)
4. \( 3(\mathbf{i} - \mathbf{j} + \mathbf{k}) \)

Q.68 If the function \( f(x) = \begin{cases} \frac{1 + |\cos x|}{\cos x} & , 0 < x < \frac{\pi}{2} \\ \frac{\mu}{\cot 6x} & , x = \frac{\pi}{2} \\ \frac{\mu}{e^{\cot 4x}} & , \frac{\pi}{2} < x < \pi \end{cases} \)

is continuous at \( x = \frac{\pi}{2} \), then \( 9\mu + 6\log_2\mu + \mu e^\mu - e^{6\mu} \) is equal to

Options
1. 8
2. \( 2e^4 + 8 \)
3. 10
4. 11
Q.69

The integral \[\int_{1}^{2} \frac{dx}{x^3 \left(x^2 + 2\right)^2}\] is equal to

Options
1. \(\frac{11}{6} + \log_e 4\)
2. \(\frac{11}{12} - \log_e 4\)
3. \(\frac{11}{12} + \log_e 4\)
4. \(\frac{11}{6} - \log_e 4\)

---

Q.70

The equations of two sides of a variable triangle are \(x = 0\) and \(y = 3\), and its third side is a tangent to the parabola \(y^2 = 6x\). The locus of its circumcentre is:

Options
1. \(4y^2 - 18y - 3x - 18 = 0\)
2. \(4y^2 - 18y + 3x + 18 = 0\)
3. \(4y^2 + 18y + 3x + 18 = 0\)
4. \(4y^2 - 18y - 3x + 18 = 0\)

---

Q.71

Let \(\Delta, \nabla \in \{\land, \lor\}\) be such that \((p \rightarrow q) \land (p \land \nabla q)\) is a tautology. Then

Options
1. \(\Delta = \land, \nabla = \land\)
2. \(\Delta = \lor, \nabla = \land\)
3. \(\Delta = \land, \nabla = \lor\)
4. \(\Delta = \lor, \nabla = \lor\)
### Question 72

The foot of perpendicular of the point \((2, 0, 5)\) on the line \(\frac{x+1}{2} = \frac{y-1}{5} = \frac{z+1}{-1}\) is \((\alpha, \beta, \gamma)\). Then, which of the following is NOT correct?

<table>
<thead>
<tr>
<th>Options</th>
<th>(\frac{\alpha \beta}{\gamma})</th>
<th>(\gamma)</th>
<th>(\alpha)</th>
<th>(\frac{\beta}{\gamma})</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(\frac{4}{15})</td>
<td>(\frac{5}{8})</td>
<td>(-5)</td>
<td>(-8)</td>
</tr>
</tbody>
</table>

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### Question 73

Let \(f : \mathbb{R} \to \mathbb{R}\) be a function defined by

\[ f(x) = \log_2(\sqrt{2x} \sin x - \cos x + m - 2) \]

for some \(m\), such that the range of \(f\) is \([0, 2]\). Then the value of \(m\) is ________

<table>
<thead>
<tr>
<th>Options</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>
Q.74 If the four points, whose position vectors are \(3i - 4j + 2k, 1 + 2j - k, -2i - j + 3k\) and \(5i - 20j + 4k\) are coplanar, then \(u\) is equal to

Options
1. \(\frac{73}{17}\)
2. \(\frac{73}{17}\)
3. \(\frac{107}{17}\)
4. \(\frac{107}{17}\)

Question Type: MCQ
Question ID: 7155051688
Option 1 ID: 7155055110
Option 2 ID: 7155055112
Option 3 ID: 7155055109
Option 4 ID: 7155055111
Status: Not Attempted and Marked For Review
Chosen Option: --

Q.75 Let the function \(f(x) = 2x^3 + (2p - 7)x^2 + 3(2p - 9)x - 6\) have a maxima for some value of \(x < 0\) and a minima for some value of \(x > 0\). Then, the set of all values of \(p\) is

Options
1. \(\left( -\frac{9}{2}, \frac{9}{2} \right)\)
2. \((0, \frac{9}{2})\)
3. \((-\infty, \frac{9}{2})\)
4. \(\left( \frac{9}{2}, \infty \right)\)

Question Type: MCQ
Question ID: 7155051690
Option 1 ID: 7155055078
Option 2 ID: 7155055077
Option 3 ID: 7155055079
Option 4 ID: 7155055080
Status: Not Answered
Chosen Option: --
Q.76 Let \( z \) be a complex number such that \( \left| \frac{z-2i}{z+i} \right| = 2 \), \( z \neq -i \). Then \( z \) lies on the circle of radius 2 and

Options:
1. (0, 2)
2. (0, 0)
3. (2, 0)
4. (0, -2)

Q.77 Let \( N \) be the sum of the numbers appeared when two fair dice are rolled and let the probability that \( N - 2, \sqrt{3N}, N + 2 \) are in geometric progression be \( \frac{k}{48} \). Then the value of \( k \) is

Options:
1. 16
2. 2
3. 4
4. 8

Q.78 The number of functions

\[ f: \{1,2,3,4\} \rightarrow \{a \in \mathbb{Z} \mid |a| \leq 8\} \]

satisfying \( f(n) + \frac{1}{n} f(n+1) = 1 \), \( \forall n \in \{1,2,3\} \) is

Options:
1. 2
2. 3
3. 4
4. 1
Q.79 Let \( y = y(t) \) be a solution of the differential equation

\[
\frac{dy}{dt} + \alpha y = y e^{-\beta t}
\]

where, \( \alpha > 0 \), \( \beta > 0 \) and \( \gamma > 0 \). Then \( \lim_{t \to \infty} y(t) \)

Options
1. is 0
2. does not exist
3. is 1
4. is \(-1\)

Q.80 \( \sum_{k=0}^{6} 51-k \cdot C_3 \) is equal to

Options
1. \( 51 C_3 - 45 C_3 \)
2. \( 51 C_4 - 45 C_4 \)
3. \( 52 C_4 - 45 C_4 \)
4. \( 52 C_3 - 45 C_3 \)

Section: Mathematics Section B

Q.81 If \( \frac{1}{2} \log_e x = \frac{m}{n} \log_e \left( \frac{u}{v} \right) \), where \( m \) and \( n \) are co-prime natural numbers, then \( m^2 + n^2 - 5 \) is equal

Given --

Answer:

Question ID: 7155051706
Status: Not Answered
Q.82 Let \( a \in \mathbb{R} \) and let \( a, \beta \) be the roots of the equation \( x^2 + \frac{1}{60} x + a = 0 \). If \( a^4 + \beta^4 = -30 \), then the product of all possible values of \( a \) is _____.

- **Given:**
- **Answer:**

**Question Type:** SA  
**Question ID:** 7155051701  
**Status:** Not Answered

Q.83 If the shortest distance between the line joining the points \((1, 2, 3)\) and \((2, 3, 4)\), and the line \( \frac{x-1}{2} = \frac{y+1}{-1} = \frac{z-2}{0} \) is \( a \), then \( 28a^2 \) is equal to _____.

- **Given:**
- **Answer:**

**Question Type:** SA  
**Question ID:** 7155051708  
**Status:** Not Answered

Q.84 For the two positive numbers \( a, b \), if \( a, b \) and \( \frac{1}{18} \) are in a geometric progression, while \( \frac{1}{a}, 10 \) and \( \frac{1}{b} \) are in an arithmetic progression, then \( 16a + 12b \) is equal to _____.

- **Given:**
- **Answer:**

**Question Type:** SA  
**Question ID:** 7155051704  
**Status:** Not Answered

Q.85 The remainder when \((2023)^{2023}\) is divided by 35 is ________

- **Given:**
- **Answer:**

**Question Type:** SA  
**Question ID:** 7155051703  
**Status:** Not Answered

Q.86 Suppose Anil’s mother wants to give 5 whole fruits to Anil from a basket of 7 red apples, 5 white apples and 8 oranges. If in the selected 5 fruits, at least 2 oranges, at least one red apple and at least one white apple must be given, then the number of ways, Anil’s mother can offer 5 fruits to Anil is ________.

- **Given:**
- **Answer:**

**Question Type:** SA  
**Question ID:** 7155051702  
**Status:** Not Answered

Q.87 Points \((-3, 2)\), \((9, 10)\) and \((0, 4)\) lie on a circle \( C \) with \( PR \) as its diameter. The tangents to \( C \) at the points \( Q \) and \( R \) intersect at the point \( S \). If \( S \) lies on the line \( 2x - ky = 1 \), then \( k \) is equal to ________.

- **Given:**
- **Answer:**

**Question Type:** SA  
**Question ID:** 7155051705  
**Status:** Not Answered
Q.88  If m and n respectively are the numbers of positive and negative values of \( \theta \) in the interval \([-\pi, \pi]\) that satisfy the equation \( \cos 2\theta \cos \frac{\theta}{2} = \cos 3\theta \cos \frac{3\theta}{2} \), then m + n is equal to ________.

Given --
Answer :

Q.89  25% of the population are smokers. A smoker has 27 times more chances to develop lung cancer than a non-smoker. A person is diagnosed with lung cancer and the probability that this person is a smoker is \( \frac{k}{10} \). Then the value of k is ________.

Given --
Answer :

Q.90  A triangle is formed by X-axis, Y-axis and the line 3x + 4y = 60. Then the number of points \( P(a, b) \) which lie strictly inside the triangle, where a is an integer and b is a multiple of a, is ________.

Given --
Answer :