

BITSAT 2023 Memory Based Question Paper PDF

Question 1

An object moves with speed v_1 , v_2 and v_3 along a line segment AB, BC and CD respectively as shown in figure. Where $AB = BC$ and $AD = 3AB$, then average speed of the object will be:



Options:

A. $\frac{v_1 v_2 v_3}{3(v_1 v_2 + v_2 v_3 + v_3 v_1)}$

B. $\frac{3v_1 v_2 v_3}{(v_1 v_2 + v_2 v_3 + v_3 v_1)}$

C. $\frac{(r^2 + r_2 + r_3)}{3}$

D. $\frac{(v_1 + v_2 + v_3)}{3v_1 v_2 v_3}$

Question 2

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:

A. Both n_e and resistance decrease

B. Both n_e and resistance increase

C. n_e increases, resistance decreases

D. n_e decreases, resistance increases

Question 3

A radio-active material is reduced to $1/8$ of its original amount in 3 days. If 8×10^{-3} kg of the material is left after 5 days. The initial amount of the material is

Options:

A. 700 gm

B. 900 gm

C. 475 gm

D. 256 gm

Question 4

A 12.5 eV electron beam is used to bombard gaseous hydrogen at room temperature. The number of spectral lines emitted will be:

Options:

- A. 2
- B. 1
- C. 3
- D. 4

Question 5

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

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

Options:

- A. $7.92 \times 10^{-6} \text{J}$
- B. $7.92 \times 10^{-4} \text{J}$
- C. $9.68 \times 10^{-4} \text{J}$
- D. $8.8 \times 10^{-5} \text{J}$

Question 6

The force between two small charged spheres having charges of $1 \times 10^{-7} \text{C}$ and $2 \times 10^{-7} \text{C}$ placed 20 cm apart in air is

Options:

- A. $4.5 \times 10^{-2} \text{N}$
- B. $4.5 \times 10^{-3} \text{N}$
- C. $5.4 \times 10^{-2} \text{N}$
- D. $5.4 \times 10^{-3} \text{N}$

Question 7

The work done in placing a charge of 8×10^{-18} coulomb on a condenser of capacity 100 microfarad is

Options:

- A. 3.1×10^{-26} joule
- B. 4×10^{-10} joule
- C. 32×10^{-32} joule
- D. 16×10^{-32} joule

Question 8

The resistance of a wire is 5Ω . Its new resistance in ohm if stretched to 5 times of its original length will be :

Options:

- A. 625
- B. 5
- C. 125
- D. 25

Question 9

A charge particle is moving in a uniform magnetic field $(2\hat{i} + 3\hat{j})$ T. If it has an acceleration of $(\alpha\hat{i} - 4\hat{j})$ m / s², then the value of α will be :

Options:

- A. 3
- B. 6
- C. 12
- D. 2

Question 10

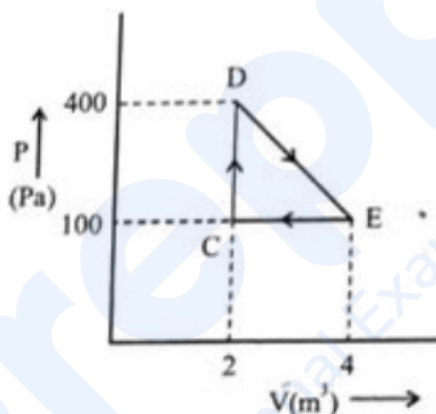
Proton (p) and electron (e) will have same de-Broglie wavelength when the ratio of their momentum is (assume, $m_n = 1849m_e$)

Options:

- A. 1:43
- B. 43 : 1
- C. 1 : 1849
- D. 1 : 1

Question 11

A thermodynamic system is taken through cyclic process. The total work done in the process is :



Options:

- A. 100J
- B. 300J
- C. Zero
- D. 200J

Question 12

In a reflecting telescope, a secondary mirror is used to:

Options:

- A. reduce the problem of mechanical support
- B. remove spherical aberration
- C. make chromatic aberration zero
- D. move the eyepiece outside the telescopic tube

Question 13

The magnetic moment of an electron (e) revolving in an orbit around nucleus with an orbital angular momentum is given by:

Options:

A. $\vec{\mu}_L = \frac{e\vec{L}}{2m}$

B. $\vec{\mu}_L = -\frac{e\vec{L}}{2m}$

C. $\vec{\mu}_l = -\frac{e\vec{L}}{m}$

D. $\vec{\mu}_l = \frac{2e\vec{L}}{m}$

Question 14

The ratio of intensities at two points P and Q on the screen in a Young's double slit experiment where phase difference between two wave of same amplitude are $\frac{\pi}{3}$ and $\frac{\pi}{2}$, respectively are

Options:

A. 1 : 3

B. 3 : 1

C. 3 : 2

D. 2 : 3

Question 15

A bicycle tyre is filled with air having pressure of 270 kPa at 27°C. The approximate pressure of the air in the tyre when the temperature increases to 36°C is

Options:

A. 270 kPa

B. 262 KPa

C. 278 kPa

D. 360 kPa

Question 16

A particle executes SHM of amplitude A. The distance from the mean position when its kinetic energy becomes equal to its potential energy is

Options:

- A. $\sqrt{2}A$
- B. $2A$
- C. $\frac{1}{\sqrt{2}}A$
- D. $\frac{1}{2}A$

Question 17

Electric field in a certain region is given by $\vec{E} = \left(\frac{A}{x^2}\hat{i} + \frac{B}{y^3}\hat{j} \right)$. The SI unit of A and B are:

Options:

- A. Nm^3C^{-1} ; Nm^2C^{-1}
- B. Nm^2C^{-1} ; Nm^3C^{-1}
- C. Nm^3C ; Nm^2C
- D. Nm^2C ; Nm^3C

Question 18

At any instant the velocity of a particle of mass 500g is $(2t\hat{i} + 3t^2\hat{j})\text{ms}^{-1}$. If the force acting on the particle at $t = 1\text{s}$ is $(\hat{i} + x\hat{j})\text{N}$. Then the value of x will be:

Options:

- A. 3
- B. 4
- C. 6
- D. 2

Question 19

A particle of mass m moving with velocity v collides with a stationary particle of mass $2m$. After collision, they stick together and continue to move together with velocity

Options:

A. v

B. $\frac{v}{2}$

C. $\frac{v}{3}$

D. $\frac{v}{4}$

Question 20

Which of the following Maxwell's equations is valid for time varying conditions but not valid for static conditions :

Options:

A. $\oint \vec{B} \cdot d\vec{l} = \mu_0 I$

B. $\oint \vec{E} \cdot d\vec{l} = 0$

C. $\oint \vec{E} \cdot d\vec{l} = - \frac{\partial \phi_B}{\partial t}$

D. $\oint \vec{D} \cdot d\vec{A} = Q$

Question 21

In an LC oscillator, if values of inductance and capacitance become twice and eight times, respectively, then the resonant frequency of oscillator becomes x times its initial resonant frequency ω_0 . The value of x is:

Options:

A. $1 / 4$

B. 16

C. $1 / 16$

D. 4

Question 22

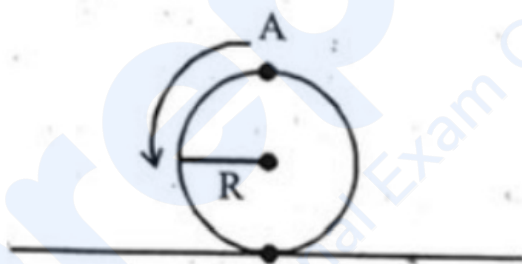
A conducting loop of radius $\frac{10}{\sqrt{\pi}}$ cm is placed perpendicular to a uniform magnetic field of 0.5T. The magnetic field is decreased to zero in 0.5 s at a steady rate. The induced emf in the circular loop at 0.25s is:

Options:

- A. emf = 1 mV
- B. emf = 10 mV
- C. emf = 100 mV
- D. emf = 5 mV

Question 23

A disc is rolling without slipping on a surface. The radius of the disc is R. At $t = 0$, the top most point on the disc is A as shown in figure. When the disc completes half of its rotation, the displacement of point A from its initial position is



Options:

- A. $R\sqrt{(\pi^2 + 4)}$
- B. $R\sqrt{(\pi^2 + 1)}$
- C. $2R$
- D. $2R\sqrt{(1 + 4\pi^2)}$

Question 24

Two planets A and B of radii R and 1.5R have densities ρ and $\rho / 2$ respectively. The ratio of acceleration due to gravity at the surface of B to A is :

Options:

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

Question 25

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

Options:

- A. $6.25 \times 10^{-3} \text{m}$
- B. $4 \times 10^{-4} \text{m}$
- C. $6.25 \times 10^{-6} \text{m}$
- D. $4 \times 10^{-3} \text{m}$

Question 26

The ratio of speed of sound in hydrogen gas to the speed of sound in oxygen gas at the same temperature is:

Options:

- A. 4 : 1
- B. 1 : 2
- C. 1 : 4
- D. 1 : 1

Question 27

The free space inside a current carrying toroid is filled with a material of susceptibility 2×10^{-2} . The percentage increase in the value of magnetic field inside the toroid will be

Options:

- A. 2%
- B. 0.2%
- C. 0.1%
- D. 1%

Question 28

The ratio of average electric energy density and total average energy density of electromagnetic wave is :

Options:

- A. 2
- B. $\frac{1}{2}$
- C. 1
- D. 3

Question 29

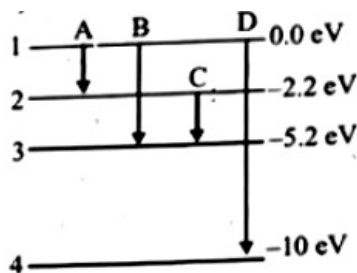
In a Young's double slit experiment, the intensities at two points, for the path difference $\frac{\lambda}{4}$ and $\frac{\lambda}{3}$ (λ being the wavelength of light used) are I_1 and I_2 respectively. If I_0 denotes the intensity produced by each one of the individual slits, then $\frac{I_1 + I_2}{I_0} = \dots$

Options:

- A. 3
- B. 5
- C. 7
- D. 10

Question 30

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 124.1 nm ? Given ($h = 6.62 \times 10^{-34}$ Js)



Options:

- A. B
- B. A
- C. C
- D. D

Question 31

Frenkel and Schottky defects are :

Options:

- A. nucleus defects
- B. non-crystal defects
- C. crystal defects
- D. nuclear defects

Question 32

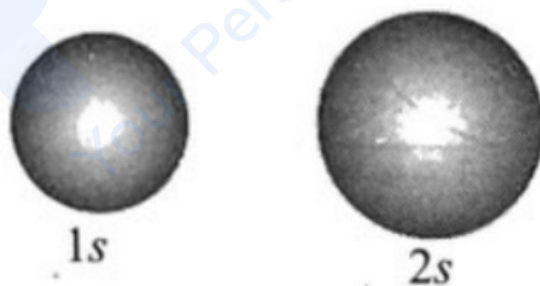
The Bohr orbit radius for the hydrogen atom ($n = 1$) is approximately $0.530\text{\AA}$. The radius for the first excited state ($n = 2$) orbit is (in $\text{\AA}$)

Options:

- A. 0.13
- B. 1.06
- C. 4.77
- D. 2.12

Question 33

The probability density plots of 1s and 2s orbitals are given in figure.'



The density of dots in a region represents the probability density of finding electrons in the region.

On the basis of above diagram which of the following statements is incorrect?

Options:

- A. 1s and 2s orbitals are spherical in shape.
- B. The probability of finding the electron is maximum near the nucleus.
- C. The probability of finding the electron at a given distance is equal in all directions.
- D. The probability density of electrons for 2s orbital decreases uniformly as distance from the nucleus increases.

Question 34

Element with electronic configuration $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 4d^{10} 5s^2 5p^3$ belongs to the following group of the periodic table

Options:

- A. 5th
- B. 15th
- C. 3rd
- D. 17th

Question 35

Which of the following pairs will form the most stable ionic bond?

Options:

- A. Na and Cl
- B. Mg and F
- C. Li and F
- D. Na and F

Question 36

**How much ethyl alcohol must be added to 1 litre of water so that the solution will freeze at 14°C ?
(K_f for water = $1.86^\circ\text{C} / \text{mol}$)**

Options:

- A. 7.5 mol
- B. 8.5 mol
- C. 9.5 mol
- D. 10.5 mol

Question 37

The conductivity of a weak acid HA of concentration 0.001 mol L^{-1} is $2.0 \times 10^{-5} \text{ Scm}^{-1}$.

If $\Lambda_m^\circ(\text{HA}) = 190 \text{ Scm}^2 \text{ mol}^{-1}$, the ionization constant (K_a) of HA is equal to _____ 10^{-6} . ×

Options:

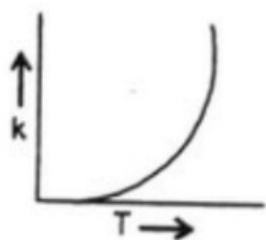
- A. 24
- B. 48
- C. 12
- D. 45

Question 38

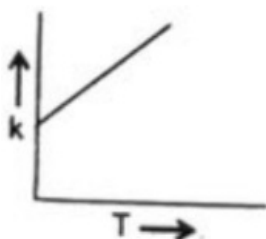
Plots showing the variation of the rate constant (k) with temperature (T) are given below. The plot that follows Arrhenius equation is

Options:

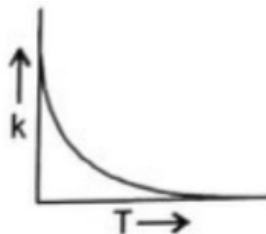
A.



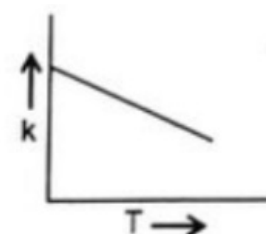
B.



C.



D.



Question 39

Which of the following method is used for coagulation of the sol?

Options:

- A. By mixing two oppositely charged sols.
- B. By electrophoresis.
- C. By addition of electrolytes.
- D. All of the above.

Question 40

The reaction that does NOT take place in a blast furnace between 900K to 1500K temperature range during extraction of iron is :

Options:

- A. $\text{Fe}_2\text{O}_3 + \text{CO} \rightarrow 2\text{FeO} + \text{CO}_2$
- B. $\text{FeO} + \text{CO} \rightarrow \text{Fe} + \text{CO}_2$
- C. $\text{C} + \text{CO}_2 \rightarrow 2\text{CO}$
- D. $\text{CaO} + \text{SiO}_2 \rightarrow \text{CaSiO}_3$

Question 41

Kinetic theory of gases proves

Options:

- A. only Boyle's law
- B. only Charles' law
- C. only Avogadro's law
- D. all of these

Question 42

If enthalpies of formation of $\text{C}_2\text{H}_4(\text{g})$, $\text{CO}_2(\text{g})$ and $\text{H}_2\text{O}(\text{l})$ at 25°C and 1 atm pressure are 52 , 394 and -286 kJ / mol respectively, the change in enthalpy for combustion of C_2H_4 is equal to

Options:

- A. -141.2 kJ / mol
- B. -1412 kJ / mol
- C. $+14.2 \text{ kJ / mol}$
- D. $+1412 \text{ kJ / mol}$

Question 43

The photochemical smog does not generally contain:

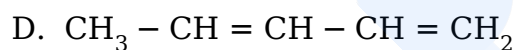
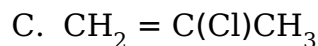
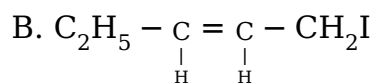
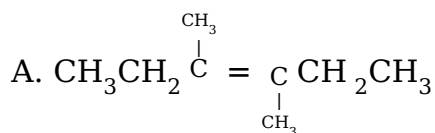
Options:

- A. NO
- B. SO₂
- C. NO₂
- D. HCHO

Question 44

Geometrical isomerism is not shown by

Options:



Question 45

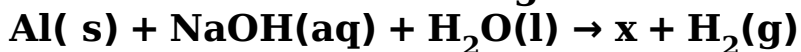
For the separation of two immiscible liquids which method is used?

Options:

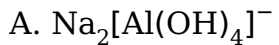
- A. Chromatography
- B. Fractionating column
- C. Fractional distillation
- D. Separating funnel

Question 46

What is x in the following reaction?



Options:



Question 47

Which of the following will precipitate first when aqueous solution containing sulphate ions are added?

Options:



Question 48

Ionic hydrides reacts with water to give

Options:

A. acidic solutions

B. hydride ions

C. basic solutions

D. electrons

Question 49

The drug used as an antidepressant is

Options:

- A. Luminol
- B. Tofranil
- C. Mescaline
- D. Sulphadiazine

Question 50

Melamine plastic crockery is a copolymer of:

Options:

- A. HCHO and melamine
- B. HCHO and ethylene
- C. melamine and ethylene
- D. None of these

Question 51

The helical structure of protein is stabilized by

Options:

- A. dipeptide bonds
- B. hydrogen bonds
- C. ether bonds
- D. peptide bonds

Question 52

Which of the following factors affect the basic strength of amine?

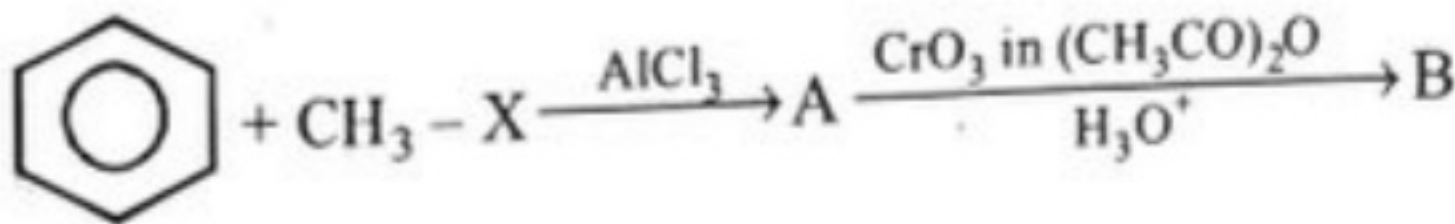
- (i) Inductive effect**
- (ii) Steric hinderance**
- (iii) Solvation effect**
- (iv) Solubility in organic solvents.**

Options:

- A. (i) and (iv)
- B. (i), (ii) and (iii)
- C. (ii) and (iii)
- D. (ii) and (iv)

Question 53

Find out B in the given reactions



Options:

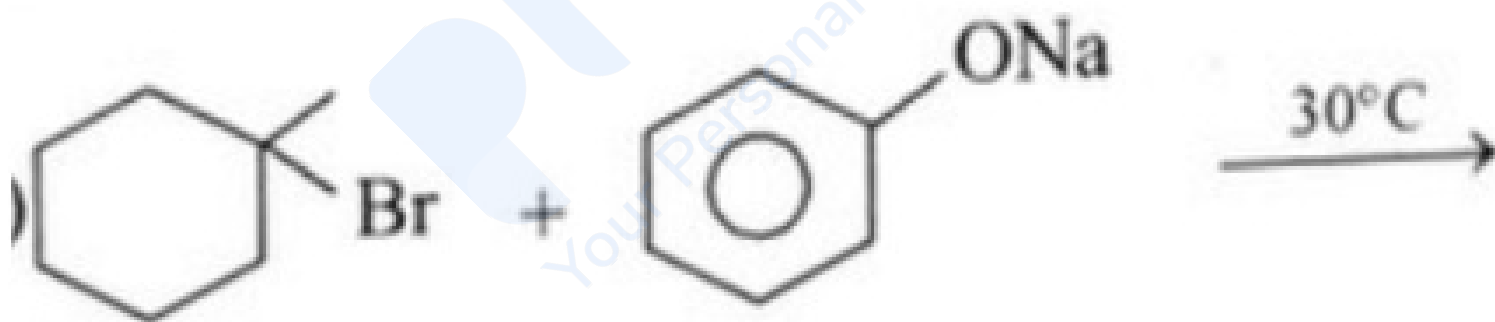
- A. acetophenone
- B. benzaldehyde
- C. cyclohexyl carbaldehyde
- D. benzoic acid

Question 54

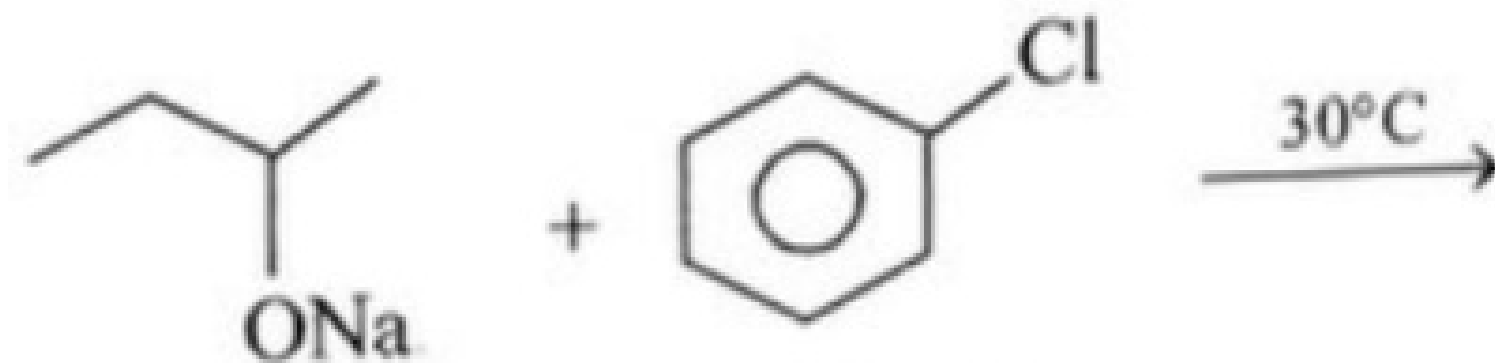
Which method is useful for the synthesis of ether?

Options:

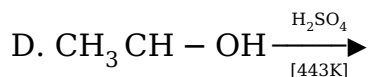
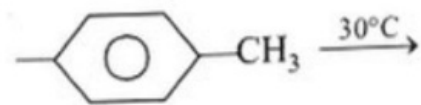
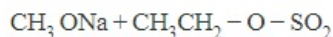
A.



B.

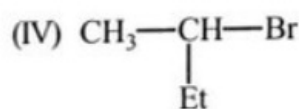
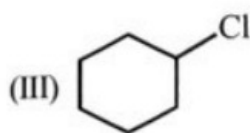
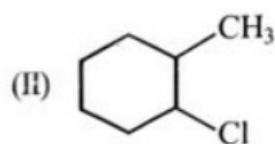
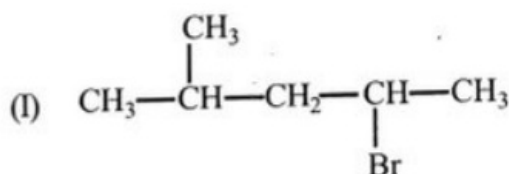


C.



Question 55

Among the given halides, which one will give same product in both $\text{S}_{\text{N}}1$ and $\text{S}_{\text{N}}2$ reactions.



Options:

- A. (III) only
- B. (I) and (II)
- C. (III) and (IV)
- D. (I), (III) and (IV)

Question 56

Among the ligands NH_3 , en, CN^- and CO the correct order of their increasing field strength, is :

Options:

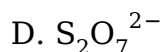
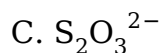
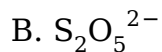
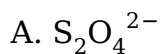
- A. $\text{NH}_3 < \text{en} < \text{CN}^- < \text{CO}$
- B. $\text{CN}^- < \text{NH}_3 < \text{NH}_3 < \text{en}$
- C. $\text{en} < \text{CN}^- < \text{NH}_3 < \text{CO}$
- D. $\text{CO} < \text{NH}_3 < \text{en} < \text{CN}^-$



Question 57

S – S bond is not present in

Options:



Question 58

In the laboratory, manganese (II) salt is oxidised to permanganate ion in aqueous solution by

Options:

A. hydrogen peroxide

B. conc. nitric acid

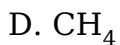
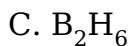
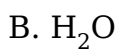
C. peroxy disulphate

D. dichromate

Question 59

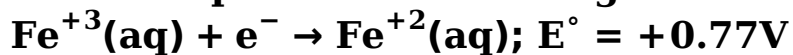
Which one of the following molecular hydrides acts as a Lewis acid?

Options:



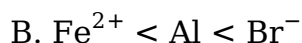
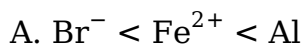
Question 60

Electrode potential data are given below:



Based on the data, the reducing power of Fe^{2+} , Al and Br^{-} will increase in the order

Options:



Question 61

fricassee

Options:

A. grill

B. decorate

C. stew

D. to baste

Question 62

RETRIBUTION

Options:

A. compensation

B. forgiveness

C. contempt

D. grudge

Question 63

SUMPTUOUS

Options:

A. irritable

B. meagre

C. fancy

D. sad

Question 64

Rajeev failed in the examination because his answers were not _____ to the questions asked

Options:

- A. allusive
- B. pertinent
- C. revealing
- D. referential

Question 65

**Choose the correct words to complete the sentence:
It was _____ cold _____ we couldn't go out.**

Options:

- A. so, that
- B. too, to
- C. neither, nor
- D. either, or

Question 66

Faced with the

P : traditional culture in the pre-independence India

Q : challenge of the intrusion of colonial culture and ideology

R : developed during the nineteenth century

S : at attempt to reinvigorate traditional institutions and realize the potential of

Which one of the following is the correct sequence?

Options:

- A. P – R – Q – S
- B. Q-S - P - R
- C. P – S – Q – R
- D. Q – R – P – S

Question 67

A diversified use

P : as a heating or power generation fuel by converting gas into

Q : adding a new dimension to the traditional use of gas

R : of natural gas is emerging

S : amongst other products, high quality diesel transportation fuel virtually free of sulphur

Which one of the following is the correct sequence?

Options:

A. R – P – Q – S

B. S – Q – P – R

C. R – Q – P – S

D. S – P – Q – R

Question 68

Music is often linked to _____.

Options:

A. anger

B. mood

C. anxiety

D. happiness

Question 69

How is music an important part of life?

Options:

A. It makes us feel different emotions

B. It makes us sad

C. It helps in our daily activities

D. It helps us in remembering things

Question 70

Which of the statements is true?

Options:

A. All forms of music may heal wounds

B. All forms of music may have good effect

- C. All forms of music may be soothing
- D. All forms of music may have therapeutic effects

Question 71

On the following questions, select the related word/letters/from the attractive

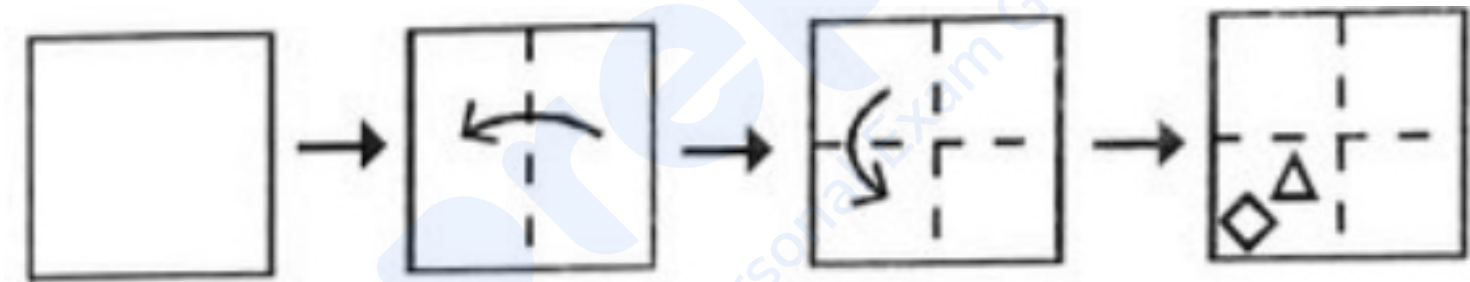
MASTER: OCUVGT ::LABOUR:?

Options:

- A. NCDQWT
- B. HDERWT
- C. NBECRWT
- D. NEDRWT

Question 72

The sequence of folding a paper and the manner in which the folded paper has been cut is shown in the following figures. How would this paper look when unfolded?



Options:

- A.
- B.
- C.

D.



Question 73

In a given code SISTER is coded as 535301 . UNCLE as 84670 and BOY as 129 . How is RUSTIC written in that code?

Options:

- A. 633185
- B. 185336
- C. 363815
- D. 581363

Question 74

Daya has a brother, Anil. Daya is the son of Chandra. Bimal is Chandra's father. In terms of relationship, what is Anil of Bimal?

Options:

- A. Son
- B. Grandson
- C. Brother
- D. Grandfather

Question 75

Find the odd word pair among the given four word pairs.

Options:

- A. Error : Accurate
- B. Careless: Casual
- C. Strength : Lethargy
- D. Gloomy: Cheerful

Question 76

Which letter will come at the place of question mark (?)

Options:

- A. U
- B. V
- C. W
- D. X

Question 77

Arrange the following words as per order in the dictionary.

1. Flunching
2. Fluntlock
3. Flunpites
4. Fluntlocks
5. Flunchers

Options:

- A. 1, 5, 2, 4, 3
- B. 5, 1, 2, 4, 3
- C. 5, 1, 3, 2, 4
- D. 5, 1, 3, 4, 2

Question 78

Two statements are given followed by three conclusions numbered I, II and III. Assuming the statements to be true, even if they seem to be at variance with commonly known facts, decide which of the conclusions logically follow(s) from the statements.

Statements:

All utensils are spoons.

All bowls are spoons.

Conclusions:

I. No utensil is a bowls.

II. Some utensils are bowls

III. No spoon is a utensil.

Options:

- A. Only conclusions I follows
- B. Conclusions I and III follow
- C. Either conclusion I or II follows
- D. Only conclusion III follows

Question 79

In this question, a word has been given following by four other words, one of which cannot be formed by using the letters of the given word. Find this word.

'CHEMOTHERAPY'

Options:

- A. HECTARE
- B. MOTHER
- C. THEATER
- D. FATHER

Question 80

Which one set of letters when sequentially placed at the gaps in the given letter series would complete it?

fgg ____ gff ____ f ____ gfg ____ fgfo

Options:

- A. fggf
- B. ccfc
- C. fgfg
- D. ffgg

Question 81

Select the option in which the numbers are related in the same way as are the numbers in the given set.

(9, 217, 8)

Options:

- A. (4, 37, 3)
- B. (2, 76, 5)
- C. (5, 625, 6)
- D. (3, 49, 2)

Question 82

Find the next term in the following series: X24C, V22E, T20G, _____

Options:

- A. RI 19
- B. R19I
- C. R18I
- D. RI 18

Question 83

In the following question, Select the related number that will correct the place of question mark.

108 : 11664 :: 112 : ?

Options:

- A. 12504
- B. 12544
- C. 13644
- D. 17644

Question 84

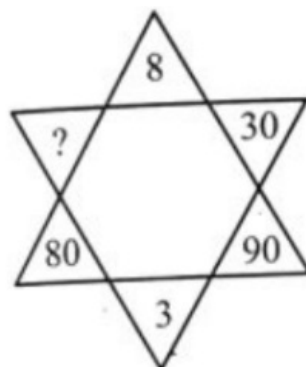
Which number pair is odd among the given four number Pair

Options:

- A. 123 – 321
- B. 456 – 654
- C. 789 – 978
- D. 678 – 876

Question 85

In the questions, select the missing number from the given responses.



Options:

- A. 20
- B. 15
- C. 40
- D. 10

Question 86

Find the Missing Number: 2, 12, 36, 80, 150, ?

Options:

- A. 195
- B. 210
- C. 252
- D. 258

Question 87

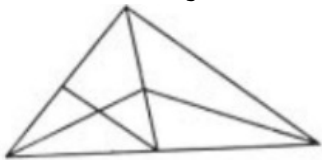
If 'when' means ' $\times$ ', 'you' means ' $\div$ ', 'come' means '-' and 'will' means '+', then what will be the value of " 8 when 12 will 16 you 2 come 10" = ?

Options:

- A. 45
- B. 94
- C. 96
- D. 112

Question 88

How many triangles are there in the following figure?



Options:

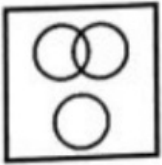
- A. 11
- B. 13
- C. 9
- D. 15

Question 89

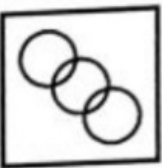
Identify the Venn diagram that best represents the relationship among classes given below. Profit, dividend and Bonus

Options:

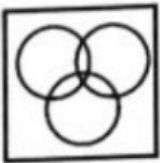
A.



B.



C.

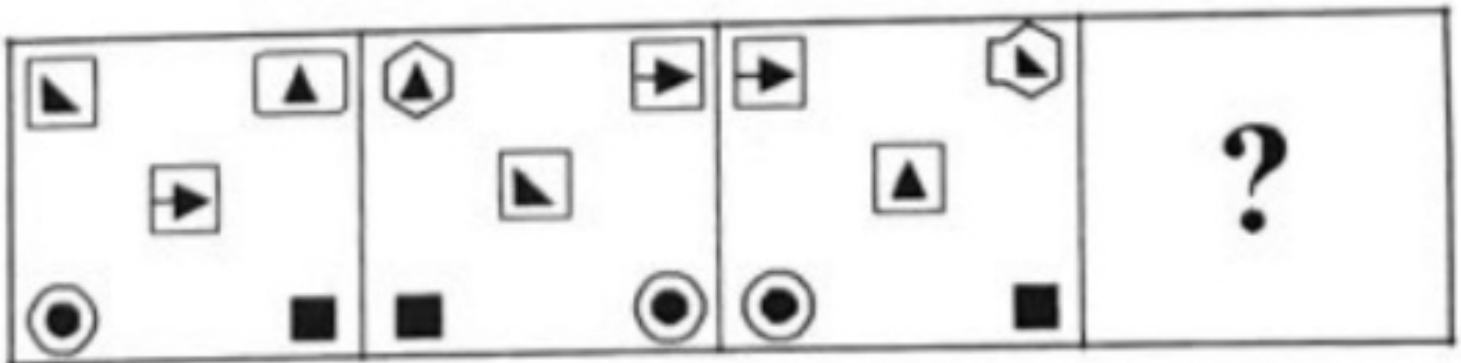


D.



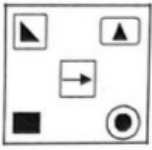
Question 90

Select the figure from among the given options that can replace the question mark (?) in the following series.

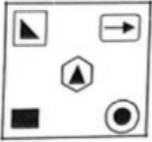


Options:

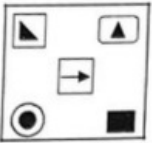
A.



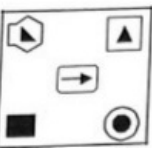
B.



C.



D.



Question 91

If $\sec^2 \theta = \frac{4}{3}$, then the general value of θ is

Options:

A. $2n\pi \pm \frac{\pi}{6}$

B. $n\pi \pm \frac{\pi}{6}$

C. $2n\pi \pm \frac{\pi}{3}$

D. $n\pi \pm \frac{\pi}{3}$

Question 92

Number of words from the letters of the words BHARAT in which B and H will never come together is

Options:

A. 210

B. 240

C. 422

D. 400

Question 93

The ratio in which the YZ-plane divide the line segment formed by joining the points $(-2, 4, 7)$ and $(3, -5, 8)$ is $2 : m$. The value of m is

Options:

A. 2

B. 3

C. 4

D. 1

Question 94

A set A has 3 elements and another set B has 6 elements. Then

Options:

A. $3 \leq n(A \cup B) \leq 6$ B. $3 \leq n(A \cup B) \leq 9$ C. $6 \leq n(A \cup B) \leq 9$ D. $0 \leq n(A \cup B) \leq 9$

Question 95

For all $n \in \mathbb{N}$, the sum of $\frac{n^5}{5} + \frac{n^3}{3} + \frac{7n}{15}$ is

Options:

A. a negative integer

B. a whole number

C. a real number

D. a natural number

Question 96

The roots of the given equation $(p - q)x^2 + (q - r)x + (r - p) = 0$ are :

Options:

A. $\frac{p-q}{r-p}, 1$

B. $\frac{q-r}{p-q}, 1$

C. $\frac{r-p}{p-q}, 1$

D. None of these

Question 97

What is the angle between the two straight lines $y = (2 - \sqrt{3})x + 5$ and $y = (2 + \sqrt{3})x - 7$?

Options:

A. 60°

B. 45°

C. 30°

D. 15°

Question 98

The range of the function $f(x) = \sqrt{3x^2 - 4x + 5}$ is

Options:

A. $\left(-\infty, \sqrt{\frac{11}{3}}\right]$

B. $\left(-\infty, \sqrt{\frac{11}{5}}\right]$

C. $\left[\sqrt{\frac{11}{3}}, \infty\right)$

D. $\left(\sqrt{\frac{11}{5}}, \infty\right)$

Question 99

If $f(x) = \frac{x}{\sqrt{1+x^2}}$, then $(f \circ f)(x)$ is

Options:

A. $\frac{3x}{\sqrt{1+x^2}}$

B. $\frac{x}{\sqrt{1+3x^2}}$

C. $\frac{3x}{\sqrt{1-x^2}}$

D. None of these

Question 100

The derivative of e^{x^3} with respect to $\log x$ is

Options:

A. e^{x^3}

B. $3x^2 e^{x^3}$

C. $3x^3 e^{x^3}$

D. $3x^3 e^{x^3} + 3x^2$

Question 101

If the coordinates of the points A and B be (3, 3) and (7, 6), then the length of the portion of the line AB intercepted between the axes is

Options:

A. $\frac{5}{4}$

B. $\frac{\sqrt{10}}{4}$

C. $\frac{\sqrt{13}}{3}$

D. None of these

Question 102

Solution of $2^x + 2^{|x|} \geq 2\sqrt{2}$ is

Options:

A. $(-\infty, \log_2(\sqrt{2} + 1))$

B. $(0, \infty)$

C. $\left(\frac{1}{2}, \log_2(\sqrt{2} - 1)\right)$

D. $(-\infty, \log_2(\sqrt{2} - 1)] \cup \left[\frac{1}{2}, \infty\right)$

Question 103

If $y = \sqrt{\left(\frac{1 + \cos 2\theta}{1 - \cos 2\theta}\right)}$, then $\frac{dy}{d\theta}$ at $\theta = \frac{3\pi}{4}$ is :

Options:

A. -2

B. 2

C. ± 2

D. None of these

Question 104

The number of solutions of $\frac{dy}{dx} = \frac{y+1}{x-1}$, when $y(1) = 2$ is

Options:

A. none

B. one

C. two

D. infinite

Question 105

The probability of getting sum more than 7 when a pair of dice are thrown is:

Options:

A. $\frac{7}{36}$

B. $\frac{5}{12}$

C. $\frac{7}{12}$

D. None of these

Question 106

The probability that a card drawn from a pack of 52 cards will be a diamond or king is:

Options:

A. $\frac{1}{52}$

B. $\frac{2}{13}$

C. $\frac{4}{13}$

D. $\frac{1}{13}$

Question 107

If $A = \begin{bmatrix} 0 & 2 \\ 3 & -4 \end{bmatrix}$ and $kA = \begin{bmatrix} 0 & 3a4 \\ 2b & 2 \end{bmatrix}$, then the values of k, a and b respectively are:

Options:

A. $-6, -12, -18$

B. $-6, -4, -9$

C. $-6, 4, 9$

D. $-6, 12, 18$

Question 108

If the eccentricity and length of latus rectum of a hyperbola are $\frac{\sqrt{13}}{3}$ and $\frac{10}{3}$ units respectively, then what is the length of the transverse axis?

Options:

- A. $\frac{7}{2}$ unit
- B. 12 unit
- C. $\frac{15}{2}$ unit
- D. $\frac{15}{4}$ unit

Question 109

If the sum of an infinite GP $a, ar, ar^2, ar^3, \dots$ is 15 and the sum of the squares of its each term is 150, then the sum of $ar^2, ar^4, ar^6, \dots$ is :

Options:

- A. $\frac{5}{2}$
- B. $\frac{1}{2}$
- C. $\frac{25}{2}$
- D. $\frac{9}{2}$

Question 110

The interval in which the function $f(x) = \frac{4x^2 + 1}{x}$ is decreasing is :

Options:

- A. $\left(-\frac{1}{2}, \frac{1}{2}\right]$
- B. $\left[-\frac{2}{3}, \frac{2}{3}\right]$
- C. $(-1, 1)$
- D. $[-1, 1]$

Question 111

If $\int \frac{e^x(1 + \sin x) dx}{1 + \cos x} = e^x f(x) + C$, then $f(x)$ is equal to

Options:

A. $\sin \frac{x}{2}$

B. $\cos \frac{x}{2}$

C. $\tan \frac{x}{2}$

D. $\log \frac{x}{2}$

Question 112

The curve given by $x + y = e^{xy}$ has a tangent parallel to the Y-axis at the point

Options:

A. (0, 1)

B. (1, 0)

C. (1, 1)

D. None of these

Question 113

The area enclosed between the curve $y = \log_e(x + e)$ and the coordinate axes is

Options:

A. 1

B. 2

C. 3

D. 4

Question 114

If $\vec{a} = \hat{i} + \hat{j} + \hat{k}$, $\vec{a} \cdot \vec{b} = 1$ and $\vec{a} \times \vec{b} = \vec{j} - \vec{k}$, then $\vec{b}$ is

Options:

- A. $\hat{i} - \hat{j} + \hat{k}$
- B. $2\hat{j} - \hat{k}$
- C. $2\hat{i}$
- D. $\hat{i}$

Question 115

$\lim_{x \rightarrow 0} \frac{|\sin x|}{x}$ is equal to

Options:

- A. 1
- B. -1
- C. Does not exist
- D. None of these

Question 116

The lines $\frac{x-2}{1} = \frac{y-3}{1} = \frac{z-4}{-k}$ and $\frac{x-1}{k} = \frac{y-4}{2} = \frac{z-5}{1}$ are coplanar if

Options:

- A. $k = 3$ or -2
- B. $k = 0$ or -1
- C. $k = 1$ or -1
- D. $k = 0$ or -3

Question 117

Negation of the Boolean expression $p \Leftrightarrow (q \Rightarrow p)$ is

Options:

- A. $(\sim p) \wedge q$
- B. $(p) \wedge (\sim q)$
- C. $(\sim p) \vee (\sim q)$
- D. $(\sim p) \wedge (\sim q)$

Question 118

The maximum value of $z = 5x + 2y$ subject to constraints $x + y \leq 7$, $x + 2y \leq 10$, $x, y \geq 0$

Options:

- A. 10
- B. 26
- C. 35
- D. 70

Question 119

Find the mean deviation about the mean for the data 4, 7, 8, 9, 10, 12, 13, 17

Options:

- A. 3
- B. 24
- C. 10
- D. 8

Question 120

Bag P contains 6 red and 4 blue balls and bag Q contains 5 red and 6 blue balls. A ball is transferred from bag P to bag Q and then a ball is drawn from bag Q. What is the probability that the ball drawn is blue?

Options:

- A. $\frac{7}{15}$
- B. $\frac{8}{15}$
- C. $\frac{4}{19}$
- D. $\frac{8}{19}$

Question 121

$\tan^{-1}\left(\frac{1}{4}\right) + \tan^{-1}\left(\frac{2}{9}\right)$ is equal to

Options:

A. $\frac{1}{2}\cos^{-1}\left(\frac{3}{5}\right)$

B. $\frac{1}{2}\sin^{-1}\left(\frac{3}{5}\right)$

C. $\frac{1}{2}\tan^{-1}\left(\frac{3}{5}\right)$

D. $\tan^{-1}\left(\frac{1}{2}\right)$

Question 122

The middle term in the expansion of $\left(\frac{10}{x} + \frac{x}{10}\right)^{10}$ is

Options:

A. ${}^{10}C_5$

B. ${}^{10}C_6$

C. ${}^{10}C_5 \frac{1}{x^{10}}$

D. ${}^{10}C_5 x^{10}$

Question 123

The equation of a common tangent to the parabolas $y = x^2$ and $y = -(x - 2)^2$ is

Options:

A. $y = 4(x - 2)$

B. $y = 4(x - 1)$

C. $y = 4(x + 1)$

D. $y = 4(x + 2)$

Question 124

A circle touches both the y-axis and the line $x + y = 0$. Then the locus of its center is

Options:

A. $y = \sqrt{2}x$

B. $x = \sqrt{2}y$

C. $y^2 - x^2 = 2xy$

D. $x^2 - y^2 = 2xy$

Question 125

The function $f(x) = \tan^{-1}(\sin x + \cos x)$ is an increasing function in

Options:

A. $\left(\frac{\pi}{4}, \frac{\pi}{2}\right)$

B. $\left(-\frac{\pi}{2}, \frac{\pi}{4}\right)$

C. $\left(0, \frac{\pi}{2}\right)$

D. $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

Question 126

$i^{57} + \frac{1}{i^{25}}$ when simplified has the value

Options:

A. 0

B. $2i$

C. $-2i$

D. 2

Question 127

If one root of the equation $x^2 + px + 12 = 0$ is 4 , while the equation $x^2 + px + q = 0$ has equal roots, then the value of ' q ' is

Options:

- A. 4
- B. 12
- C. 3
- D. $\frac{49}{4}$

Question 128

$\int \frac{x+3}{(x+4)^2} e^x dx$ is equal to

Options:

- A. $e^x \left(\frac{1}{x+4} \right) + C$
- B. $e^{-x} \left(\frac{1}{x+4} \right) + C$
- C. $e^{-x} \left(\frac{1}{x-4} \right) + C$
- D. $e^{2x} \left(\frac{1}{x-4} \right) + C$

Question 129

The shortest distance between the lines $\frac{x-3}{2} = \frac{y-2}{3} = \frac{z-1}{-1}$ and $\frac{x+3}{2} = \frac{y-6}{1} = \frac{z-5}{3}$ is :

Options:

- A. $\frac{18}{\sqrt{5}}$
- B. $\frac{22}{3\sqrt{5}}$
- C. $\frac{46}{3\sqrt{5}}$
- D. $6\sqrt{3}$

Question 130

If $P(B) = \frac{3}{5}$, $P(A | B) = \frac{1}{2}$ and $P(A \cup B) = \frac{4}{5}$, then $P(A \cup B)' + P(A' \cup B) =$

Options:

A. $\frac{1}{5}$

B. $\frac{4}{5}$

C. $\frac{1}{2}$

D. 1