Question no. 1

A S.H.M. has amplitude 'a' and time period T. The maximum velocity will be

(1) $\frac{4a}{T}$

(2) $\frac{2a}{T}$

(3) $2\pi\sqrt{\frac{a}{T}}$

(4) $\frac{2\pi a}{T}$

Question no. 2

A particle is vibrating in a simple harmonic motion with an amplitude of 4 cm. At what displacement from the equilibrium position, is its energy half potential and half kinetic.

(1) 1 cm

(2) $\sqrt{2}$ cm

(3) 3 cm

(4) $2\sqrt{2}$ cm

Question no. 3

A particle starts simple harmonic motion from the mean position. Its amplitude is a and total energy E. At one instant its kinetic energy is 3E/4. Its displacement at that instant is

(1) $\frac{a}{\sqrt{2}}$ (2) $a/2$

(3) $\frac{a}{\sqrt{3/2}}$ (4) $a/\sqrt{3}$

Question no. 4

Equation of a particle executing SHM is $\frac{2d^2x}{dt^2} + 32x = 0$, then the time period of the body particle is

(1) Zero (2) π

(3) 2π (4) $\frac{\pi}{2}$

Question no. 5

A particle is subjected to two SHMs, $x_1 = A_1 \sin\omega t$ and $x_2 = A_2 \sin\left(\omega t + \frac{\pi}{4}\right)$. The resultant SHM will have an amplitude of

(1) $\frac{A_1 + A_2}{2}$

(2) $\sqrt{A_1^2 + A_2^2}$

(3) $\sqrt{A_1^2 + A_2^2 + \sqrt{2}A_1A_2}$

(4) A_1A_2

Question no. 6

A simple harmonic motion has an amplitude A and time period T. The time required by it to travel from $x = A$ to $x = A/2$ is:

(1) T/6 (2) T/4

(3) T/3 (4) T/2

Question no. 7

The displacement of a particle is represented by the equation $y = 3 \cos\left(\frac{\pi}{4} - 2\omega t\right)$. The motion of the particle is

(1) Simple harmonic with period $2\pi / \omega$

(2) Simple harmonic with period π / ω

(3) Periodic but not simple harmonic

(4) Non – periodic

Question no. 8

Particle is executing SHM along a straight line. Its velocities at distances x_1 and x_2 from the mean position are V_1 and V_2, respectively. Its time period is:–

(1) $2\pi\sqrt{\frac{x_2^2 - x_1^2}{v_1^2 - v_2^2}}$

(2) $2\pi\sqrt{\frac{v_1^2 + v_2^2}{x_1^2 + x_2^2}}$

(3) $2\pi\sqrt{\frac{v_1^2 - v_2^2}{x_1^2 - x_2^2}}$

(4) $2\pi\sqrt{\frac{x_1^2 + x_2^2}{v_1^2 + v_2^2}}$

Question no. 9

Two waves are represented by (in same medium)

$y_1 = 5 \sin 2\pi (75t - 0.25x)$

$y_2 = 10 \sin 2\pi (150t - 0.50\,x)$

The intensity ratio $\frac{I_1}{I_2}$ of the two waves is

(1) 1 : 2 (2) 1 : 4

(3) 1 : 8 (4) 1 : 16

Question no. 10

The equation of a wave travelling on a string is $y_F = 4 \sin\left[\frac{\pi}{2}\left(8t - \frac{x}{8}\right)\right]$, where x, y are in cm and t is in second. The velocity of the wave is :–

(1) 64 cm/s in – x –direction

(2) 32 cm/s in – x –direction

(3) 32 cm/s in + x –direction

(4) 64 cm/s in + x –direction

Question no. 11

Two vibrating tuning forks produce progressive wave given by $y_1 = 6 \sin 300\pi t$ and $y_2 = 8 \sin 304\pi t$.

Number of beats produced per minute is:

(1) 2

(2) 4

(3) 120

(4) 240

Question no. 12

The ratio of the velocity of sound in hydrogen to that in helium at the same temperature is

(1) $\sqrt{\frac{5}{42}}$

(2) $\sqrt{\frac{5}{21}}$

(3) $\frac{\sqrt{42}}{5}$

(4) $\frac{\sqrt{21}}{5}$

Question no. 13

Which of the following statements is correct?

(1) The distance between any two consecutive antinodes or nodes is $\frac{\lambda}{4}$.

(2) The distance between a node and adjoining antinode is $\frac{\lambda}{4}$.

(3) Node is formed at open end.

(4) antinode is formed at closed end.

Question no. 14

In an organ pipe of length L open at both ends, the fundamental mode has a frequency

(where v is the speed of sound in air)

(1) $\frac{v}{2L}$ and only odd harmonics are present.

(2) $\frac{v}{2L}$ and only even harmonics are present.

(3) $\frac{v}{2L}$ and all harmonics are present.

Question no. 15

Which of the following statements is true for wave motion?

(1) Mechanical transverse waves can propagate through all mediums.

(2) Longitudinal waves can propagate through solids only.

(3) Mechanical transverse waves can propagate through solids only.

(4) Longitudinal waves can propagate through vacuum.

Question no. 16

The volume of a metal sphere increases by 0.24% when its temperature is raised by 40°C. The coefficient of linear expansion of the metal is

(1) $2 \times 10^{-5}\ °C^{-1}$ (2) $6 \times 10^{-5}\ °C^{-1}$

(3) $18 \times 10^{-5}\ °C^{-1}$ (4) $1.2 \times 10^{-5}\ °C^{-1}$

Question no. 17

10g of ice at 0°C is mixed with 100g of water at 50° C in a calorimeter. The final temperature of the mixture is

(1) 31.2° C

(2) 32.8° C

(3) 36.7° C

(4) 38.2° C

Question no. 18

The triple point of carbon dioxide is 216.5 K the corresponding temperature on the celsius and Fahrenheit scale respectively are

(1) 56.45°C, – 69.61°F

(2) – 56.45°C, 69.61°F

(3) 56.45°C, 69.61°F

(4) – 56.45°C, – 69.61°F

Question no. 19

Consider a composite slab consisting of two different materials having equal thickness and thermal conductivities K and 2 K respectively.The equivalent thermal conductivity of the slab is

(1) $\frac{2}{3}K$

(2) $\sqrt{2}K$

(3) 3 K

(4) $\frac{4}{3}K$

Question no. 20

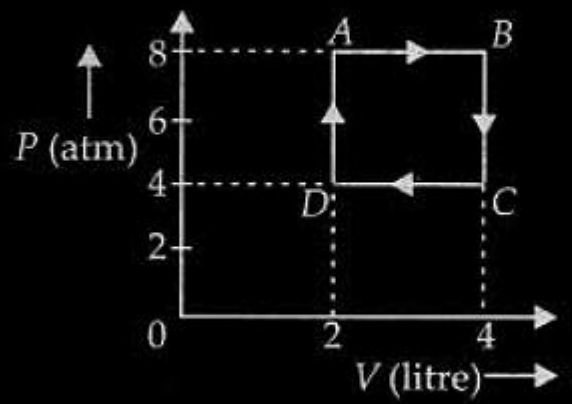
A rectangular body has maximum intensity wavelength λ_m at 2000 K. Its corresponding wavelength at 3000 K will be

(1) $\frac{3}{2}\lambda_m$ (2) $\frac{2}{3}\lambda_m$

(3) $\frac{16}{81}\lambda_m$ (4) $\frac{81}{16}\lambda_m$

Question no. 21

One mole of an ideal gas undergoes a cyclic process ABCDA as shown in the P–V diagram. The net work done in the process is



(1) 500 J

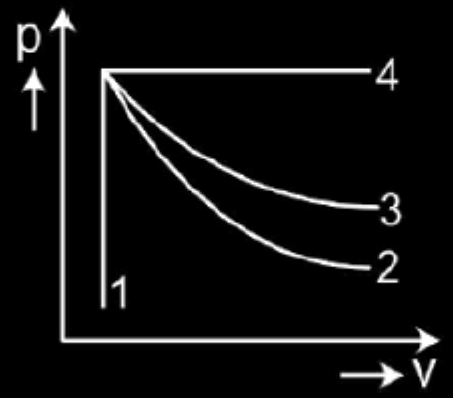
(2) 700 J

(3) 800 J

(4) 900 J

Question no. 22

An ideal gas undergoes four different processes from the same initial state as shown in P–V diagram. Four processes are adiabatic, isothermal, isobaric and isochoric. Out of 1, 2, 3 and 4 which one is adiabatic?



(1) 4 (2) 3

(3) 2 (4) 1

Question no. 23

At what temperature is the rms velocity of hydrogen molecule equal to that of an oxygen molecule at 47°C?

(1) 10 K (2) 20 K

(3) 30 K (4) 40 K

Question no. 24

Three mole of oxygen are mixed with two moles of helium. What will be the ratio of specific heats at constant pressure and constant volume for the mixture?

(1) 2.5 (2) 3.5

(3) 1.5 (4) 1

Question no. 25

The average energy per molecule of a triatomic gas at room temperature T is

(1) $3\ kT$

(2) $\frac{1}{2}kT$

(3) $\frac{3}{2}kT$

(4) $\frac{5}{2}kT$

Question no. 26

If a gas has n degrees of freedom then ratio of specific heats of gas is

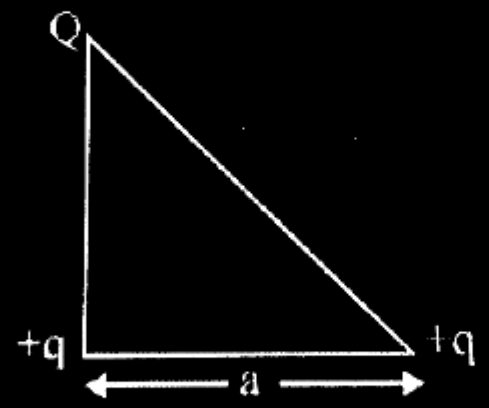
(1) $\frac{1+n}{2}$ (2) $1+\frac{1}{n}$

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

Question no. 27

Three charges Q, + q and +q are placed at the vertices of a right–angled isosceles triangle as shown.

The net electrostatic energy of the configuration is zero if Q is equal to



(1) $\frac{-q}{1+\sqrt{2}}$

(2) $\frac{-2q}{2+\sqrt{2}}$

(3) $-2q$

(4) $+q$

Question no. 28

Two metal wires of identical dimensions are connected in series. If σ_1 and σ_2 are the conductivities of the metals respectively, the effective conductivity of the combination is

(1) $\sigma_1 + \sigma_2$

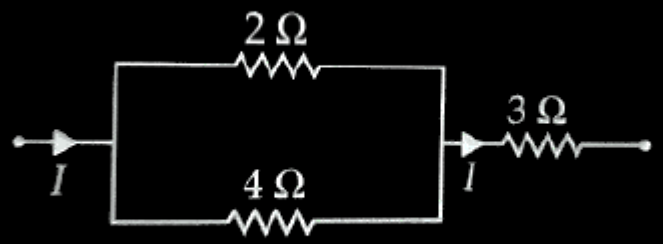
(2) $\frac{\sigma_1 + \sigma_2}{2}$

(3) $\sqrt{\sigma_1 \sigma_2}$

(4) $\frac{2\sigma_1 \sigma_2}{\sigma_1 + \sigma_2}$

Question no. 29

In the circuit shown in figure heat developed across 2Ω, 4Ω and 3Ω resistance are in the ratio of



(1) 2 : 4 : 3

(2) 8 : 4 : 12

(3) 4 : 8 : 27

(4) 8 : 4 : 27

Question no. 30

A proton, a deuteron and an α – particle with same kinetic energy enter perpendicularly in a uniform magnetic field, then the ratio of radii of their circular paths is

(1) $1:1:\sqrt{2}$

(2) $\sqrt{2}:1:1$

(3) $1:\sqrt{2}:1$

(4) $1:2:\sqrt{2}$

Question no. 31

A galvanometer coil has a resistance of 15 Ω and meter shows full scale deflection for current of 4 mA. To convert meter into a voltmeter of range 0 to 18 V, the required resistance is –

(1) 5885 Ω in series

(2) 4485 Ω in series

(3) 5885 Ω in parallel

(4) 4485 Ω in parallel

Question no. 32

A dipole of magnetic moment $\vec{M} = 30\hat{j}\left(A m^2\right)$ is placed along the y–axis in a uniform magnetic field $\vec{B} = \left(2\hat{i} + 5\hat{j}\right)$ T. The torque acting on it is

(1) $-40k$ N m (2) $-50k$ N m

(3) $-60k$ N m (4) $-70k$ N m

Question no. 33

A copper rod of length l rotates about its end with angular velocity ω in a uniform magnetic field B. The emf developed between the ends of the rod if the field is normal to the plane of rotation is

(1) $B\omega l^2$

(2) $\frac{1}{2} B\omega l^2$

(3) $2\, B\omega l^2$

(4) $\frac{1}{4} B\omega l^2$

Question no. 34

A small square loop of wire of side l is placed inside a large square loop of wire of side L ($>>l$). The loops are coplanar and their centres coincide. What is the mutual inductance of the system?

(1) $2\sqrt{2}\frac{\mu_0}{\pi}\frac{l^2}{L}$

(2) $8\sqrt{2}\frac{\mu_0}{\pi}\frac{l^2}{L}$

(3) $2\sqrt{2}\frac{\mu_0}{2\pi}\frac{l^2}{L}$

(4) $2\sqrt{2}\frac{\mu_0 L^2}{\pi l}$

Question no. 35

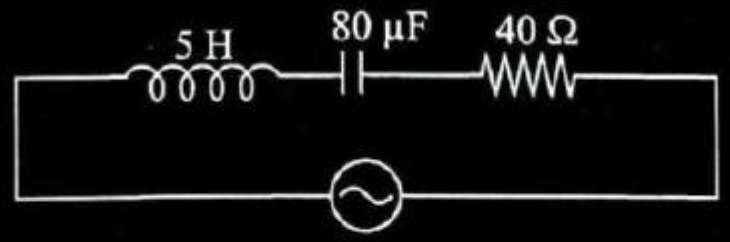
The Q factor of a series LCR circuit with L = 2 H, C = 32 μ F and R = 10 Ω is

(1) 15 (2) 20

(3) 25 (4) 30

Question no. 36

Figure shows a series LCR circuit connected to a variable frequency 230 V source.



The source frequency which drives the circuit in resonance is

(1) 4 Hz (2) 5 Hz

(3) 6 Hz (4) 8 Hz

Question no. 37

A step down transformer converts transmission line voltage from 11000 V to 220 V. The primary of the transformer is 60%. If the output power is 9 kW, then the input power will be

(1) 11 kW (2) 12 kW

(3) 14 kW (4) 15 kW

Question no. 38

If μ_0 be the permeability and ε_0 be the permittivity of a medium, then its refractive index is given by

(1) $\frac{1}{\sqrt{\mu_0\varepsilon_0}}$ (2) $\frac{1}{\mu_0\varepsilon_0}$

(3) $\sqrt{\mu_0\varepsilon_0}$ (4) $\mu_0\varepsilon_0$

Question no. 39

The de Broglie wavelength of a particle of kinetic energy K is λ. What will be the wavelength of the particle, if its kinetic energy is $\frac{K}{4}$?

(1) λ (2) 2λ

(3) $\frac{\lambda}{2}$ (4) 4λ

Question no. 40

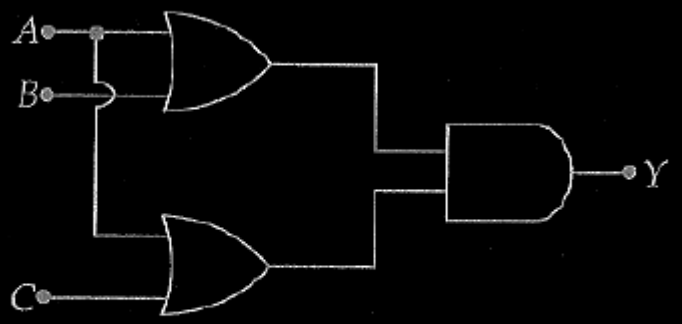
The mass of $^{7}_{3}\mathrm{Li}$ is 0.042 amu less than the sum of masses of its constituents. The binding energy per nucleon is

(1) 5.586 MeV (2) 10.522 MeV

(3) 2.433 MeV (4) 3.739 MeV

Question no. 41

The output of given logic circuit is



(1) $A \cdot (B + C)$

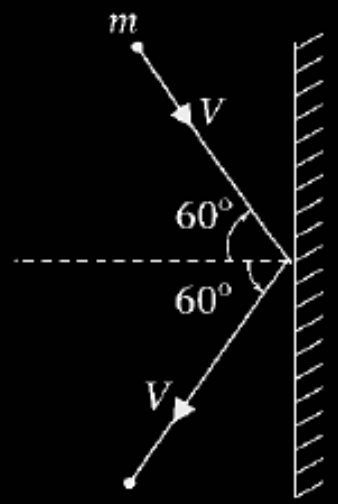
(2) $A \cdot (B \cdot C)$

(3) $(A + B) \cdot (A + C)$

(4) $A + B + C$

Question no. 42

A rigid ball of mass m strikes a rigid wall at 60° and gets reflected without loss of speed as shown in the figure. The value of impulse imparted by the wall on the ball will be



(1) mV

(2) 2 mV

(3) $\frac{mV}{2}$

(4) $\frac{mV}{3}$

Question no. 43

The coefficient of friction between the tyres and road is 0.1. The maximum speed with which a cyclist can take a circular turn of radius 3 m without skidding is (Take $g = 10\ m\ s^{-2}$)

(1) $\sqrt{15}\,ms^{-1}$ (2) $\sqrt{3}\,ms^{-1}$

(3) $\sqrt{30}\,ms^{-1}$ (4) $\sqrt{10}\,ms^{-1}$

Question no. 44

A cord of negligible mass is wound round the rim of a flywheel of mass 20 kg and radius 20 cm. A steady pull of 25 N is applied on the cord to drag it downward. The work done by the pull when 2 m of the cord is unwound is, if the rim was initially at the rest position–

(1) 20 J

(2) 25 J

(3) 45 J

(4) 50 J

Question no. 45

Match List– I with List–II

	List–I		List–II
A.	Moment of inertia of solid sphere of radius R about any tangent	I.	$\frac{5}{3}MR^2$
B.	Moment of inertia of hollow sphere of radius (R) about my tangent	II.	$\frac{7}{5}MR^2$
C.	Moment of inertia of circular ring of radius (R) about its diameter.	III.	$\frac{1}{4}MR^2$
D.	Moment of inertia of circular disc of radius (R) about any diameter	IV.	$\frac{1}{2}MR^2$

Choose the correct answer from the options given below.

(1) A–II, B–I, C–IV, D–III

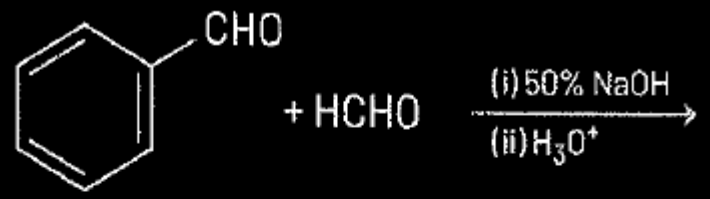
(2) A–I, B–II, C–IV, D–III

(3) A–II, B–I, C–III, D–IV

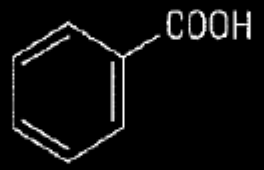
(4) A–I, B–II, C–III, D–IV

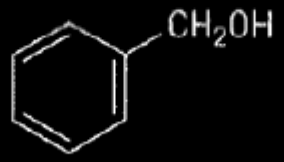
Question no. 46

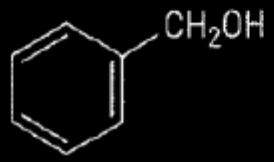
Major products of the following reaction are

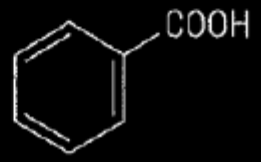


(1) CH_3OH and HCO_2H

(2) CH_3OH and 

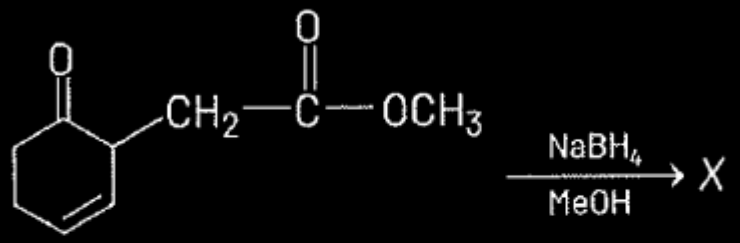
(3) HCOOH and 

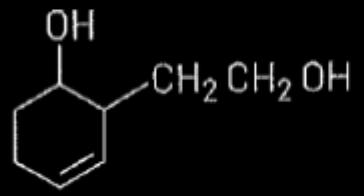
(4) 

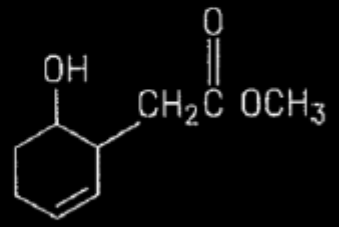
and 

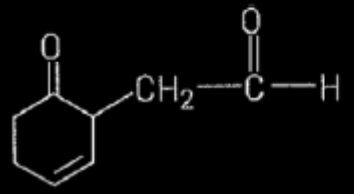
Question no. 47

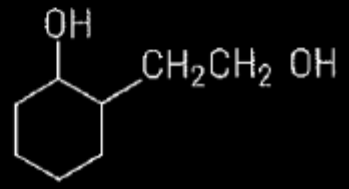
The major product 'X' formed in the following reaction is



(1) 

(2) 

(3) 

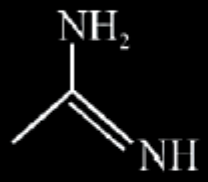
(4) 

Question no. 48

The increasing order of basicity of the following compounds is

I. 

II. 

III. 

IV. 

(1) I < II < III < IV

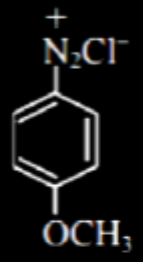
(2) II < I < III < IV

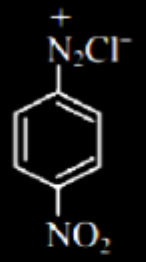
(3) II < I < IV < III

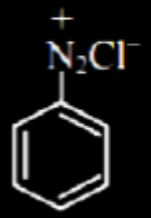
(4) IV < II < I < III

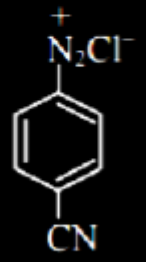
Question no. 49

The correct stability order of the following diazonium salt is

A. 

B. 

C. 

D. 

(1) A > B > C > D

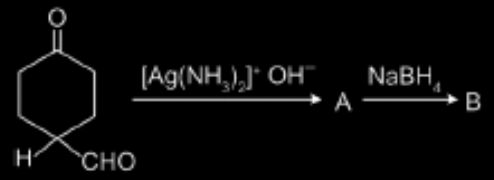
(2) A > C > D > B

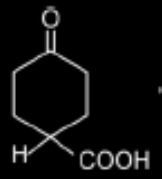
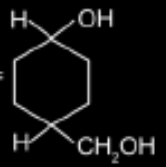
(3) C > A > D > B

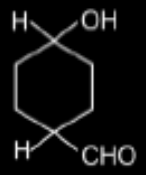
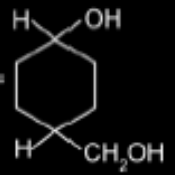
(4) C > D > B > A

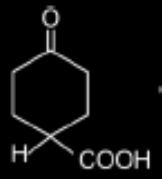
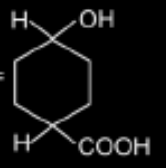
Question no. 50

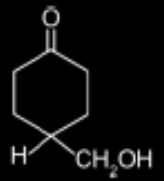
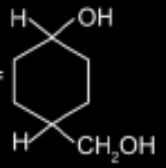
The products formed in the following reaction, A and B are



(1) A =  , B = 

(2) A =  , B = 

(3) A =  , B = 

(4) A =  , B = 

Question no. 51

A compound with molecular formula, C_4H_8O gives a positive haloform test and a 2, 4-DNP derivative. The compound is

(1) $CH_3CH_2CH_2CHO$ (2) $CH_3COCH_2CH_3$

(3) $(CH_3)_2CHCHO$ (4) All the above

Question no. 52

Which of the following reagents cannot be used to oxidize primary alcohols to aldehydes?

(1) Heat in the presence of Cu at 573 K.

(2) Pyridinium clorochromate

(3) CrO_3 in anhydrous medium

(4) $KMnO_4$ in acidic medium

Question no. 53

The correct order of the basic strength of following amines in aqueous medium is

(1) $CH_3NH_2 > (CH_3)_2NH > (CH_3)_3N$

(2) $CH_3NH_2 > (CH_3)_3NH > (CH_3)_2N$

(3) $(CH_3)_2NH > (CH_3)_3N > CH_3NH_2$

(4) $(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N$

Question no. 54

The correct increasing order of molecules in accordance with number of lone pair of electrons on central-atom is :

(1) $XeF_2 < H_2O < NH_3$

(2) $XeF_2 < NH_3 > H_2O$

(3) $NH_3 < H_2O < XeF_2$

(4) $H_2O = XeF_2 = NH_3$

Question no. 55

Match List-I with List-II.

	List-I		List-II
A.	Principal quantum Number	i.	Orientation of the orbital
B.	Azimuthal quantum Number	ii.	energy and size of orbital
C.	Magnetic quantum number	iii.	spin of electron
D.	Spin quantum number	iv.	shape of the orbital

(1) A – ii, B – iv, C – i, D – iii

(2) A – iv, B – ii, C – i, D – iii

(3) A – ii, B – i, C – iv, D – iii

(4) A – ii, B – iv, C – iii, D – i

Question no. 56

The vapour pressure of pure benzene is 640 mm of Hg. The vapour pressure of solution containing 2.5 gm substance in 39 gm. benzene is 600 mm of Hg then molecular mass of X will be

(1) 65.25

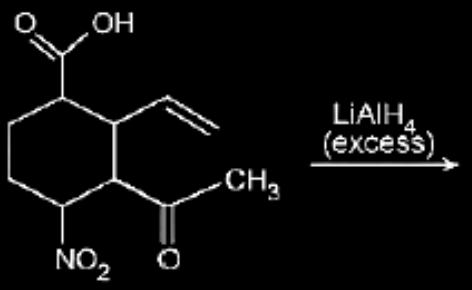
(2) 130

(3) 40

(4) 75

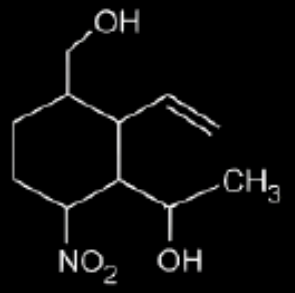
Question no. 57

The major product obtained in the following reaction is

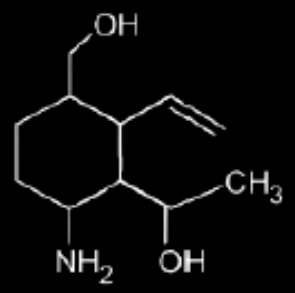


$LiAlH_4$ (excess) →

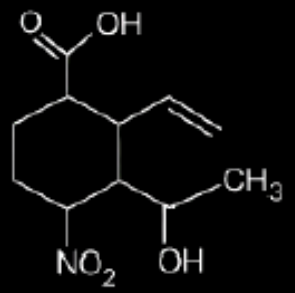
(1)



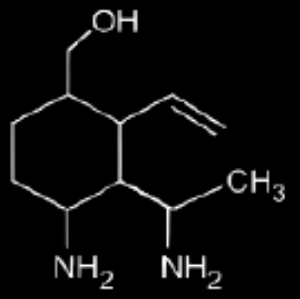
(2)



(3)

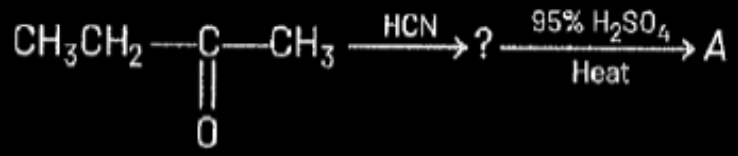


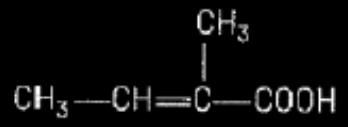
(4)

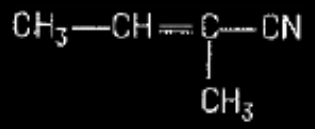


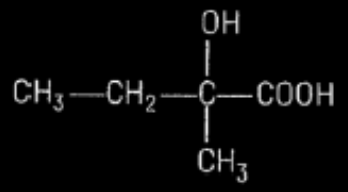
Question no. 58

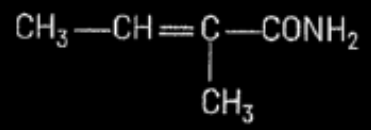
The final product 'A' in the following reaction sequence will be–



(1) 

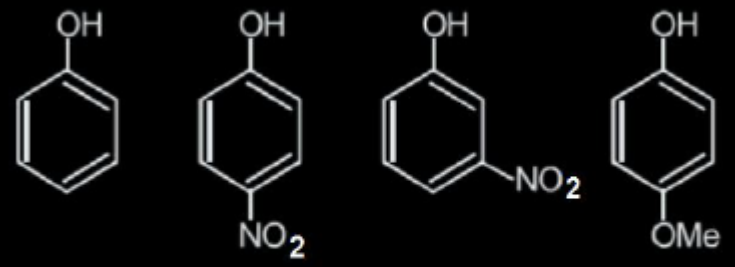
(2) 

(3) 

(4) 

Question no. 59

The increasing order of the pK_a values of the following compounds is



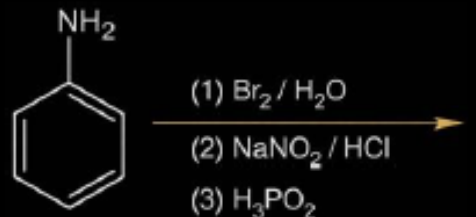
A B C D

(1) D < A < C < B (2) B < C < A < D

(3) C < B < A < D (4) B < C < D < A

Question no. 60

Identify the major product formed in the following sequence of reactions.

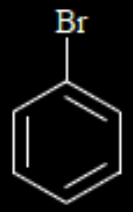


(1) Br_2 / H_2O

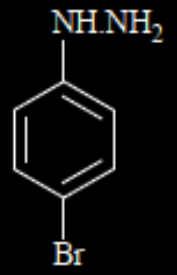
(2) $NaNO_2 / HCl$

(3) H_3PO_2

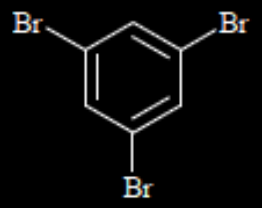
(1)



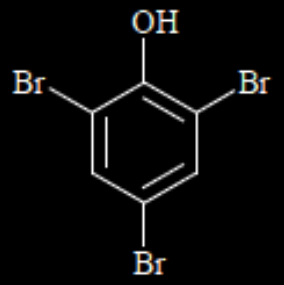
(2)



(3)

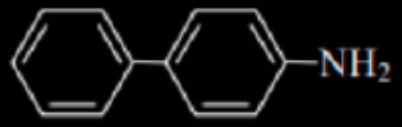


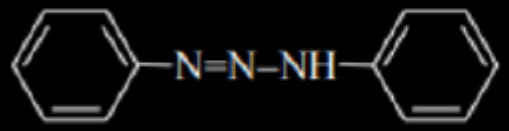
(4)

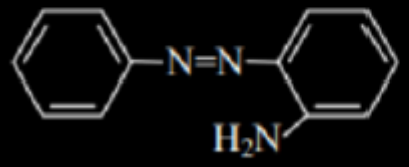


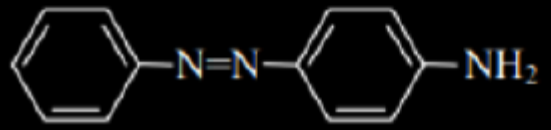
Question no. 61

Benzene diazonium chloride on reaction with aniline in the presence of dilute hydrochloric acid gives

(1) 

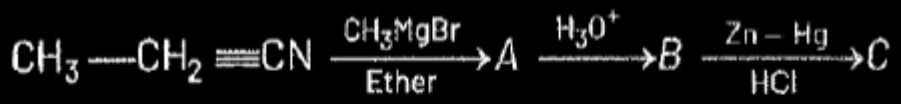
(2) 

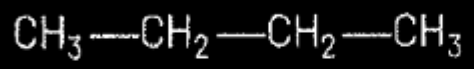
(3) 

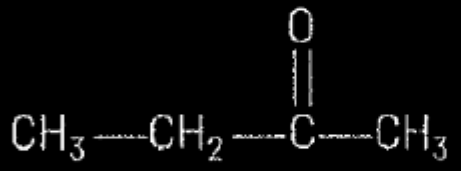
(4) 

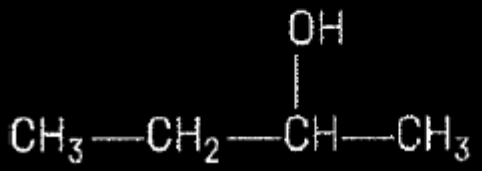
Question no. 62

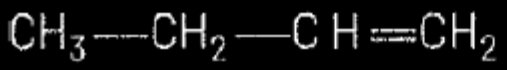
The correct structure of C is



(1) 

(2) 

(3) 

(4) 

Question no. 63

Which of the following will not undergo Hell-Volhard Zelinsky (HVZ) reaction?

(1) $HCOOH$ (2) CH_3COOH

(3) CH_3CH_2COOH (4) $CH_3CHBrCOOH$

Question no. 64

If aniline is treated with 1 : 1 mixture of conc. HNO_3 and conc. H_2SO_4, p-nitroaniline and m-nitroaniline are formed nearly in equal amounts. This is due to

(1) m-directing property of $-NH_2$ group

(2) Protonation of $-NH_2$ which causes deactivation of benzene ring.

(3) m and p directing property of $-NH_2$ group

(4) Isomerisation of some p-nitroaniline into m-nitroaniline.

Question no. 65

If the molecular axis is Z then which of the following overlapping is not possible?

(1) $p_z + p_z = \sigma$ bond (2) $p_x + p_y = \pi$ bond

(3) $p_x + p_x = \pi$ bond (4) $p_y + p_y = \pi$ bond

Question no. 66

The hybridization of carbon atoms in $C_2 - C_3$ single bond of $\overset{4}{HC} \equiv \overset{3}{C} - \overset{2}{CH} = \overset{1}{CH_2}$ is :

(1) $sp^3 - sp^2$

(2) $sp^2 - sp$

(3) $sp - sp^2$

(4) $sp^3 - sp$

Question no. 67

What is the potential of half-cell consisting of zinc electrode in 0.01 M $ZnSO_4$ solution at 25°C. $\left(E^{o}_{ox} = 0.763V\right)$

(1) 0.8221 V (2) 8.221 V

(3) 0.5282 V (4) 9.282 V

Question no. 68

Equal masses of H_2, O_2 and methane have been taken in container of volume V at temperature 27°C in identical conditions. The ratio of the volumes of gases H_2 : O_2 : methane would be

(1) 8 : 16 : 1

(2) 16 : 8 : 1

(3) 16 : 1 : 2

(4) 8 : 1 : 2

Question no. 69

The increasing order of the rate of HCN addition to compounds A-D is

A. HCHO

B. CH_3COCH_3

C. $PhCOCH_3$

D. PhCOPh

(1) A < B < C < D

(2) D < B < C < A

(3) D < C < B < A

(4) C < D < B < A

Question no. 70

Phenyl magnesium bromide reacts with methanol to give.

(1) a mixture of anisole and Mg(OH)Br

(2) a mixture of benzene and Mg(OMe)Br

(3) a mixture of toluene and Mg(OH)Br

(4) a mixture of phenol and Mg(Me)Br

Question no. 71

The major product of following reaction is

$$R-C\equiv N \xrightarrow[H_2O]{AlH(i\text{-}Bu)_2} ?$$

(1) RCHO

(2) $RCONH_2$

(3) RCOOH

(4) RCH_2NH_2

Question no. 72

For the following amines what will be the correct order for basicity.

A. phenyl methanamine B. N, N-dimethylaniline

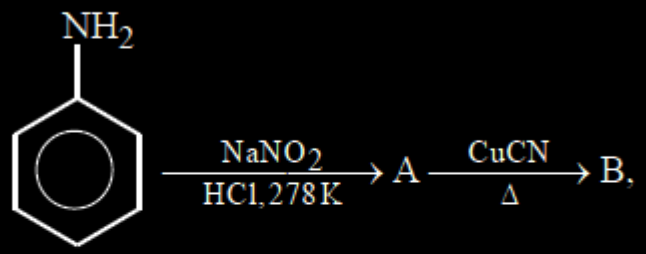
C. N-methyl aniline D. Benzenamine

(1) A > C > B > D (2) D > C > B > A

(3) D > B > C > A (4) A > B > C > D

Question no. 73

In the following chemical reaction, compounds A and B respectively are



(1) fluorobenzene and phenol

(2) benzene diazonium chloride and benzonitrile

(3) nitrobenzene and chlorobenzene

(4) phenol and bromobenzene

Question no. 74

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

Assertion (A) : Synthesis of ethyl phenyl ether may be achieved by Williamson synthesis.

Reason (R) : Reaction of bromobenzene with sodium ethoxide yields ethyl phenyl ether.

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

(1) Both (A) and (R) true but (R) is not the correct explanation of (A).

(2) (A) is true but (R) is false.

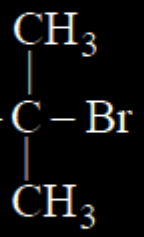
(3) (A) is false but (R) is true.

(4) Both (A) and (R) true but (R) is correct explanation of (A).

Question no. 75

Which of the following compound most reactive for S_N2 reaction?

(1) $CH_3 - CH_2 - CH_2 - Br$

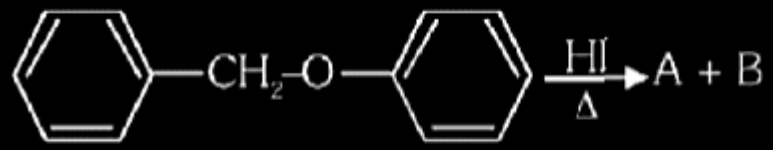
(2) 

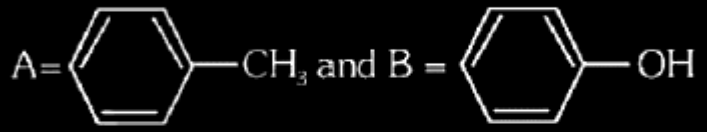
(3) $CH_3 - CH - CH_2 - Br$

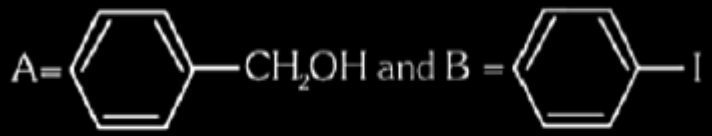
(4) $CH_3 - CH_2 - Br$

Question no. 76

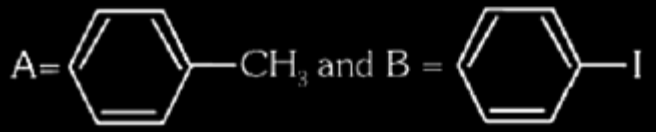
Consider the following reaction and Identify products A and B.



(1) 

(2) 

(3) 

(4) 

Question no. 77

The term invert sugar refers to an equimolar mixture of :

(1) D–glucose and D–galactose

(2) D–glucose and D–fructose

(3) D–glucose and D–mannose

(4) D–glucose and D–ribose

Question no. 78

Which pair of ions has the same shape?

(1) CO_3^{2-} and NO_3^- (2) CO_3^{2-} and SO_3^{2-}

(3) NO_3^- and ClO_3^- (4) CO_3^{2-} and ClO_3^-

Question no. 79

In the Arrhenius plot of $\ell n\ k$ vs $\frac{1}{T}$, a linear plot is obtained with a slope of -2×10^4 K. The energy of activation of the reaction (in kJ mol^{-1}) is

(1) 83 (2) 166

(3) 249 (4) 332

Question no. 80

In the following reaction product C will be–

$$CH_3COOH \xrightarrow{LiAlH_4} A \xrightarrow{PCl_5} B \xrightarrow{alc.KOH} C$$

(1) acetaldehyde

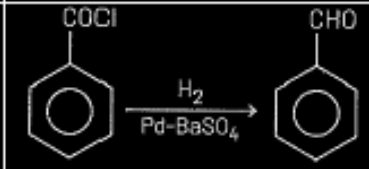
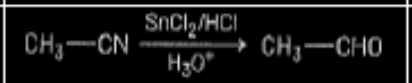
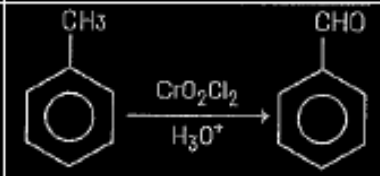
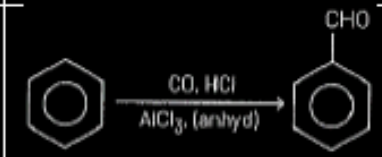
(2) acetylene

(3) ethylene

(4) acetylchoride

Question no. 81

Match List I with List II.

	List I		List II
A.		i.	Gattermann Koch reaction
B.		ii.	Etard reaction
C.		iii.	Stephen reaction
D.		iv.	Rosenmund reaction

Choose the correct answer from the options given below.

(1) A – iv, B – iii, C – ii, D – i

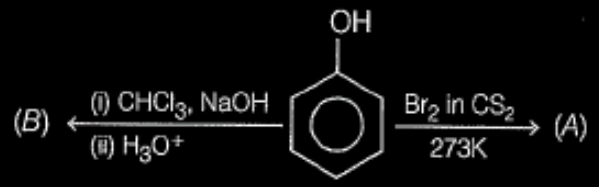
(2) A – i, B – ii, C – iii, D – iv

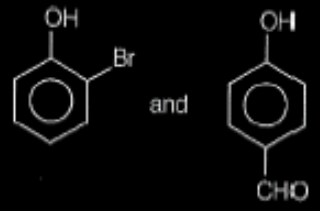
(3) A – ii, B – iii, C – iv, D – i

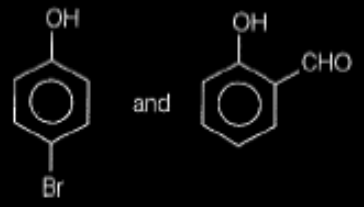
(4) A – iii, B – ii, C – i, D – iv

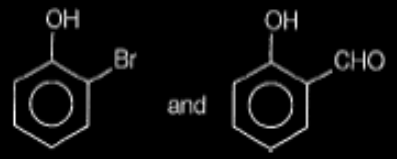
Question no. 82

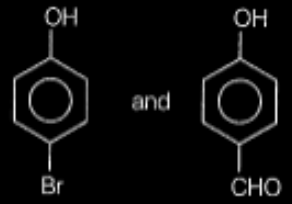
Identify the major products A and B respectively in the following reactions of phenol.



(1) 

(2) 

(3) 

(4) 

Question no. 83

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

Assertion (A): Gabriel phthalimide synthesis can not be used to prepare aromatic primary amines.

Reason (R): Aryl halides do not undergo nucleophilic substitution reaction.

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

(1) Both (A) and (R) true but (R) is not the correct explanation of (A).

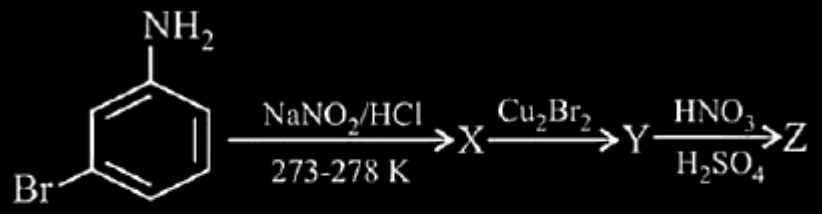
(2) (A) is false but (R) is true.

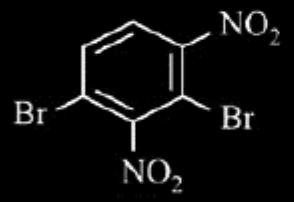
(3) Both (A) and (R) true but (R) is correct explanation of (A).

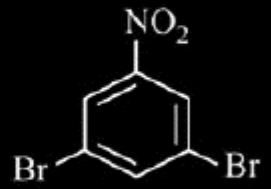
(4) (A) is true but (R) is false.

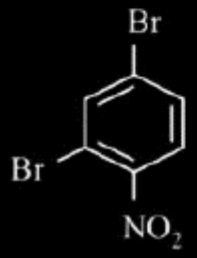
Question no. 84

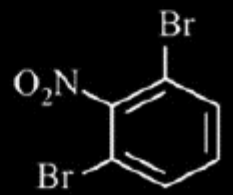
The major product Z obtained in the following reaction scheme is



(1) 

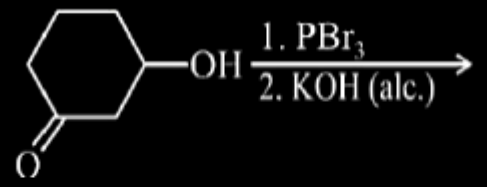
(2) 

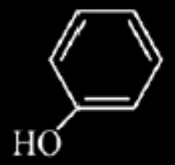
(3) 

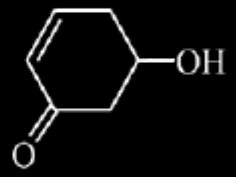
(4) 

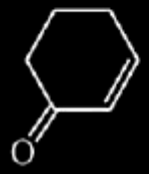
Question no. 85

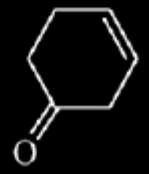
The major product of the following reaction is



(1) 

(2) 

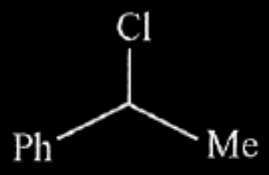
(3) 

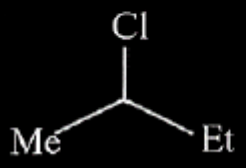
(4) 

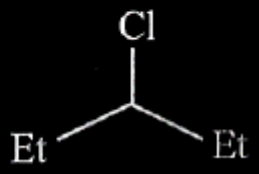
Question no. 86

Which is most reactive for S_Nl reaction–

(1) 

(2) 

(3) 

(4) 

Question no. 87

Given below are two statements:

Statements I : In Lucas test, primary, secondary and tertiary alcohols are distinguished on the basis of their reactivity with conc. HCl + $ZnCl_2$, known as Lucas reagent.

Statement II : Primary alcohols are most reactive and immediately produce turbidity at room temperature on reaction with Lucas reagent.

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

(1) Statement I is correct, but Statement II is incorrect.

(2) Statement I is incorrect, but Statement II is correct.

(3) Both Statement I and Statement II are correct.

(4) Both Statement I and Statement II are incorrect.

Question no. 88

A : tetracyanomethane $\left[C_2(CN)_4\right]$

B : carbon dioxide

C : benzene

D : 1, 3-buta-diene

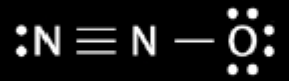
For above molecules ratio of σ and π bonds is in the order :

(1) $A = B < C < D$ (2) $A = B < D < C$

(3) $A = B = C = D$ (4) $C < D < A < B$

Question no. 89

What is the formal charge on the central Nitrogen atom in N_2O?



(1) +1 (2) 0

(3) –1 (4) –2

Question no. 90

For the following reaction

$NO_2(g) + CO(g) \rightarrow NO(g) + CO_2(g)$

the rate law is: Rate = $k\,[NO_2]^2$.

If 0.1 mole of gaseous carbon monoxide is added at constant temperature to the reaction mixture which of the following statements is true?

(1) Both k and the reaction rate remain the same.

(2) Both k and the reaction rate increase

(3) Both k and the reaction rate decrease

(4) Only k incrases, the reaction rate remain the same.

Question no. 91

Question no. 92

Question no. 93

Question no. 94

Question no. 95

Question no. 96

Question no. 97

Question no. 98

Question no. 99

Question no. 100

Question no. 101

Question no. 102

Question no. 103

Question no. 104

Question no. 105

Question no. 106

Question no. 107

Question no. 108

Question no. 109

Question no. 110

Question no. 111

Question no. 112

Question no. 113

Question no. 114

Question no. 115

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Question no. 180