NEET Exam. 2017 (7th May 2017)

(Paper & Solution)

Code – Y

Q.1 The most suitable method of separation of 1 : 1 mixture of ortho and para-nitrophenols is :

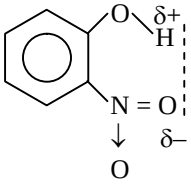
(1) Steam distillation (2) Sublimation (3) Chromatography (4) Crystallisation

Students may find similar question in CP exercise sheet :

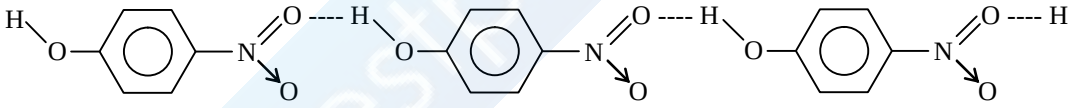
[*Chapter : Chemical Bonding, Exercise # 1, Page No.219, Q.110*]

Ans. **[1]**

Sol. In O-nitrophenol intra molecular H-Bond present. So Bpt is low where as in p-nitrophenol molecules are associated by inter molecular H-Bond. So Bpt is high, so o & p-nitrophenol seperated by steam distillation method



O – nitrophenol



P-nitrophenol

Q.2 Which of the following statements is **not** correct?

(1) Denaturation makes the proteins more active.

(2) Insulin maintains sugar level in the blood of a human body.

(3) Ovalbumin is a simple food reserve in egg-white.

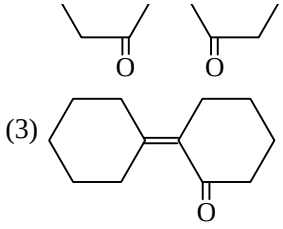
(4) Blood proteins thrombin and fibrinogen are involved in blood clotting.

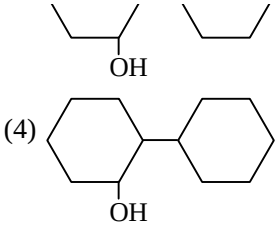
Students may find similar question in CP exercise sheet :

[*Chapter :Biomolecules from Class Notes*]

Ans. **[1]**

Sol. ∵ Denaturation makes the protein inactive.

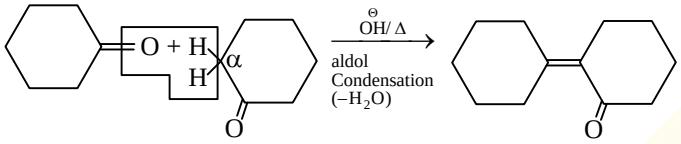
(3) 

(4) 

Students may find similar question in CP exercise sheet :

[*Chapter : Oxygen containing compounds from Class Notes*]

Ans. **[3]**

Sol. 

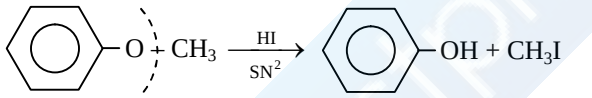
Q.4 The heating of phenyl-methyl ethers with HI produces.

(1) benzene (2) ethyl chlorides (3) iodobenzene (4) phenol

Students may find similar question in CP exercise sheet :

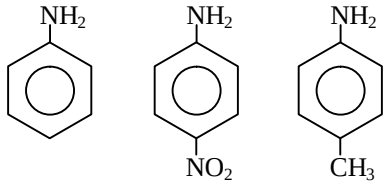
[*Chapter : Oxygen compounds from Class Notes*]

Ans. **[4]**

Sol. 

Methyl Phenyl ether — Phenol — Methyl iodide

Q.5 The **correct** increasing order of basic strength for the following compounds is :



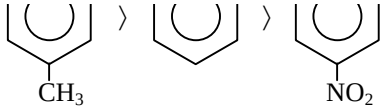
(I) (II) (III)

(1) II < I < III (2) II < III < I (3) III < I < II (4) III < II < I

Students may find similar question in CP exercise sheet :

[*Chapter : GOC-II, Exercise # 1, Page No.110, Q.68*]

Ans. **[1]**



(III) (I) (II)

Q.6 Which one of the following pairs of species have the same bond order?

(1) N_2, O_2^- (2) CO, NO (3) O_2, NO^+ (4) CN^-, CO

Students may find similar question in CP exercise sheet :
[Chapter : Chemical Bonding, Exercise # 3(A), Page No.235, Q.116]

Ans. **[4]**

Sol. CO & CN^- are isoelectronic and having same bond order 3

Q.7 Name the gas that can readily decolourise acidified $KMnO_4$ solution :

(1) P_2O_5 (2) CO_2 (3) SO_2 (4) NO_2

Students may find similar question in CP exercise sheet :
[Chapter : Oxidation Reduction, Exercise # 1, Page No.90, Q.70]

Ans. **[3]**

Sol. $KMnO_4 + SO_2 + H_2SO_4 \rightarrow K_2SO_4 + MnSO_4 + H_2O$

$\therefore$ SO_2 which is R.A. decolourize $KMnO_4$

Q.8 The reason for greater range of oxidation states in actinoids is attributed to :

(1) 4f and 5d levels being close in energies

(2) the radioactive nature of actinoids

(3) actinoid contraction

(4) 5f, 6d and 7s levels having comparable energies

Students may find similar question in CP exercise sheet :
[Chapter : Periodic table, Exercise # 3(A), Page No.188, Q.33]

Ans. **[4]**

Sol. Actinoid shows grater range of oxidation state because 5f, 6d, 7s levels having comparable energies.

Q.9 Concentration of the Ag^+ ions in a saturated solution of $Ag_2C_2O_4$ is 2.2×10^{-4} mol L^{-1}. Solubility product of $Ag_2C_2O_4$ is :

(1) 5.3×10^{-12} (2) 2.42×10^{-8} (3) 2.66×10^{-12} (4) 4.5×10^{-11}

Students may find similar question in CP exercise sheet :
[Chapter : Ionic equilibrium, Exercise # 1-A, Page No.142, Q.59]

Ans. **[1]**

$K_{sp} = 4s^3 = 4 \times (1.1 \times 10^{-4})^3$

$= 4 \times (1.1)^3 \times 10^{-12}$

$= 5.324 \times 10^{-12}\ M^3$

Q.10 With respect to the conformers of ethane, which of the following statements is **true?**

(1) Both bond angles and bond length remains same

(2) Bond angle remains same but bond length changes

(3) Bond angle changes but bond length remains same

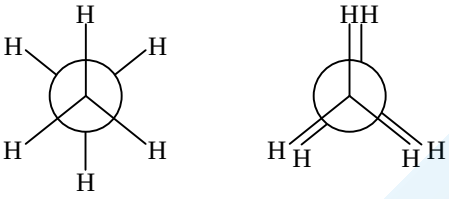
(4) Both bond angle and bond length change

Students may find similar question in CP exercise sheet :

[*Chapter : Isomerism (GOC-I) from Class Notes*]

Ans. **[1]**

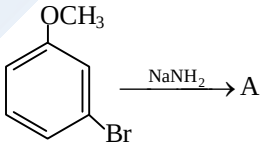
Sol.

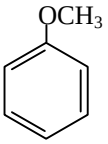


Bond angle $\Rightarrow$ Unchanged

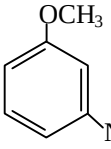
Bond length $\Rightarrow$ Unchanged

Q.11 Identify A and predict the type of reaction

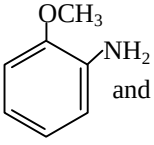


(1) 

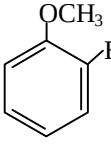
and cine substitution reaction

(2) 

and substitution reaction

(3) 

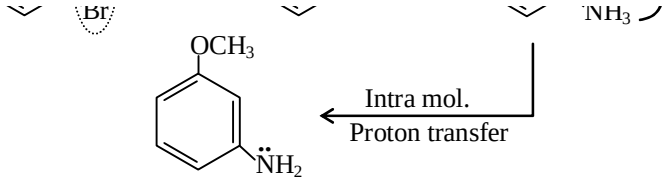
and elimination addition reaction

(4) 

and cine substitution reaction

Students may find similar question in CP exercise sheet :

[*Chapter : Halogen Compounds, Exercise # 2, Page No.18, Q.9*]



Overall Br is replaced by NH_2 group so we can say substitution reaction.

Q.12 Which of the following is sink for CO?

(1) Plants (2) Haemoglobin

(3) Micro organisms present in the soil (4) Oceans

Students may find similar question in CP exercise sheet :

[*Chapter : Environmental Chemistry, Exercise # 2, Page No.243, Q.20*]

Ans. **[3]**

Sol. Soil is a natural sink for carbon monoxide. The soil's ability to remove carbon monoxide from the atmosphere is due to the activity of soil micro-organisms.

Q.13 In which pair of ions both the species contain S – S bond?

(1) $S_4O_6^{2-}$, $S_2O_7^{2-}$ (2) $S_2O_7^{2-}$, $S_2O_3^{2-}$ (3) $S_4O_6^{2-}$, $S_2O_3^{2-}$ (4) $S_2O_7^{2-}$, $S_2O_8^{2-}$

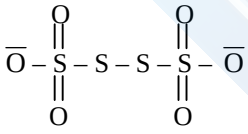
Students may find similar question in CP sheet :

[*Chapter : p-block from Class Notes*]

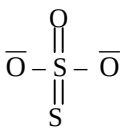
Ans. **[3]**

Sol. (i)

$S_4O_6^{-2}$



$S_2O_3^{-2}$



Q.14 Pick out the correct statement with respect to $[Mn(CN)_6]^{3-}$:

(1) It is dsp^2 hybridised and square planar

(2) It is sp^3d^2 hybridised and octahedral

(3) It is sp^3d^2 hybridised and tetrahedral

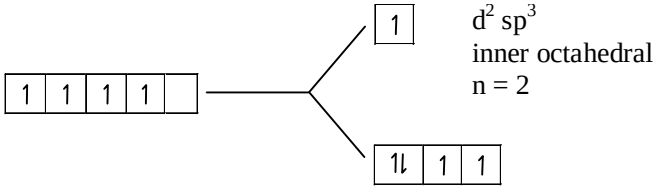
(4) It is d^2sp^3 hybridised and octahedral

Students may find similar question in CP sheet :

[*Chapter : Coordination compounds from Class Notes*]

Ans. **[4]**

$\therefore$ Δ_0 is high complex is d^2sp^3 hybridised and inner octahedral



$d^2\ sp^3$
inner octahedral
n = 2

Q.15 The equilibrium constants of the following are :

$N_2 + 3\ H_2 \rightleftharpoons 2\ NH_3$

$N_2 + O_2 \rightleftharpoons 2\ NO$

$H_2 + \frac{1}{2} O_2 \rightarrow H_2O$

The equilibrium constant (K) of the reaction :

$2\ NH_3 + \frac{5}{2} O_2 \overset{K}{\rightleftharpoons} 2\ NO + 3\ H_2O$, will be :

(1) $K_2^3\ K_3/K_1$ (2) $K_1\ K_3^3/K_2$ (3) $K_2\ K_3^3/K_1$ (4) $K_2\ K_3/K_1$

Students may find similar question in CP exercise sheet :

[*Chapter : Chemical Equilibrium, Exercise # 3-A, Page No121, Q.18*]

Ans. **[3]**

Sol. (1) $N_2 + 3\ H_2 \rightleftharpoons 2\ NH_3$ K_1

(2) $N_2 + O_2 \rightleftharpoons 2\ NO$ K_2

(3) $H_2 + \frac{1}{2} O_2 \rightleftharpoons H_2O$ K_3

Object $2\ NH_3 + \frac{5}{2} O_2 \overset{K}{\rightleftharpoons} 2\ NO + 3\ H_2O$

Equation (3) × 3 + (2) – (1)

$\therefore$ $K = \frac{K_2 \times K_3^3}{K_1}$

Q.16 Match the interhalogen compounds of **column I** with the geometry in **column II** and assign the correct code.

Column I	Column II
(a) XX'	(i) T - shape
(b) XX'_3	(ii) Pentagonal bipyramidal
(c) XX'_5	(iii) Linear
(d) XX'_7	(iv) Square – pyramidal
	(v) Tetrahedral

(3) (iii) (i) (iv) (ii)

(4) (v) (iv) (iii) (ii)

Students may find similar question in CP exercise sheet :

[*Chapter : p-block from Class Notes*]

Ans. **[3]**

Sol. (a) XX^1 sp^3 Linear

(b) XX_3^1 sp^3d T-shape

(c) XX_5^1 sp^3d^2 square pyramid

(d) XX_7^1 sp^3d^3 Penta genal planar

a $\Rightarrow$ iii

b $\Rightarrow$ (i)

c $\Rightarrow$ (iv)

d $\Rightarrow$ (ii)

Q.17 Mixture of chloroxylenol and terpineol acts as :

(1) antibiotic (2) analgesic (3) antiseptic (4) antipyretic

Students may find similar question in CP exercise sheet :

[*Chapter : Chemistry in everyday life, Exercise # 3, Page No.214, Q.25*]

Ans. **[3]**

Sol. Mixture of Chloroxylenol and terpineol is called dettol which acts as an antiseptic.

Q.18 It is because of inability of ns^2 electrons of the valence shell to participate in bonding that :

(1) Sn^{4+} is reducing while Pb^{4+} is oxidising

(2) Sn^{2+} is reducing while Pb^{4+} is oxidising

(3) Sn^{2+} is oxidising while Pb^{4+} is reducing

(4) Sn^{2+} and Pb^{2+} are both oxidising and reducing

Students may find similar question in CP exercise sheet :

[*Chapter : Electro Chemistry, Exercise # 3(A), Page No.30, Q.21*]

Ans. **[2]**

Sol. Due to inert pair effect Pb^{+2} is more stable where as in tin Sn^{+4} is more stable.

y Pb^{+4} will get reduce and Sn^{+2} will get Oxidize.

[Pb^{+4} = oxidising agent, Sn^{+2} = reducing agent]

Ans. **[1]**

Sol. Silver is extracted by cyanide process involving :

1. Complex formation
2. Metal displacement with zinc

$$Ag_2S \xrightarrow{NaCN} Na\,[Ag(CN)_2] + Na_2S$$
$$\downarrow Zn$$
$$Ag + Na_2\,[Zn(CN)_4]$$

Q.20 A 20 litre container at 400 K contains $CO_2(g)$ at pressure 0.4 atm and an excess of SrO (neglect the volume of solid SrO). The volume of the container is now decreased by moving the movable piston fitted in the container. The maximum volume of the container, when pressure of CO_2 attains its maximum value, will be :

(Given that : $SrCO_3(s) \overset{K}{\rightleftharpoons} SrO\,(s) + CO_2(g)$, Kp = 1.6 atm)

(1) 2 litre (2) 5 litre (3) 10 litre (4) 4 litre

Students may find similar question in CP exercise sheet :

[*Chapter : Chemical equilibrium, Exercise # 3(B), Page No.127, Q.66*]

Ans. **[2]**

Sol. $\underset{(s)}{SrCO_3} \rightleftharpoons \underset{(s)}{SrO} + \underset{(g)}{CO_2}$

At maximum pressure of CO_2

$K_p = P_{CO_2} = 1.6$ atm

Temperature is constant

$\therefore \quad P_1V_1 = P_2V_2$

$0.4 \times 20 = 1.6 \times V_2$

$V_2 = 5$ lit

Q.21 Which is the incorrect statement ?

(1) Frenkel defect is favoured in those ionic compounds in which sizes of cation and anions are almost equal

(2) $FeO_{0.98}$ has non stoichiometric metal deficiency defect

(3) Density decreases in case of crystals with Schottky's defect

(4) NaCl(s) is insulator, silicon is semiconductor, silver is conductor, quartz is piezo electric crystal

Students may find similar question in CP exercise sheet :

[*Chapter : Solid State, Exercise # 1, Page No.118, Q.6*]

Ans. **[1]**

Sol. Frenkel defect is favoured in those ionic compounds in which sizes of cation and anions are not equal . i.e. cation is small in size

[*Chapter : Solution colligative properties, Exercise # 1, Page No.49, Q.33*]

Ans. **[3]**

Sol. Molarity depends upon temperature

$$M = \frac{W_A \times 1000}{M_A \times V}$$

$V \propto T$

$T \uparrow$, $V \uparrow$,, Molarity ($\downarrow$)

Q.23 The correct order of the stoichiometries of AgCl formed when $AgNO_3$ in excess is treated with the complexes : $CoCl_3.6NH_3$, $CoCl_3.5NH_3$, $CoCl_3.4NH_3$ respectively is -

(1) 2AgCl, 3AgCl, 1AgCl (2) 1AgCl, 3AgCl, 2AgCl

(3) 3AgCl, 1AgCl, 2AgCl (4) 3AgCl, 2AgCl, 1AgCl

Students may find similar question in CP exercise sheet :

[*Chapter : Coordination compounds, Exercise # 11(B), Page No.77, Q.113*]

Ans. **[4]**

Sol. $CoCl_3.6NH_3$

$[Co(NH_3)_6]Cl_3 \xrightarrow{AgNO_3} 3AgCl$

$CoCl_3.5NH_3$

$[Co(NH_3)_5Cl]Cl_2 \xrightarrow{AgNO_3} 2AgCl$

$CoCl_3.4NH_3$

$[Co(NH_3)_4Cl_2]Cl \xrightarrow{AgNO_3} 1AgCl$

Q.24 An example of a sigma bonded organometallic compound is -

(1) Cobaltocene (2) Ruthenocene (3) Grignard's reagent (4) Ferrocene

Students may find similar question in CP exercise sheet :

[*Chapter : Coordination compounds, Exercise # 7, Page No.56, Q.3*]

Ans. **[3]**

Sol. Grignard's reagent (R mg x) is σ-bonded organometallic compound CH_3–Mg–I

Ferrocene, cobaltocene and Ruthenocene are π-bonded organometallic compound and they contain cyclopentadionyl ring

particle.

(3) The uncertainty principle is $\Delta E \times \Delta t \geq \frac{h}{4\pi}$

(4) Half filled and fully filled orbitals have greater stability due to greater exchange energy, greater symmetry and more balanced arrangement

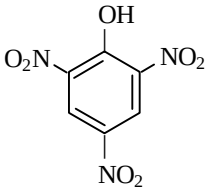
Students may find similar question in CP exercise sheet :

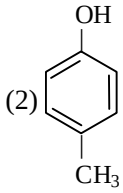
[*Chapter : Atomic Structure, Exercise # 1, Page No.21, Q.28*]

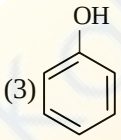
Ans. **[1]**

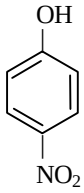
Sol. In hydrogen like atom energy 2s in equal to 2p (as in single electron species)

Q.26 Which one is the most acidic compound ?

(1) 

(2) 

(3) 

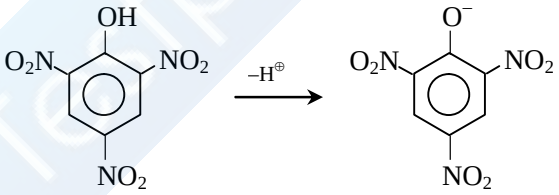
(4) 

Students may find similar question in CP exercise sheet :

[*Chapter : GOC-II, Exercise # 2, Page No.115, Q.23*]

Ans. **[1]**

Sol. $\because$ Acidic strength $\propto$ stability of anion



Max. stable anion due to delocalised Θve charge & –M effect of all three NO_2 group

Q.27 A first order reaction has a specific reaction rate of 10^{-2} sec^{-1}. How much time will it take for 20 g of the reactant to reduce to 5g ?

(1) 693.0 sec (2) 238.6 sec (3) 138.6 sec (4) 346.5 sec

Students may find similar question in CP exercise sheet :

[*Chapter : Chemical Kinetics, Exercise # 3A, Page No.201, Q.36*]

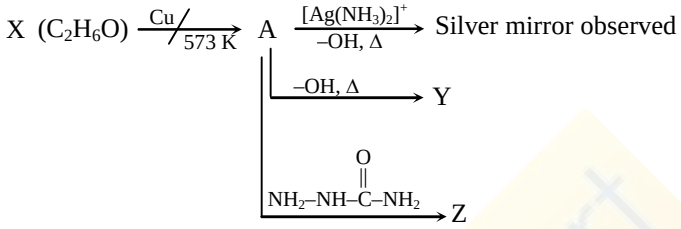
Ans. **[3]**

Sol. For first order reaction

$$t = \frac{2.303}{10^{-2}} \log 4$$

$$= \frac{2.303 \times 0.6020}{10^{-2}} = 138.64 \text{ sec}$$

Q.28 Consider the reactions :



Identify A, X, Y and Z

(1) A-Ethanol, X-Acetaldehyde, Y-Butanone Z-Hydrazone

(2) A-Methoxymethane, X-Ethanoic acid, Y-Acetate ion, Z-Hydrazine

(3) A-Methoxymethane, X-Ethanol, Y-Ethanoic acid, Z-Semicarbazide

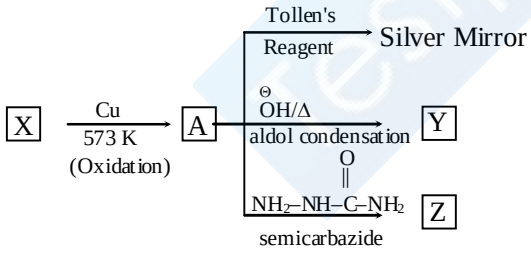
(4) A-Ethanal, X-Ethanol, Y-But-2-enal., Z-Semicarbazone

Students may find similar question in CP sheet :

[*Chapter : Oxygen Compound From Class Notes*]

Ans. **[4]**

Sol.



X is $CH_3CH_2–OH$ (Ethanol)

A is $CH_3–CH=O$ (Ethanal)

Y is $CH_3–CH=CH–CH=O$ (But-2-enal)

Z is $CH_3–CH=N–NH–\underset{\underset{O}{\|}}{C}–NH_2$ (Acetaldehyde-semicarbazone)

The overall order of the reaction will be -

(1) 1.5 (2) 1 (3) 2 (4) 0

Students may find similar question in CP exercise sheet :

[*Chapter : Chemical Kinetics, Exercise #2, Page No.191, Q.8*]

Ans. **[1]**

Sol. From slow step

$r = k[X][Y_2]$

but [X] is dummy reactant so it will replaced by step I

$$K_c = \frac{[X]^2}{[X_2]}$$

$$[X] = \sqrt{K_c[X_2]}$$

$$\therefore\ r = K(K_c)^{\frac{1}{2}}[X_2]^{\frac{1}{2}}[Y_2]^1$$

so overall order = $\frac{1}{2} + 1 = 1.5$

Q.30 Predict the correct intermediate and product in the following reaction :

$$H_3C - C \equiv CH \xrightarrow[HgSO_4]{H_2O,\ H_2SO_4} \underset{(A)}{\text{Intermediate}} \longrightarrow \underset{(B)}{\text{Product}}$$

(1) A : $H_3C-\underset{\displaystyle OH}{\underset{|}{C}}=CH_2$ B : $H_3C-\overset{\displaystyle O}{\overset{\|}{C}}-CH_3$

(2) A : $H_3C-\underset{\displaystyle SO_4}{\underset{|}{C}}=CH_2$ B : $H_3C-\overset{\displaystyle O}{\overset{\|}{C}}-CH_3$

(3) A : $H_3C-\underset{\displaystyle OH}{\underset{|}{C}}=CH_2$ B : $H_3C-\underset{\displaystyle SO_4}{\underset{|}{C}}=CH_2$

(4) A : $H_3C-\overset{\displaystyle O}{\overset{\|}{C}}-CH_3$ B : $H_3C-C\equiv CH$

Students may find similar question in CP exercise sheet :

[*Chapter : _Hydrocarbons, Exercise # 3, Page No.170, Q.50*]

Ans. **[1]**

Sol.

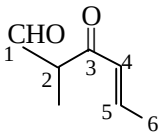
$$CH_3-C\equiv CH \xrightarrow[\substack{HgSO_4\\(\text{Markowinikoff}\\\text{addition})}]{H_2O} \underset{(A)}{CH_3-\underset{\displaystyle OH}{\underset{|}{C}}=CH_2} \overset{(T)}{\rightleftharpoons} \underset{(B)}{CH_3-\overset{\displaystyle O}{\overset{\|}{C}}-CH_3}$$

(3) 5-formylhex-2-en-3-one (4) 5-methyl-4-oxohex-2en-5-al

Students may find similar question in CP exercise sheet :

[*Chapter : Nomenclature (GOC–I) From Class Notes*]

Ans. **[2]**

Sol. 

In IUPAC called 3-Keto-2-methyl hex-4-enal

Q.32 In the electrochemical cell –

$Zn|ZnSO_4(0.01M) \parallel CuSO_4\ (1.0\ M)| Cu$, the emf of this Daniel cell is E_1. When the concentration of $ZnSO_4$ is changed to 1.0 M and that of $CuSO_4$ changed to 0.01M, the emf changes to E_2. From the followings, which one is the relationship between E_1 and E_2 ? (Given, $\frac{RT}{F} = 0.059$) .

(1) $E_2 = 0 \neq E_1$ (2) $E_1 = E_2$ (3) $E_1 < E_2$ (4) $E_1 > E_2$

Students may find similar question in CP exercise sheet :

[*Chapter : Electrochemistry, Exercise # 3A, Page No.31, Q.31*]

Ans. **[4]**

Sol.

$$Zn \underset{(0.01M)}{|} ZnSO_4 \parallel CuSO_4 \underset{(1.0M)}{|} | Cu$$

Nernst equation

$$Emf = E^{\circ}_{cell} - \frac{0.059}{2}\log\frac{[Zn^{+2}]}{[Cu^{+2}]}$$

In first case

$$E_1 = E^{\circ}_{cell} - \frac{0.059}{2}\log\frac{0.01}{1}$$

In second case

$$E_2 = E^{\circ}_{cell} - \frac{0.059}{2}\log\frac{1}{0.01}$$

So $\boxed{E_1 > E_2}$

[*Chapter : Chemical Thermodynamics & Energetic, Exercise # 3(A), Page No.154, Q.32*]

Ans. **[4]**

Sol. $\Delta U = q + w$

Insulated container So, $q = 0$

$\Delta U = -PdV$

$= -2.5\,[4.50 - 2.50]$

$= -2.5 \times 2$ litre – atm $= -5\ l$ atm [1 ℓ-atm = 101.3 ≈ 101J]

$= -5 \times 101$

$\Rightarrow -505$ J

Q.34 Correct increasing order for the wavelengths of absorption in the visible region for the complexes of Co^{3+} is -

(1) $[Co(NH_3)_6]^{3+}$, $[Co(en)_3]^{3+}$, $[Co(H_2O)_6]^{3+}$ (2) $[Co(en)_3]^{3+}$, $[Co(NH_3)_6]^{3+}$, $[Co(H_2O)_6]^{3+}$

(3) $[Co(H_2O)_6]^{3+}$, $[Co(en)_3]^{3+}$, $[Co(NH_3)_6]^{3+}$ (4) $[Co(H_2O)_6]^{3+}$, $[Co(NH_3)_6]^{3+}$, $[Co(en)_3]^{3+}$

Students may find similar question in CP exercise sheet :

[*Chapter : Coordination compounds, Exercise # 11(A), Page No.65, Q.74*]

Ans. **[2]**

Sol. Increasing order of wavelength of absorption is

$\Delta_0 = en > NH_3 > H_2O$

$$\Delta_0 = E = \frac{hc}{\lambda}$$

$$\lambda = [Co(en)_3]^{+3} < [Co(NH_3)_6]^{+3} < [Co(HO)_6]^{+3}$$

Q.35 The correct statement regarding electrophile is :

(1) Electrophile can be either neutral or positively charged species and can form a bond by accepting a pair of electrons from a nucleophile

(2) Electrophile is a negatively charged species and can form a bond by accepting a pair of electrons form a nucleophile

(3) Electrophile is a negatively charged species and can form a bond by accepting a pair of electrons from another electrophile

(4) Electrophiles are generally neutral species and can form a bond by accepting a pair of electrons from a nucleophile

Students may find similar question in CP sheet :

[*Chapter : GOC-II from Class Notes*]

Ans. **[1]**

ΔH and ΔS do not vary with temperature)

(1) T > 298 K (2) T < 425 K

(3) T > 425 K (4) All temperatures

Students may find similar question in CP exercise sheet :

[*Chapter : Chemical Thermodynamics & Energetic, Exercise # 3(A), Page No.157, Q.66*]

Ans. **[3]**

Sol. $\Delta G = \Delta H - T\Delta S$

at equilibrium $\Delta G = 0$

$35.5 \times 10^3 - T \times 83.6 = 0$

$T_{eq} = \frac{35.5 \times 10^3}{83.6} = 424.64$

If $T > T_{eq}$; ΔG = –ve

$\therefore$ T > 425 K

Q.37 Which of the following pairs of compounds is isoelectronic and isostructural ?

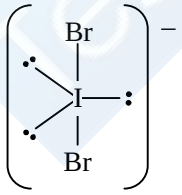
(1) IF_3, XeF_2 (2) $BeCl_2$, XeF_2 (3) TeI_2, XeF_2 (4) IBr_2, XeF_2

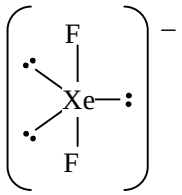
Students may find similar question in CP exercise sheet :

[*Chapter : Chemical Bonding, Exercise # 3(A), Page No.228, Q.81*]

Ans. **[4]**

Sol. IBr_2^- and XeF_2 are isoelectronic because they conation same number of valence electron and both are linear.

IBr_2^- sp^3d linear 

XeF_2 sp^3d linear 

[Chapter : d-block, Exercise # 1(B), Page No.72, Q.44]

Ans. **[4]**

Sol. Due to formation of complex

$HgCl_2 \xrightarrow{2I^-} HgI_2 \xrightarrow{2I^-} [HgI_4]^{-2}$

$I_2 \xrightarrow{I^-} I_3^-$

Q.39 Which one of the following statements is not correct ?

(1) Coenzymes increase the catalytic activity of enzyme

(2) Catalyst does not initiate and reaction

(3) The value of equilibrium constant is changed in the presence of a catalyst in the reaction at equilibrium

. (4) Enzymes catalyse mainly bio-chemical reaction.

Students may find similar question in CP exercise sheet :

[*Chapter : Chemical Equilibrium, Exercise # 3(A), Page No.120, Q.12*]

Ans. **[3]**

Sol. Equilibrium constant does not depend on catalyst.

Q.40 Ionic mobility of which of the following alkali metal ions is lowest when aqueous solutions of their salts are put under an electric filed?

(1) Li (2) Na (3) K (4) Rb

Students may find similar question in CP exercise sheet :

[*Chapter : Electro Chemistry, Exercise # 1, Page No.15, Q.21*]

Ans. **[4]**

Sol. According to electrochemistry due to presence of electric field hydration of ions will not place in excess means it effect will be negligible then only ionic weight is the factor.

Ionic weight of rubidium is high so its mobility will be less.

Q.41 The element Z = 114 has been discovered recently. It will belong to which of the following family/group and electronic configuration ?

(1) Nitrogen family, [Rn] $5f^{14}\ 6d^{10}\ 7s^2\ 7p^6$ (2) Halogen family, [Rn] $5f^{14}\ 6d^{10}\ 7s^2\ 7p^5$

(3) Carbon family, [Rn] $5f^{14}\ 6d^{10}\ 7s^2\ 7p^2$ (4) Oxygen family, [Rn] $5f^{14}\ 6d^{10}\ 7s^2\ 7p^4$

Students may find similar question in CP sheet :

[*Chapter : Periodic table from Class Notes*]

Ans. **[3]**

Sol. Z = 114

Z_{114} = [Rn] $5f^{14}6d^{10}7s^27p^2$

valence configuration is ns^2np^2 so, Z = ... belong to carbon family

(3) $CH \equiv CH > CH_3 - C \equiv CH > CH_2 = CH_2 > CH_3 - CH_3$

(4) $CH \equiv CH > CH_2 = CH_2 > CH_3 - C \equiv CH > CH_3 - CH_3$

Students may find similar question in CP exercise sheet :

[*Chapter : Hydrocarbons, Exercise # 3, Page No.165, Q.3*]

Ans. **[3]**

Sol. Acidic nature $\propto \frac{-I}{+I} \propto$ E. N.

$\therefore$ Acidic strength order will be

$$\underbrace{HC \equiv CH}_{EN(sp\ carbon) = 3.25} > \underbrace{CH_2 = CH_2}_{EN(sp^2\ carbon) = 2.75} > \underbrace{CH_3 - CH_3}_{EN(sp^3\ carbon) = 2.50}$$

Q.43 If molality of the dilute solution is doubled, the value of molal depression constant (K_f) will be

(1) unchanged (2) doubled (3) halved (4) tripled

Students may find similar question in CP exercise sheet :

[*Chapter : Solution Colligative Properties , Page No.59, Table No. 4*]

Ans. **[1]**

Sol. $\Delta T_f = K_f \times m$

$K_f \rightarrow$ does not depend on molality

So, K_f molal depression constant remains same

Q.44 The species, having bond angles of 120º is

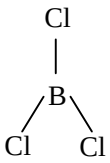
(1) BCl_3 (2) PH_3 (3) ClF_3 (4) NCl_3

Students may find similar question in CP exercise sheet :

[*Chapter : Chemical Bonding, Exercise # 3(A), Page No.226, Q.34*]

Ans. **[1]**

Sol. BCl_3 is sp^2 hybridized so, BCl_3 is trigonal planar and Bond angle is 120º



[*Chapter :Nitrogen compounds from Class Notes*]

Ans. **[3]**

Sol.

$$CH_3 - \underset{\underset{O}{\|}}{C} - NH_2 \xrightarrow[\text{Or KOBr}]{Br_2 + (4)\ KOH} CH_3 - NH_2$$

(Acetamide) (Methanamine)

It is called Hoffmann's hypobromamide reaction.

Students may find similar question in CP exercise sheet :

[*Chapter : Ecology : Population & Community, Theory, Page No.51*]

Ans. **[3]**

Sol. K = N

When K (Carrying capacity) equals to N (Population Density) the logistic growth acquire steady or asymptote stage

Q.47 The vascular cambium normally gives rise to :

(1) Periderm (2) Phelloderm

(3) Primary phloem (4) Secondary xylem

***Students may find similar question in CP exercise sheet : Structural organization in plants Exercise # 2, Page No.61, Q.61*]**

Ans. **[4]**

Sol. The vascular cambium normally gives rise to secondary xylem

Q.48 In case of poriferans, the spongocoel is lined with flagellated cells called :

(1) Mesenchymal cells (2) Ostia

(3) Oscula (4) Choanocytes

Students may find this in CP sheet : Animal Diversity, Page 15

Ans. **[4]**

Sol. Choanocyte or Collar cell are flagellated cell and lines Spongocoel and canal both.

Q.49 Fruit and leaf drop at early stages can be prevented by the application of

(1) Gibberellic acid (2) Cytokinins (3) Ethylene (4) Auxins

Students may find similar question in CP exercise sheet :

[*Chapter : Plant Physiology : Plant growth & Hormones, Theory, Page No.144*]

Ans. **[4]**

Sol. Auxin prevents abscission of young plant parts

Q.50 A gene whose expression helps to identify transformed cell is known as

(1) Structural gene (2) Selectable marker

(3) Vector (4) Plasmid

Students may find this in CP sheet : Biotechnology, Page No.96

Ans. **[2]**

(4) Avery, Mcleod and McCarty

Students may find this in CP sheet :Protoplasm,Page No.135

Ans. **[3]**

Sol. Hershey and Chase gave the final unequivocal proof for DNA as the genetic material.

Q.52 With reference to factors affecting the rate of photosynthesis, which of the following statements is **not correct** ?

(1) Tomato is a greenhouse crop which can be grown in CO_2-enriched atmosphere for higher yield

(2) Light saturation for CO_2 fixation occurs at 10% of full sunlight

(3) Increasing atmospheric CO_2 concentration up to 0.05% can enhance CO_2 fixation rate

(4) C_3 plants respond to higher temperatures with enhanced photosynthesis while C_4 plants have much lower temperature optimum

Students may find similar question in CP exercise sheet :

[*Chapter :Plant Physioology : Photosynthesis, Theory, Page No.21*]

Ans. **[4]**

Sol. C_3 plants are adapted to cold climate while C_4 plants are adapted to hot & dry climate

Q.53 The association of histone H1 with a nucleosome indicates :

(1) The DNA double helix is exposed

(2) Transcription is occurring

(3) DNA replication is occurring

(4) The DNA is condensed into a Chromatin Fibre

Students may find this in CP sheet :Protoplasm

Ans. **[4]**

Sol. During DNA condensation into a chromatin fibre the DNA wraps around histone octamer and H1 Histone works as clip to prevent unwraping of DNA

Q.54 GnRH, a hypothalamic hormone, needed in reproduction, acts on

(1) Posterior pituitary gland and stimulates secretion of LH and relaxin

(2) Anterior pituitary gland and stimulates secretion of LH and oxytocin

(3) Anterior pituitary gland and stimulates secretion of LH and FSH

(4) Posterior pituitary gland and stimulates secretion of oxytocin and FSH

Ans. **[3]**

Sol. GnRH gonadotropic releasing hormone is released by hypothalamus and acts on anterior pituitary (adenohypophysis) and stimulates release of gonadotropins (FSH & LH)

(4) Neutral

Students may find similar question in CP exercise sheet : Genetic, Page No.42

Ans. **[3]**

Sol. DNA fragments are negatively charged due to phosphate ($H_3PO_4^-$) backbone

Q.56 Which of the following options gives the **correct sequences** of events during mitosis ?

(1) condensation → arrangement at equator → centromere division → segregation → telophase

(2) condensation → nuclear membrane disassembly → crossing over → segregation → telophase

(3) condensation → nuclear membrance disassembly → arrangement at equator → centromere division → segregation → telophase

(4) condensation → crossing over → nuclear membrane disassembly → segregation → telophase

Students may find similar question in CP exercise sheet : Cell Structure and Function
Exercise # 2, Page No.88, Q.171

Ans. **[3]**

Sol. The correct sequence reduce of events during mitosis is

condensation → nuclear membrance disassembly → arrangement at equator → centromere division → segregation → telophase

Q.57 Lungs are made up of air-filled sacs, the alveoli. They do not collapse even after forceful expiration, because of :

(1) Expiratory Reserve Volume (2) Residual Volume

(3) Inspiratory Reserve Volume (4) Tidal Volume

Students may find this in CP sheet : Animal Physiology, Page No.149

Ans. **[2]**

Sol. 1200 ml residual volume always stays inside lungs

Q.58 Which one of the following statements is **correct** with reference to enzymes ?

(1) Holoenzyme = Coenzyme + Co-factor

(2) Apoenzyme = Holoenzyme + Coenzymes

(3) Holoenzyme = Apoenzyme + Coenzyme

(4) Coenzyme = Apoenzyme + Holoenzyme

Students may find similar question in CP exercise sheet :
[*Chapter : Plant Physiology : Enzyme, Theory, Page No.119*]

Ans. **[3]**

Sol. Holoenzyme formed by binding of Apoenzyme (protein part) with non-protein part (eoenzyme)

(4) Polysaccharides

Students may find this in CP sheet :Protoplasm, Page No.108

Ans. **[1]**

Sol. Lipids are strictly not macromolecules they are not polymeric and have molecular weight less than 800 Da

Q.60 Which of the following components provides sticky character to the bacterial cells ?

(1) Gylcocalyx (2) Cell wall

(3) Nuclear membrane (4) Plasma membrane

Students may find this in CP sheet :Plant Diversity, Page No.25

Ans. **[1]**

Sol. Glycocalyx is the outer most part of bacterial envelope which is either composed of slimy layer (Dextrin sugar) or capsule form

Q.61 **An example** of colonial alga is :

(1) *Spirogyra* (2) *Chlorella* (3) *Volvox* (4) *Ulothrix*

Students may find this in CP sheet :Plant Diversity, Page No.99

Ans. **[3]**

Sol. Volvox forms colony which rolls over water – colony of volvox is termed coenobium.

Q.62 A dioecious flowering plant prevents both :

(1) Cleistogamy and xenogamy

(2) Autogamy and xenogamy

(3) Autogamy and geitonogamy

(4) Geitonogamy and xenogamy

Ans. **[3]**

Sol. Dioecious flowing plant means sex organs are present on separate plants which will prevent both autogamy (within same flower and geitonogamy (between two different flower of same plant)

Q.63 Plants which produce characteristic pneumatophores and show vivipary belong to :

(1) Hydrophytes (2) Mesophytes (3) Halophytes (4) Psammophytes

Students may find similar question in CP exercise sheet : Ecology

***Chapter: Organism & Environment, Theory, Page No.30*]**

Ans. **[3]**

Sol. Halophytes grows in saline conditions so show pheumatophores of vivipary

Ans. **[2]**

Sol. Coconut is a drupe fruit

Q.65 Which of the following is made up of dead cells ?

(1) Phloem (2) Xylem parenchyma

(3) Collenchyma (4) Phellem

***Students may find similar question in CP exercise sheet : Structural Organisation in Plants Exercise # 1, Page No.54, Q.166, Exercise # 2, Page No.68, Q.181*]**

Ans. **[4]**

Sol. Phellem is made up of dead cells

Q.66 Root hairs develop from the region of :

(1) Meristematic activity (2) Maturation

(3) Elongation (4) Root cap

***Students may find similar question in CP exercise sheet : Structural Organisation in Plants Exercise # 2, Page No.83 (diagram)*]**

Ans. **[2]**

Sol. Root hair develop from region of maturation

Q.67 Which of the following options best represents the enzyme composition of pancreatic juice ?

(1) Lipase, amylase, trypsinogen, procarboxypeptidase

(2) Amylase, peptidase, trypsinogen, rennin

(3) Amylase, pepsin, trypsinogen, maltase

(4) Peptidase, amylase, pepsin, rennin

Ans. **[1]**

Sol. Pancreas produces pancreatic juice which is released in duodenum along with bile juice & contains enzymes as such lipase, amylase trypsinogen & procarboxypeptidase.

Q.68 Zygotic meiosis is characteristic of :

(1) *Chlamydomonas* (2) *Marchentia* (3) *Fucus* (4) *Funaria*

Students may find this in CP sheet :Plant Diversity, Page No.102

Ans. **[1]**

Sol. Zygotic meiosis – Haplontic life cycle eg. Chlamydomonas

Marchantia → Haplo-diplontic → Sporic meiosis

Fucus → Diplontic → Sporic meiosis

Funaria → Haplo-diplontic → Sporic meiosis

Sol. Halophiles form of Archebacteria are found in extreme saline conditions

Q.70 In Bougainvillea thorns are the modifications of :

(1) Leaf (2) Stipules (3) Adventitious root (4) Stem

***Students may find similar question in CP exercise sheet : Structural Organisation in Plants Theory, Page No.87*]**

Ans. **[4]**

Sol. In bougainvillea the throns are modifications of stem

Q.71 Viroids differ from viruses in having

(1) RNA molecules without protein coat

(2) DNA molecules with protein coat

(3) DNA molecules without protein coat

(4) RNA molecules with protein coat

Students may find this in CP sheet :Plant Diversity, Page No.189

Ans. **[1]**

Sol. Viroids have only low molecular weight RNA without protein coat

Q.72 Adult human RBCs are enucleate. Which of the following statements(s) is / are **most appropriate** explanation for this feature ?

(a) They do not need to reproduce

(b) They are somatic cells

(c) They do not metabolize

(d) All their internal space is available for oxygen transport

Options :

(1) (b) and (c)

(2) Only (d)

(3) Only (a)

(4) (a), (c) and (d)

Students may find similar question in CP exercise sheet : Animal Physiology-I Page No.32

Ans. **[2]**

Sol. Adult human RBCs are enucleated, this helps in increased availability of space for haemoglobin. This feature is benificial for carrying more oxygen.

(4) m-RNA

Students may find this in CP sheet :Protoplasm,Page No.121

Ans. **[2]**

Sol. rRNA – approx 80% of cellular RNA

Q.74 During DNA replication, Okazaki fragments are used to elongate.

(1) The lagging strand away from the replication fork

(2) The leading strand towards replication fork

(3) The lagging strand towards replication fork

(4) The leading strand away from replication

Students may find this in CP sheet :Protoplasm, Page No.125

Ans. **[1]**

Sol. In replication fork, leading and lagging strand are away from each other, Okazaki fragments are present on lagging strand.

Q.75 Select the **correct** route for the passage of sperms in male frogs :

(1) Testes → Vasa efferentia → Kidney → Bidder's canal → Urinogenital duct → Cloaca

(2) Testes → Bidder's canal → Kidney → Vasa efferentia → Urinogenital duct → Cloaca

(3) Testes → Vasa efferentia → Kidney → Seminal vesicle → Urinogenital duct → Cloaca

(4) Testes → Vasa efferentia → Bidder's canal → Ureter → Cloaca

Students may find this in CP sheet : Lower Animal, Page No.177

Ans. **[1]**

Sol. From testes of frog 10-12 Vasa efferentia comes out enters into kidney and open into Bidder's canal which leads into ureter (Urinogenital duct).& then into Cloaca.

Ureter = Urinogenital duct in male frog

Q.76 If there are 999 bases in an RNA that codes for a protein with 333 amino acids, and the base at position 901 is deleted such that the length of the RNA becomes 998 bases, how many codons will be altered ?

(1) 333 (2) 1 (3) 11 (4) 33

Students may find this in CP sheet :Protoplasm, Page No.132

Ans. **[4]**

Sol. 333 amino acid from 999 bases

300 amino acid from 900 bases

Alteration in 901 means frame shift occurred in the sequence thereafter, which will affect rest 33 codons.

(4) Radial orientation of cellulose microfibrils in the cell wall of guard cells

Students may find similar question in CP exercise sheet : Plant Physiology
[Chapter : Plant Water Relation, Page No.202,]

Ans. **[4]**

Sol. Radial arrangement of cellulose microfibrils is present on inner wall of guards cell

Q.78 Anaphase Promoting Complex (APC) is protein degradation machinery necessary for proper mitosis of animal cells. If APC is defective in a human cell, which of the following is expected to occur ?

(1) Recombination of chromosome arms will occur

(2) Chromosomes will not condense

(3) Chromosomes will be fragmented

(4) Chromosomes will not segregate

Students may find this in CP sheet

Ans. **[4]**

Sol. Separase enzyme is a part of APC (Anaphase promoting complex) that degrades cohesion protein, separating the two chromatids. It APC is defective, the chromatids will not separate.

Q.79 Life cycle of Ectocarpus and Fucus **respectively** are :

(1) Haplodiplontic, Haplontic (2) Haplontic, Diplontic

(3) Diplontic, Haplodiplontic (4) Haplodiplontic, Diplontic

Students may find this in CP sheet :Plant Diversity, Page No.102

Ans. **[4]**

Sol. Ectocarpus – Haplodiplontic (Iso morphic type)

Fucus – Diplontic life cycle.

Q.80 Which statements is **wrong** for Krebs' cycle?

(1) The cycle starts with condensation of acetyl group (acetylCoA) with pyruvic acid to yield citric acid.

(2) There are three points in the cycle where NAD^+ is reduced to NADH + H^+

(3) There is one point in the cycle where FAD^+ is reduced to $FADH_2$

(4) During conversion of succinyl CoA to succinic acid, a molecule of GTP is synthesised

Students may find similar question in CP exercise sheet :Plant physiology
[Chapter : Cell Rejiration, Theory Page No.72,

Ans. **[1]**

Sol. Kreb's cycle starts with condensation of Acetyl CoA with Oxaloacetic acid.

(3) Cell-mediated immune response

(4) Hormonal immune response

Students may find similar question in CP exercise sheet : Immunity and Disease
[Page No.110]

Ans. **[3]**

Q.82 Artificial selection to obtain cows yielding higher milk output represents :

(1) stabilizing followed by disruptive as it stabilizes the population to produce higher yielding cows.

(2) stabilizing selection as it stabilizes this character in the population.

(3) directional as it pushes the mean of the character in one direction.

(4) disruptive as it splits the population into two, one yielding higher output and the other lower output.

Students may find this in CP sheet : Theory Page No.219]

Ans. **[2]**

Sol. In Directional selection one Extreml is favoured for selection as compared to the other extreme phenotype.

Q.83 Select the **mismatch** :

(1) *Rhizobium* - Alfalfa

(2) *Frania* - *Alnus*

(3) *Rhodospirillum* - Mycorrhiza

(4) *Anabaena* - Nitrogen fixer

Students may find similar question in CP exercise sheet : Plant physiology
[Chapter : Mineral Nutritaion & N_2 metabolism, Theory Page No.219]

Ans. **[3]**

Sol. Rhodospirillum is a free living N_2 fixing microbe.

Q.84 Presence of plants arranged into well defined vertical layers depending on their height can be seen best in :

(1) Temperate Forest

(2) Tropical Savannah

(3) Tropical Rain Forest

(4) Grassland

Students may find similar question in CP exercise sheet : Ecology
[Chapter :population & community, Theory Page No 53]

Ans. **[3]**

Sol. Tropical Rain forest show clear cut stratification of vegetations.

(b) Syphilis (ii) *Neisseria*

(c) Genital Warts (iii) *Treponema*

(d) AIDS (iv) Human papilloma – virus

Options :

	(a)	(b)	(c)	(d)
(1)	(iv)	(iii)	(ii)	(i)
(2)	(ii)	(iii)	(iv)	(i)
(3)	(iii)	(iv)	(i)	(ii)
(4)	(iv)	(ii)	(iii)	(i)

Students may find similar question in CP exercise sheet : Immunity and Disease
[Page No.138]

Ans. **[2]**

Sol. C

Q.86 Select the **mismatch** :

(1) *Equisetum* - Homosporous

(2) *Pinus* - Dioecious

(3) *Cycas* - Dioecious

(4) *Salvinia* - Heterosporous

Students may find this in CP sheet :Plant Diversity, Page No.134

Ans. **[2]**

Sol. In Pinus, both male and female cones are present are same plant i.e monoecious

Q.87 The region of Biosphere Reserve which is legally protected and where no human activity is allowed is known as :

(1) Restoration zone

(2) Core zone

(3) Buffer zone

(4) Transition zone

Students may find similar question in CP exercise sheet : Ecology
[Chapter : Biodivercity, Theory Page No.46]

Ans. **[2]**

Sol. Core zone of biosphere reserves is totally undistorbed zone.

(4) It conducts water and minerals efficiently

Students may find similar question in CP exercise sheet : Structural Organisation in Plants
Exercise # 2, Page No.73, Q.265

Ans. **[4]**

Sol. The wrong statement in context to heartwood is "It conducts water and minerals efficiently.

Q.89 The function of copper ions in copper releasing IUD's is :

(1) They inhibit ovulation

(2) They suppress sperm motility and fertilising capacity of sperms.

(3) They inhibit gametogenesis.

(4) They make uterus unsuitable for implantation

Students may find this in CP sheet : Reproductive health, Theory, Page No.59

Ans. **[2]**

Q.90 The process of separation and purification of expressed protein before marketing is called :

(1) Postproduction processing (2) Upstream processing

(3) Downstream processing (4) Bioprocessing

Students may find this in CP sheet : Biotechnology, Page No. 108

Ans. **[3]**

Q.91 Which among the following are the smallest living cells, known without a definite cell wall, pathogenic to plants as well as animals and can survive without oxygen ?

(1) *Nostoc* (2) *Bacillus* (3) *Pseudomonas* (4) **Mycoplasma**

Students may find this in CP sheet :Plant Diversity, Page No.44

Ans. **[4]**

Sol. Mycoplasma lack cell wall and are facultature anaerobe i.e can survive in absence of oxygen also.

Q.92 **Phosphoenol pyruvate** (PEP) is the primary CO_2 acceptor in :

(1) C_3 and C_4 plants (2) C_3 plants (3) C_4 plants (4) C_2 plants

Students may find similar question in CP exercise sheet : Plant physiology
[*Chapter : Photosynthesis, Theory Page No.21*]

Ans. **[3]**

Sol. Phospho enol pyruvate (PEP) is primary CO_2 acceptor in C_4 plants.

Q.94 The DNA fragments separated on an agarose gel can be visualised after staining with :

(1) Ethidium bromide (2) Bromophenol blue (3) Acetocarmine (4) Aniline blue

Students may find this in CP sheet : Biotechnology : Principle and Process

Ans. **[1]**

Q.95 Capacitation occurs in :

(1) Female Reproductive tract (2) Rete testis

(3) Epididymis (4) Vas deferens

Ans. **[1]**

Sol. Capacitation is a phenomenon that occur in vagina, due to it the sperms aquire ability to swim through female reproductive tract & fertilise the egg in fallopian tabe.

Q.96 Which of the following is **correctly matched** for the product produced by them ?

(1) *Sacchromyces cerevisiae* : Ethanol (2) *Acetobacter aceti :* Antibiotics

(3) *Methanobacterium* : Lactic acid (4) *Penicillium notatum* : Acetic acid

Students may find this in CP sheet :Plant Diversity, Page No.84

Ans. **[1]**

Sol. Saccharomyces cerevisiae (yeast) is used in commercial production of Ethanol.

Q.97 Which of the following statements is **correct**?

(1) The descending limb of loop of Henle is permeable to electrolytes.

(2) The ascending limb of loop of Henle is impermeable to water.

(3) The descending limb of loop of Henle is impermeable to water.

(4) The ascending limb of loop of Henle is permeable to water.

Students may find this in CP sheet : Excretory System, Theory, Page No.19

Ans. **[2]**

Q.98 The water potential of pure water is :

(1) More than one (2) Zero

(3) Less than zero (4) More than zero but less than one

Students may find similar question in CP exercise sheet : Plant physiology

[Chapter : Plants water Relation, Theory Page No.182]

Ans. **[2]**

Sol. Water Potential or free energy of pore water / pure solvent is maximum i.e zero as system not Performing any work.

Students may find this in CP sheet : Genetics, Page No. 21

Ans. **[4]**

Sol.

	I^A	I^B
I^A	I^AI^A	I^AI^B
i	I^Ai	I^Bi

Blood group or phenotype is A, B, AB so 3 phenotype

Genotype - 4

Q.100 An important characteristic that Hemichordates share with Chordates is :

(1) pharynx without gill slits (2) absence of notochord

(3) ventral tubular nerve cord (4) pharynx with gill slits

Students may find this in class notes

Ans. **[4]**

Sol. Hemichordates have pharyngeal gill slits which similar to the chordates.

Q.101 Which one of the following is related to Ex-situ conservation of threatened animals and plants ?

(1) Himalayan region (2) Wildlife Safari Parks

(3) Biodiversity hot spots (4) Amazon rainforest

Students may find similar question in CP exercise sheet : Ecology

[Chapter : Biodiversity Theory, Page No. 144,]

Ans. **[2]**

Sol. Wild life safari parks are the ex-situ conservation strategy

Q.102 Which of the following in sewage treatment removes suspended solids ?

(1) Sludge treatment (2) Tertiary treatment

(3) Secondary treatment (4) Primary treatment

Students may find similar question in CP exercise sheet : Ecology

[Chapter : Environmental Issue Theory, Page No. 181]

Ans. **[4]**

Sol. Primary treatment in Sewage treatment plant involves filtration & Sedimentation leads to separation of suspended solids.

(3) X = 12, Y = 5 True ribs are attached dorsally to vertebral column and sternum on the two ends.

(4) X = 24, Y = 7 True ribs are dorsally attached to vertebral column but are free on ventral side.

Students may find this in CP sheet : Skeletal System,Page No. 107

Ans. **[2]**

Q.104 Double fertilization is exhibited by :

(1) Angiosperms (2) Gymnosperms (3) Algae (4) Fungi

Ans. **[1]**

Sol. Double fertilization and triple fusion are characteristic feature of angiosperms.

Q.105 Attractants and rewards are required for :

(1) Cleistogamy (2) Anemophily (3) Entomophily (4) Hydrophily

Ans. **[3]**

Sol. Attractants and Rewards are required to attract insects for pollination i.e. entomophily

Q.106 Which one from those given below is the period for Mendel's hybridization experiments ?

(1) 1870 – 1877 (2) 1856 – 1863 (3) 1840 – 1850 (4) 1857 – 1869

Students may find this in CP sheet : Genetics, Page No. 4

Ans. **[2]**

Q.107 Receptor sites for neurotransmitters are present on

(1) post-synaptic membrane (2) membranes of synaptic vesicles

(3) pre-synaptic membrane (4) tips of axons

Students may find similar question in CP exercise sheet : Animal Physiology - II

Ans. **[1]**

Sol. Receptor site the neurotransmitters are present on postsynaptic membrane.

Q.108 Which among these is the **correct** combination of aquatic mammals ?

(1) *Trygon*, Whales, Seals

(2) Seals, Dolphins, Sharks

(3) Dolphins, Seals, *Trygon*

(4) Whales, Dolphins, Seals

Students may find this in CP sheet : Animal Diversity, Page No. 130

Ans. **[4]**

Sol. Whale, Dolphins, Seals are aquatic mammals belongs order cetacean.

(c) Retinal is derivative of Vitamin A

(d) Retinal is a light absorbing part of all the visual photopigments

Options :

(1) (b), (c) and (d) (2) (a) and (b) (3) (a), (c) and (d) (4) (a) and (c)

Students may find similar question in CP exercise sheet : Animal Physiology - I
[Page No. 161]

Ans. **[4]**

Sol. Carotene is precursor of vitamin A. It is required for synthesis of visual pigments in rods & cone cells of retina.

Q.110 What is the criterion for DNA fragments movement on agarose gel during gel electrophoresis ?

(1) Negatively charged fragments do not move

(2) The larger the fragment size, the farther it moves

(3) The smaller the fragment size, the farther it moves

(4) Positively charged fragment move to farther end

Students may find this in CP sheet : Genetics, Page No. 42

Ans. **[3]**

Q.111 Hypersecretion of Grwoth Hormone in adults does not cause further increase in height, because :

(1) Muscle fibres do not grow in size after birth

(2) Growth Hormone becomes inactive in adults

(3) Epiphyseal plates close after adolescence

(4) Bones loose their sensitivity to Growth Hormone in adults

Students may find similar question in CP exercise sheet : Animal Physiology - I
[Page No. 24]

Ans. **[3]**

Sol. Hypersecretion of growth hormone in adults does not cause further increases in height because the epiphysial plates (growth plates) closes after adolescence.

Q.112 Which of the following represents order of 'Horse' ?

(1) Ferus (2) Equidae (3) Perissodactyla (4) Caballus

Students may find this in CP sheet : Animal Diversity, Page No. 131

Ans. **[3]**

Sol. Horse belongs to order parissodactyla of class mammalia

Order parissodactyla consist mammals with odd toes.

(3) Both are due to a quantitative defect in globin chain synthesis

(4) Thalassemia is due to less synthesis of globin molecules

Ans. **[4]**

Sol. NCERT-XII Bio Topic – Supplementary Material for Senior Secondary biology – Thalassemia & class notes

Q.114 Myelin sheath is produced by :

(1) Osteoclasts and Astrocytes

(2) Schwann Cells and Oligodendrocytes

(3) Astrocytes and Schwann Cells

(4) Oligodendrocytes and Osteoclasts

Students may find this in CP sheet : Animal Physiology - II

Ans. **[2]**

Sol. Myelin sheath is produced by Schwann cells in PNS & oligodendrocyte cells in CNS.

Q.115 Homozygous purelines in cattle can be obtained by :

(1) mating of individuals of different species

(2) mating of related individuals of same breed

(3) mating of unrelated individuals of same breed

(4) mating of individuals of different breed

Students may find similar question in CP exercise sheet : Genetics & Class Notes
***Page No. 6*]**

Ans. **[2]**

Q.116 Mycorrhizae are the example of :

(1) Mutualism (2) Fungistasis (3) Amensalism (4) Antibiosis

Students may find similar question in CP exercise sheet : Ecology
***[Chapter : Population & Community Theory, Page No. 67*]**

Ans. **[1]**

Sol. Mycorrhiza is mutualistic interaction between algae & fungi

Q.117 A baby boy aged two years is admitted to play school and passes through a dental check-up. The dentist observed that the boy had twenty teeth. Which teeth were absent ?

(1) Molars (2) Incisors (3) Canines (4) Pre-molars

Students may find similar question in CP exercise sheet : Animal Physiology-I, Page No. 133

Ans. **[4]**

Sol. Premolar teeth are absent in child who bears only milk teeth.

Ans. **[3]**

Q.119 The hepatic portal vein drains blood to liver from :

(1) Intestine (2) Heart (3) Stomach (4) Kidneys

Ans. **[1]**

Sol. Hepatic portal vein carries nutrient rich blood from intestine to liver.

Q.120 Which cells of 'Crypts of Lieberkuhn' secrete antibacterial lysozyme ?

(1) Kupffer cells (2) Argentaffin cells (3) Paneth cells (4) Zymogen cells

Ans. **[3]**

Sol. Antibacterial lysozymes are produced by paneth cells present in crypts of Lieberkuhn.

Q.121 Spliceosomes are **not** found in cells of :

(1) Bacteria (2) Plants (3) Fungi (4) Animals

Students may find this in CP sheet :Protoplasm, Page No.136

Ans. **[1]**

Sol. Spliceosomes are required for splicing of introns which are absent in Bacteria.

Q.122 Frog's heart when taken out of the body continues to beat for sometime.

Select the best option from the following statements.

(a) Frog is a poikilotherm

(b) Frog does not have any coronary circulation

(c) Heart is "myogenic" in nature

(d) Heart is autoexcitable

Options :

(1) (c) and (d) (2) Only (c) (3) Only (d) (4) (a) and (b)

Students may find this in CP sheet : Lower Animal

Ans. **[1]**

Sol. Frog's heart is myogenic and auto excitable

Q.123 Functional megaspore in an angiosperm develops into :

(1) Embryo (2) Ovule (3) Endosperm (4) Embryo sac

Ans. **[4]**

Sol. Functional megaspore in an angiosperm develops into female gametophyte i.e embryo sac.

[*Chapter :Biodiversity theory, Page No.138*]

Ans. **[4]**

Sol. Alexander Von Humbolt imposed species area relationship.

Q.125 The morphological nature of edible part of coconut is :

(1) Pericarp (2) Perisperm (3) Cotayledon (4) Endosperm

Students may find similar question in CP exercise sheet : Structural Organisation in Plants
Theory Chart, *Page No.117*

Ans. **[4]**

Sol. Endosperm is edible part of coconut.

Q.126 A temporary endocrine gland in the human body is :

(1) Corpus allatum (2) Pineal gland (3) Corpus cardiacum (4) Corpus luteum

Students may find similar question in CP sheet :Animal physiology-II Page No.174

Ans. **[4]**

Sol. Temporary endocrine gland in human body is corpus luteum present in ovaries. It is formed from graafian follicles after ovulation and produce hormones like progesterone and estrogens.

Q.127 Flowers which have single ovule in the ovary and are packed into inflorescence are usually pollinated by :

(1) Bat (2) Water (3) Bee (4) Wind

Ans. **[4]**

Sol. Wind pollinated (Anemophilous) flowers occur in inflorescence and has single ovule in the ovary.

Q.128 The pivot joint between atlas and axis is a type of :

(1) saddle joint (2) fibrous joint (3) cartilaginous joint (4) synovial joint

Students may find similar question in CP sheet : Animal physiology-II Page No.177

Ans. **[4]**

Sol. Median at lento axial joint is a pivot type of synovial joint which helps in rotatory movements.

Q.129 A decrease in blood pressure/volume will **not** cause the release of :

(1) ADH (2) Renin

(3) Atrial Natriuretic Factor (4) Aldosterone

Students may find similar question in CP exercise sheet : Animal Physiology-II, Page no.177

Ans. **[3]**

Sol. Fall in blood pressure/blood volume will not cause release of atrial natriuretic factor (ANF) because it causes fall in blood pressure/blood volume by suppressing release of rennin.

[*Chapter : Ecosystem, Page No.98*]

Ans. **[2]**

Sol. Forest ecosystem posses highest biomass.

Q.131 A disease caused by an autosomal primary non-disjunction is :

(1) Sickle Cell Anemia (2) Down's Syndrome

(3) Klinefelter's Syndrome (4) Turner's Syndrome

Students may find similar question in CP exercise sheet : Immunity and Disease
[*Page No.133*]

Ans. **[2]**

Q.132 Which of the following cell organelles is responsible for extracting energy from carbohydrates to form ATP?

(1) Mitochondrion (2) Lysosome

(3) Ribosome (4) Chloroplast

Students may find similar question in CP exercise sheet : Plant Physiology
[*Chapter : Cell Respiration, Page No.72,*]

Ans. **[1]**

Sol. Mitochondria (Power house of cell) is responsible for extracting energy from carbohydrates to ATP by electron transport system.

Q.133 DNA replication in bacteria occurs-

(1) Just before transcription (2) During S phase

(3) Within nucleolus (4) Prior to fission

Ans. **[4]**

Sol. DNA replication in bacteria occurs.

Q.134 In case of a couple where the male is having a very low sperm count, which technique will be suitable for fertilization ?

(1) Intracytoplasmic sperm injection

(2) Intrauterine transfer

(3) Gamete intracytoplasmic fallopian transfer

(4) Artifical Insemination

***Students may find this in CP sheet : Reproductive Health, Page No.61*]**

Ans. **[4]**

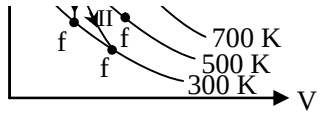
(4) They cause increased agricultural productivity

Students may find similar question in CP exercise sheet : Ecology

[*Chapter : Environmental issues, Page No.170,*]

Ans. **[4]**

Sol. Aerosols are air pollutants produces as smog, fog and decrease the ahricultral productivity.



Match the following :

Column -1	Column -2
P. Process I	a. Adiabatic
Q. Process II	b. Isobaric
R. Process III	c. Isochoric
S. Process IV	d. Isothermal

(1) P $\rightarrow$ d, Q $\rightarrow$ b, R $\rightarrow$ a, S $\rightarrow$ c

(2) P $\rightarrow$ a, Q $\rightarrow$ c, R $\rightarrow$ d, S $\rightarrow$ b

(3) P $\rightarrow$ c, Q $\rightarrow$ a, R $\rightarrow$ d, S $\rightarrow$ b

(4) P $\rightarrow$ c, Q $\rightarrow$ d, R $\rightarrow$ b, S $\rightarrow$ a

Students may find similar question in CP exercise sheet :

[*Chapter : Thermodynamics, Exercise # 3(B), Page No.46, Q.182*]

Ans. **[3]**

Sol. P $\rightarrow$ c

Q $\rightarrow$ a

R $\rightarrow$ d

S $\rightarrow$ b

Q.137 Consider a drop of rain water having mass 1g falling from a height of 1 km. It hits the ground with a speed of 50 m/s. Take 'g' constant with a value 10 m/s^2. The work done by the (i) gravitational force and the (ii) resistive force of air is

(1) (i) 10 J (ii) – 8.75 J (2) (i) –10 J (ii) –8.25 J

(3) (i) 1.25 J (ii) –8.25 J (4) (i) 100 J (ii) 8.75 J

Students may find similar question in CP exercise sheet :

[*Chapter : Work, Power & Energy, Exercise # 3(B), Page No.105, Q.4*]

Ans. **[1]**

Sol. (i) Work done by the gravitational force = mgh = $1 \times 10^{-3} \times 10 \times 1000 = 10$ J

(ii) Work done by resistive force

$$W_r = -mgh + \frac{1}{2}mv^2$$

$$= -10 + \frac{1}{2}10^{-3}(50)^2 = -8.75 \text{ J}$$

[*Chapter : Magnetism, Exercise # 1, Page No.71, Q.122*]

Ans. **[2]**

Sol. $W = MB(\cos 0^\circ - \cos 180^\circ)$

$W = 2\,MB$

$= 2(NIA)B$

$= 2 \times 250 \times 85 \times 10^{-6} \times 2.1 \times 1.25 \times 10^{-4} \times 0.85$

$= 9.4 \times 10^{-6}$ J

$= 9.1\ \mu J$

Q.139 Two Polaroids P_1 and P_2 are placed with their axis perpendicular to each other. Unpolarised light I_0 is incident on P_1. A third polaroid P_3 is kept in between P_1 and P_2 such that its axis makes an angle 45º with that of P_1. The intensity of transmitted light through P_2 is

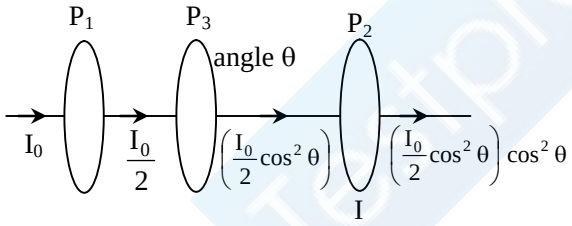
(1) $\frac{I_0}{16}$ (2) $\frac{I_0}{2}$ (3) $\frac{I_0}{4}$ (4) $\frac{I_0}{8}$

Students may find similar question in CP exercise sheet :

[*Chapter : Polarisation, Exercise # Solved Examples, Page No.117, Q.3*]

Ans. **[4]**

Sol.



Intensity of light after passing from I Polaroid = $\frac{I_0}{2}$

<u>from malus law</u>

Intensity of light after passing from II Polaroid = $\frac{I_0}{2}\cos^2\theta = \frac{I_0}{2}\cos^2 45^\circ = \frac{I_0}{4}$

Intensity of light after passing from III Polaroid $= \frac{I_0}{4}\cos^2\theta$

$= \frac{I_0}{4}\cos^2(45^\circ)$

$= \frac{I_0}{4} \times \frac{1}{2} = \frac{I_0}{8}$

9λ λ 7λ 8λ

Students may find similar question in CP Class notes of Chapter : Radioactivity

Ans. **[B/3]**

Sol.

A	B
8λ	λ
N_0	N_0

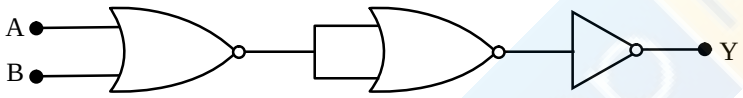
$$\frac{N_B}{N_A} = \frac{N_0 e^{-\lambda t}}{N_0 e^{-8\lambda t}} = \frac{1}{e}$$

$\boxed{e^{-7\lambda t} = e^{1}}$

Not possible

given answer by CBSE is correct for $\frac{N_A}{N_B}$ but in question $\frac{N_B}{N_A}$ is asked so none option is correct

Q.141 The given electrical network is equivalent to



(1) NOT gate (2) AND gate (3) OR gate (4) NOR gate

Students may find similar question in CP exercise sheet :
[Chapter : Electronics, Exercise # 3(A), Page No.190, Q.171]

Ans. **[4]**

Sol.

NOR + NOT + NOT ≡ NOR

Q.142 The ratio of resolving powers of an optical microscope for two wavelengths λ_1 = 4000 Å and λ_2 = 6000 Å is

(1) 16 : 81 (2) 8 : 27 (3) 9 : 4 (4) 3 : 2

Students may find similar question in CP Class notes of Chapter : Ray Optics

Ans. **[4]**

Sol. R.P. $\propto \frac{1}{\lambda}$

$$\left(\frac{\text{R.P}_1}{\text{R.P}_2}\right) = \frac{\lambda_2}{\lambda_1} = \frac{6000}{4000}$$

$$= \frac{3}{2}$$

Students may find similar question in CP Class notes of Chapter : Semiconductor

Ans. **[4]**

Sol. $A_v = \beta\frac{R_O}{R_{in}} = \beta\frac{R_C}{R_B} = 100 \times \frac{3k\Omega}{2k\Omega} = 150$

$A_p = \beta^2\frac{R_C}{R_B} = 100 \times 100 \times \frac{3}{2} = 15000$

Q.144 Two cars moving in opposite directions approach each other with speed of 22 m/s and 16.5 m/s respectively. The driver of the first car blows a horn having a frequency 400 Hz. The frequency heard by the driver of the second car is [velocity of sound 340 m/s] :

(1) 448 Hz (2) 350 Hz (3) 361 Hz (4) 411 Hz

Students may find similar question in CP exercise sheet :
[Chapter : Doppler Effect, Exercise # 3(B), Page No.85, Q.291]

Ans. **[1]**

Sol. $n' = n\left(\frac{v + v_0}{v - v_s}\right)$

$= 400\left[\frac{340 + 16.5}{340 - 22}\right]Hz$

$= 400 \times \frac{356.5}{318}Hz$

$= 448.427$ Hz

Q.145 Two astronauts are floating in gravitational free space after having lost contact with their spaceship. The two will :

(1) will become stationary (2) keep floating at the same distance between them.

(3) move towards each other (4) move away from each other.

Students may find similar question in CP Class notes of Chapter : Gravitation

Ans. **[3]**

Sol. Move towards each other due to mutual gravitational force.

Q.146 A gas mixture consists of 2 moles of O_2 and 4 moles of Ar at temperature T. Neglecting all vibrational modes, the total internal energy of the system is :

(1) 11 RT (2) 4 RT (3) 15 RT (4) 9 RT

Students may find similar question in CP exercise sheet :
[Chapter : K.T.G., Exercise # 3(A), Page No.143, Q.251]

Ans. **[1]**

$$= 2\left(\frac{5}{2}R\right)T = 5RT$$

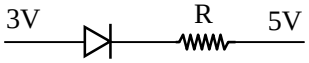
$$U_{Ar} = (4)\left(\frac{3}{2}R\right)(T) = 6RT$$

$$U_{mix} = U_{O_2} + U_{Ar}$$

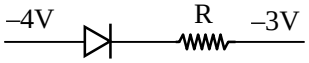
$$= 5RT + 6RT$$

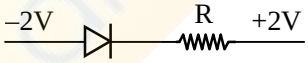
$$= 11\ RT$$

Q.147 Which one of the following represents forward bias diode ?

(1) 

(2) 

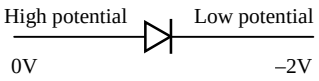
(3) 

(4) 

Students may find similar question in CP exercise sheet :
[Chapter : Semiconductor, Exercise # 3(A), Page No.194, Q.64]

Ans. **[2]**

Sol.



Q.148 A long solenoid of diameter 0.1 m has 2×10^4 turns per meter. At the centre of the solenoid, a coil of 100 turns and radius 0.01 m is placed with its axis coinciding with the solenoid axis. The current in the solenoid reduces at a constant rate to 0A from 4 A in 0.05 s. If the resistance of the coil is $10\ \pi^2\ \Omega$, the total charge flowing through the coil during this time is :

(1) $16\ \pi\ \mu C$ (2) $32\ \pi\ \mu C$ (3) $16\ \mu\ C$ (4) $32\ \mu\ C$

Students may find similar question in CP exercise sheet :
[Chapter : EMI, Exercise # Example, Page No.159, Q.18]

Ans. **[4]**

Sol. $$q_{ind} = -\frac{d\phi}{R} = -\left(\frac{\phi_2 - \phi_1}{R}\right)$$

$$= -\left[\frac{0 - \phi_1}{R}\right]$$

$$= \frac{\phi_1}{R}$$

$= 32 \times 10^{-6}$ Coulomb

$= 32\ \mu C$

Q.149 A rope is wound around a hollow cylinder of mass 3 kg and radius 40 cm. What is the angular acceleration of the cylinder if the rope is pulled with a force of 30 N ?

(1) 5 m/s^2 (2) 25 m/s^2 (3) 0.25 rad/s^2 (4) 25 rad/s^2

Students may find similar question in CP exercise sheet :

[*Chapter : Rotational Motion, Exercise # Practice Question, Page No.128, Q.3*]

Ans. **[4]**

Sol. $\tau = I\alpha$

$rF = I\alpha \qquad \because I = MR^2$

$.4 \times 30 = 3(.4)^2\alpha$

$\alpha = \dfrac{30}{1.2} = 25\ rad/s^2$

Q.150 A capacitor is charged by a battery. The battery is removed and another identical uncharged capacitor is connected in parallel. The total electrostatic energy of resulting system :

(1) increases by a factor of 2 (2) increases by a factor of 4

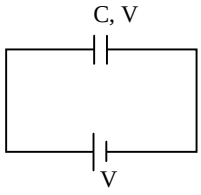
(3) decreases by a factor of 2 (4) remains the same

Students may find similar question in CP exercise sheet :

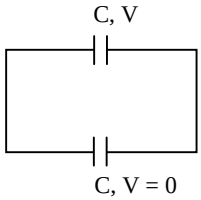
[*Chapter : Capacitance, Exercise # 3(A), Page No.122, Q.3*]

Ans. **[3]**

Sol.



$U_{system} = \dfrac{1}{2} CV^2$



Energy loss $= \dfrac{C_1C_2}{2(C_1 + C_2)}(V_1 - V_2)^2$

$= U_{system}$ becomes halt.

Q.151 The acceleration due to gravity at a height 1 km above the earth is the same as at a depth d below the surface of earth. Then :

(1) d = 2km (2) $d = \frac{1}{2}$ km (3) d = 1km (4) $d = \frac{3}{2}$ km

Students may find similar question in CP exercise sheet :
[*Chapter : Gravitation, Exercise # 3(B), Page No.219, Q.35*]

Ans. **[1]**

Sol. $g_h = g_d$

$$g\left(1-\frac{2h}{R}\right) = g\left(1-\frac{d}{R}\right)$$

$d = 2h = 2 \times 1 = 2$ km

Q.152 A particle executes linear simple harmonic motion with an amplitude of 3 cm. When the particle is at 2 cm from the mean position, the magnitude of its velocity is equal to that of its acceleration. Then its time period in seconds is :

(1) $\frac{2\pi}{\sqrt{3}}$ (2) $\frac{\sqrt{5}}{\pi}$ (3) $\frac{\sqrt{5}}{2\pi}$ (4) $\frac{4\pi}{\sqrt{5}}$

Students may find similar question in CP exercise sheet :
[*Chapter : S.H.M., Exercise # Example, Page No.238, Q.6*]

Ans. **[4]**

Sol. $v = \omega\sqrt{a^2 - x^2}$

$|f| = \omega^2 x$

$\omega^2 x = \omega\sqrt{a^2 - x^2}$

$$\omega = \frac{\sqrt{a^2 - x^2}}{x}$$

$$= \frac{\sqrt{3^2 - 2^2}}{2} = \frac{\sqrt{9-4}}{2}$$

$$\omega = \frac{\sqrt{5}}{2}$$

$$\frac{2\pi}{T} = \frac{\sqrt{5}}{2}$$

$$T = \frac{4\pi}{\sqrt{5}}$$

Students may find similar question in CP exercise sheet :
[Chapter : Thermodynamics, Exercise # 3(A), Page No.177, Q.531]

Ans. **[3]**

Sol. $\eta = \frac{1}{10} = \frac{W}{Q_1}$

$Q_1 = \frac{W}{\eta} = \frac{10\,J}{1/10} = 100\,J$

$Q_2 = Q_1 - W$

$= 100 - 10$

$= 90$ J

Q.154 The photoelectric threshold wavelength of silver is 3250×10^{-10} m. The velocity of the electron ejected from a silver surface by ultraviolet light of wavelength 2536×10^{-10} m is :
(Given $h = 4.14 \times 10^{-15}$ eVs and $c = 3 \times 10^8$ ms^{-1})
(1) $\approx 0.3 \times 10^6$ ms^{-1} (2) $\approx 6 \times 10^5$ ms^{-1} (3) $\approx 0.6 \times 10^6$ ms^{-1} (4) $\approx 61 \times 10^3$ ms^{-1}

Students may find similar question in CP exercise sheet :
[Chapter : Photoelectric Effect, Exercise # 1]

Ans. **[2,3]**

Sol. $\frac{1}{2}mv^2 = hc\left(\frac{1}{\lambda} - \frac{1}{\lambda_c}\right)$

$\frac{1}{2} \times 9.1 \times 10^{-31}\ \ v^2 = 6.62 \times 10^{-31} \times 3 \times 10^8 \left(\frac{3250 - 2536}{3250 \times 2536}\right)$

In approximation

$\approx 6 \times 10^5$ m/s

$\approx 0.6 \times 10^6$ m/s

Both are correct, but no option is exactly correct in options approximate

Q.155 Suppose the charge of a proton and an electron differ slightly. One of them is – e, the other is (e + Δe). If the net of electrostatic force and gravitational force between two hydrogen atoms placed at a distance d (much greater than atomic size) apart is zero, then Δe is of the order of [Given mass of hydrogen $m_h = 1.67 \times 10^{-27}$ kg]
(1) 10^{-47} C (2) 10^{-20} C (3) 10^{-23} C (4) 10^{-37} C

Students may find similar question in CP exercise sheet :
[Chapter : Electrostatics, Exercise # 1, Page No.50, Q.61]

Ans. **[4]**

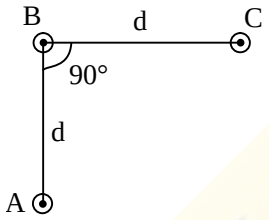
$(\Delta e)^2 = \dfrac{\qquad\qquad}{9\times10^9}$

$(\Delta e)^2 = 2.045 \times 10^{-74}$

$\Delta e \approx 1.4 \times 10^{-37}$

$\Delta e = 10^{-37}$

Q.156 An arrangement of three parallel straight wires placed perpendicular to plane of paper carrying same current 'I' along the same direction is shown in Fig. Magnitude of force per unit length on the middle wire 'B' is given by :

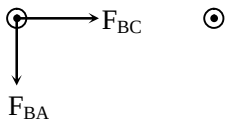


(1) $\dfrac{\mu_0 i^2}{\sqrt{2}\,\pi d}$ (2) $\dfrac{\mu_0 i^2}{2\pi d}$ (3) $\dfrac{2\mu_0 i^2}{\pi d}$ (4) $\dfrac{\sqrt{2}\mu_0 i^2}{\pi d}$

Students may find similar question in CP Class notes of Chapter : Magnetic Field

Ans. **[1]**

Sol.



$F_{BA} = \dfrac{\mu_0(I)(I)}{2\pi d} = \dfrac{\mu_0 I^2}{2\pi d} = F_{BC}$

$\therefore F_{net} = \sqrt{2}\left(\dfrac{\mu_0 I^2}{2\pi d}\right) = \dfrac{\mu_0 I^2}{\sqrt{2}\,\pi d}$

Q.157 The resistance of a wire is 'R' ohm. If it is melted and stretched to 'n' times its original length, its new resistance will be

(1) $\dfrac{R}{n^2}$ (2) nR (3) $\dfrac{R}{n}$ (4) n^2R

Students may find similar question in CP exercise sheet :
[Chapter : Current Electricity, Exercise # 1, Page No.194, Q.36]

Ans. **[4]**

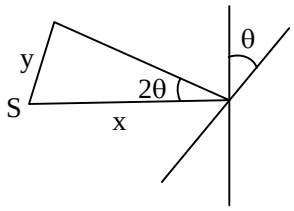
Q.158 A beam of light from a source L is incident normally in a plane mirror fixed at a certain distance x from the source. The beam is reflected back as a spot on a scale placed just above the source L. When the mirror is rotated through a small angle θ, the spot of the light is found to move through a distance y on the scale. The angle θ is given by-

(1) $\frac{x}{y}$ (2) $\frac{y}{2x}$ (3) $\frac{y}{x}$ (4) $\frac{x}{2y}$

Students may find similar question in CP Class notes of Chapter : Ray Optics

Ans. **[2]**

Sol.



$2\theta = \frac{y}{x}$ $\theta = \frac{y}{2x}$

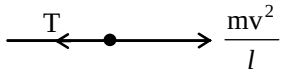
Q.159 One end of string of length *l* is connected to a particle of mass 'm' and the other end is connected to a small peg on a smooth horizontal table. If the particle moves in circle with speed 'v' the net force on the particle (directed towards center) will be (T represents the tension in the string)

(1) Zero (2) T (3) $T + \frac{mv^2}{l}$ (4) $T - \frac{mv^2}{l}$

Students may find similar question in CP Class notes of Chapter : Circular Motion

Ans. **[2]**

Sol.



$F_{net} = T = \frac{mv^2}{l}$

Q.160 A physical quantity of the dimensions of length that can be formed out of c, G and $\frac{e^2}{4\pi \in_0}$ is [c is velocity of light, G is universal constant of gravitation and e is charge] ;

[*Chapter : Unit & Dimension, Exercise # 1(B), Page No.19, Q.221*]

Ans. **[2]**

Sol. $M^0 L^1 T^0 Q^0 = c^x \; G^y \left(\frac{e^2}{4\pi\varepsilon_0}\right)^z$

$$= \left[M^0 L T^{-1}\right]^x \left[\frac{M^1 L^1 T^{-2} \times L^2}{M^2}\right]^y \left[M^1 L^1 T^{-2} \times L^2\right]^z$$

$-y + z = 0$ ....(i)

$x + 3y + 3z = 1$ ....(ii)

$-x - 2y - 2z = 0$ .....(iii)

$x = -2$

$y = z = \frac{1}{2}$

Q.161 A thin prism having refracting angle 10° is made of glass of refractive index 1.42. This prism is combined with another thin prism of glass of refractive index 1.7. This combination produces dispersion without deviation. The refracting angle of second prism should be :

(1) 10° (2) 4° (3) 6° (4) 8°

Students may find similar question in CP Class notes of Chapter : Ray Optics

Ans. **[3]**

Sol. For dispersion without deviation

$$\frac{A'}{A} = -\frac{\mu - 1}{\mu' - 1}$$

$$\frac{A'}{10^o} = -\frac{1.42 - 1}{1.7 - 1}$$

$$\frac{A'}{10^o} = -\frac{0.42}{7}$$

$A' = -6^o$

Q.162 The ratio of wavelengths of the last line of Balmer series and the last line of Lyman series is :

(1) 0.5 (2) 2 (3) 1 (4) 4

Students may find similar question in CP Class notes of Chapter : Atomic Structure

Ans. **[4]**

$$\Rightarrow \lambda_1 = \frac{1}{R}$$

$$\text{Balmer } \frac{1}{\lambda_2} = R\left(\frac{1}{2^2} - \frac{1}{\infty}\right)$$

$$\frac{1}{\lambda_2} = \frac{R}{4}$$

$$\Rightarrow \lambda_2 = \frac{4}{R}$$

$$\frac{\lambda_2}{\lambda_1} = 4$$

Q.163 The two nearest harmonics of a tube closed at one end and open at other end are 220 Hz and 260 Hz. What is the fundamental frequency of the system ?

(1) 40 Hz (2) 10 Hz (3) 20 Hz (4) 30 Hz

Students may find similar question in CP exercise sheet :

[Chapter : Wave theory, Exercise # 2, Page No.58, Q.791]

Ans. **[3]**

Sol. $n\left(\frac{v}{4L}\right) = 220$ ....(i)

$(n + 2)\left(\frac{v}{4L}\right) = 260$ ...(ii)

equation (i)/(ii) $\frac{n\left(\frac{v}{4L}\right)}{(n+2)\left(\frac{v}{4L}\right)} = \frac{22}{26}$

$$\frac{n}{n+2} = \frac{11}{13}$$

$13n = 11n + 22$

$2n = 22$

$(n = 11)$

from equation (i) $11.\left(\frac{v}{4L}\right) = 220$

$$\frac{v}{4L} = 20 \text{ Hz}$$

(3) potential gradients

(4) a condition of no current flow through the galvanometer

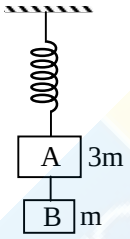
Students may find similar question in CP exercise sheet :

[*Chapter : Electrical Instrument, Exercise # 3(B), Page No.223, Q.99*]

Ans. **[4]**

Sol. Potentiometer does not draw any current from circuit under measurement so measurement is accurate.

Q.165 Two blocks A and B of masses 3m and m respectively are connected by a massless and inextensible string. The whole system is suspended by a massless spring as shown in figure. The magnitudes of acceleration of A and B immediately after the string is cut, are respectively :

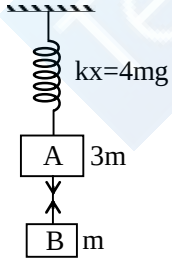


(1) $\frac{g}{3}, \frac{g}{3}$ (2) $g, \frac{g}{3}$ (3) $\frac{g}{3}, g$ (4) g, g

Students may find similar question in CP DPPS-11, Chapter : N.L.M.

Ans. **[3]**

Sol. When string AB is cut



For B block $mg = ma$

$a = g$

For A block $kx - 3mg = 3ma$

$4mg - 3mg = 3ma$

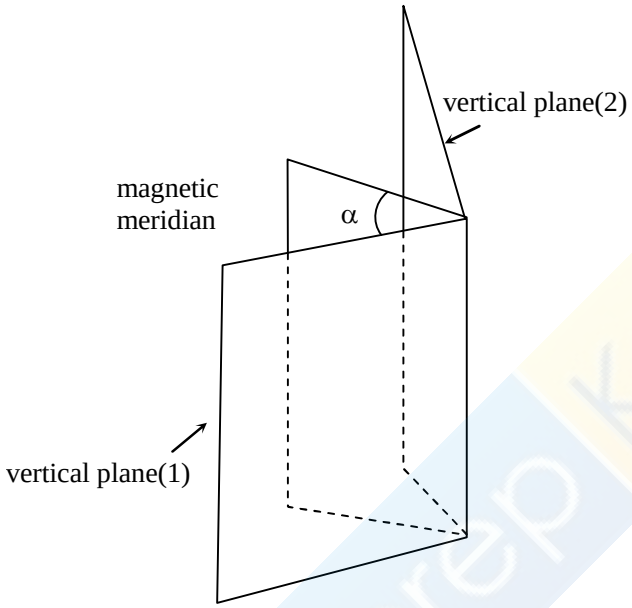
$a = \frac{g}{3}$

(3) $\tan^{\angle}\theta = \tan^{\angle}\theta_1 + \tan^{\angle}\theta_2$ (4) $\cot^{\angle}\theta = \cot^{\angle}\theta_1 - \cot^{\angle}\theta_2$

Students may find similar question in CP Class notes of Chapter : Magnetic Field

Ans. **[2]**

Sol.



Relation between real and apparent dip

$$\tan\theta' = \frac{\tan\theta}{\cos\alpha}$$

For MM and plane (1)

$$\tan\theta_1 = \frac{\tan\theta}{\cos\alpha}$$

$$\Rightarrow \quad \cos\alpha = \frac{\tan\theta}{\tan\theta_1} \qquad \ldots.(1)$$

For MM and plane (2)

$$\tan\theta_2 = \frac{\tan\theta}{\cos(90^\circ - \alpha)}$$

$$\therefore \quad \sin\alpha = \frac{\tan\theta}{\tan\theta_2} \qquad \ldots.(2)$$

$(1)^2 + (2)^2$

$$1 = \frac{\tan^2\theta}{\tan^2\theta_1} + \frac{\tan^2\theta}{\tan^2\theta_2}$$

$$\cot^2\theta = \cot^2\theta_1 + \cot^2\theta_2$$

[*Chapter : Properties of Matter, Exercise # 1(B), Page No.186, Q.22*]

Ans. **[1]**

Sol. $$B = \frac{p}{\frac{\Delta V}{V}}$$

$$\frac{\Delta V}{V} = \frac{p}{B}$$

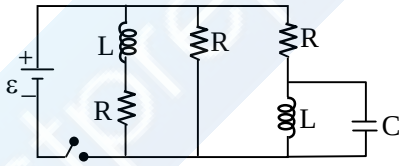
$$\left(\frac{\Delta r}{r}\right)^3 = \frac{p}{B}$$

$$\frac{\Delta r}{r} = \left(\frac{p}{B}\right)^{1/3}$$

For small change

$$\frac{\Delta r}{r} = \frac{p}{3B}$$

Q.168 Figure shows a circuit that contains three identical resistors with resistance R = 9.0 Ω each, two identical inductors with inductance L = 2.0 mH each, and an ideal battery with emf ε = 18 V. The current 'I' through the battery just after the switch closed is,……..



(1) 0 ampere (2) 2 mA (3) 0.2 A (4) 2 A

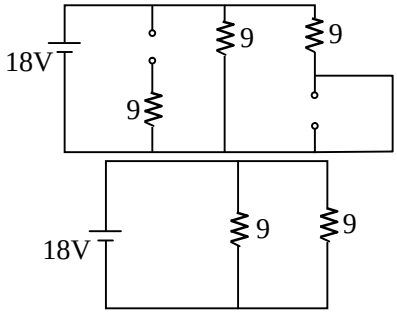
Students may find similar question in CP Class notes of Chapter : E.M.I.

Ans. **Answer not available**

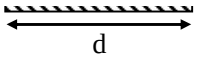
Sol. Just after switch closed

inductor → open circuit

capacitor → short circuit



$$I = \frac{18}{9/2} = 4A$$



(1) $2(K_1 + K_2)$ (2) $\frac{K_1 + K_2}{2}$ (3) $\frac{3(K_1 + K_2)}{2}$ (4) $K_1 + K_2$

Students may find similar question in CP exercise sheet :
[Chapter : Heat transfer, Exercise # 3(A), Page No.218, Q.6]

Ans. **[2]**

Sol. It is a parallel combination then equivalent conductivity of combination is

$$K_{eq} = \frac{K_1 + K_2}{2} \qquad \begin{pmatrix} L_1 = L_2 \\ A_1 = A_2 \end{pmatrix}$$

Q.170 Preeti reached the metro station and found that the escalator was not working. She walked up the stationary escalator in time t_1. On other days, if she remains stationary on the moving escalator, then the escalator takes her up in time t_2. The time taken by her to walk up on the moving escalator will be :

(1) $t_1 - t_2$ (2) $\frac{t_1 + t_2}{2}$ (3) $\frac{t_1 t_2}{t_2 - t_1}$ (4) $\frac{t_1 t_2}{t_2 + t_1}$

Students may find similar question in CP exercise sheet :
[Chapter : One Dimension Motion, Exercise # 2, Page No.109, Q.8]

Ans. **[4]**

Sol. $v_t = v_{es} + v_{preeti}$

$$\frac{d}{t} = \frac{d}{t_2} + \frac{d}{t_1}$$

$$\frac{1}{t} = \frac{t_1 + t_2}{t_1 t_2}$$

$$t = \frac{t_1 t_2}{t_1 + t_2}$$

Q.171 Two discs of same moment of inertia rotating about their regular axis passing through centre and perpendicular to the plane of disc with angular velocities ω_1 and ω_2. They are brought into contact face to face coinciding the axis of rotation. The expression for loss of energy during this process is :

(1) $\frac{I}{8}(\omega_1 - \omega_2)^2$ (2) $\frac{1}{2} I (\omega_1 + \omega_2)^2$ (3) $\frac{1}{4} I (\omega_1 - \omega_2)^2$ (4) $I (\omega_1 - \omega_2)^2$

Students may find similar question in CP exercise sheet :
[Chapter : Rotational Motion, Exercise # 3(A), Page No.162, Q.28]

Ans. **[3]**

so loss of energy

$$\Delta KE_{loss} = \frac{1}{2}I\omega_1^2 + \frac{I}{2}I\omega_2^2 - \frac{1}{2}I\left(\frac{\omega_1+\omega_2}{2}\right)^2$$

$$= \frac{1}{2}I\left(\omega_1^2+\omega_2^2-\frac{\omega_1^2-\omega_2^2-2\omega_1\omega_2}{2}\right)$$

$$= \frac{1}{4}I\left(\omega_1^2+\omega_2^2-2\omega_1\omega_2\right)$$

$$= \frac{1}{4}I(\omega_1-\omega_2)^2$$

Q.172 Which of the following statements are correct ?

(a) Centre of mass of a body always coincides with the centre of gravity of the body.

(b) Centre of mass of a body is the point at which the total gravitational torque on the body is zero.

(c) A couple on a body produce both translational and rotational motion in a body

(d) Mechanical advantage greater than one means that small effort can be used to lift a large load.

(1) (c) and (d) (2) (b) and (d) (3) (a) and (b) (4) (b) and (c)

Students may find similar question in CP Class notes of Chapter : Work, Power & Energy

Ans. **[2]**

Sol. (b) centre of mass of a body is the point at which the total gravitational torque on the body is zero.

(d) Mechanical advantage $= \frac{\text{load}}{\text{effort}}$

M.A. will be more from one when load is more than effort

Q.173 A spherical black body with a radius of 12 cm radiates 450 watt power at 500 K. If the radius were halved and the temperature doubled, the power radiated in watt would be :

(1) 1800 (2) 225 (3) 450 (4) 1000

Students may find similar question in CP exercise sheet :

[*Chapter : Heat transfer, Exercise # 1, Page No.213, Q.65*]

Ans. **[1]**

Sol. $P = eA\sigma T^4$

$P = e(4\pi R^2)(\sigma T^4)$

$P \propto R^2T^4$

$$\frac{P_2}{P_1} = \left(\frac{R_2}{R_1}\right)^2\left(\frac{T_2}{T_1}\right)^4$$

$P_2 = 4P_1$

$= 4\ (450)$

$= 1800$ watt

Q.174 In an electromagnetic wave in free space the root mean square value of the electric field is E_{rms} = 6V/m. The peak value of the magnetic field is :

(1) 4.23×10^{-8} T (2) 1.41×10^{-8} T (3) 2.83×10^{-8} T (4) 0.70×10^{-8} T

Students may find similar question in CP Class notes of Chapter : E.M.W.

Ans. **[3]**

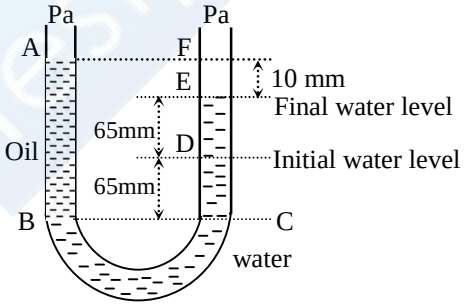
Sol. Speed of light (c) = $\frac{E_{peak}}{B_{peak}}$

$$3 \times 10^8 = \frac{\sqrt{2} \times 6}{B_{peak}}$$

$B_{peak} = 2\sqrt{2} \times 10^{-8}$ T

$= 2.83 \times 10^{-8}$ T

Q.175 A U tube with both ends open to the atmosphere, is partially filled with water. Oil, which is immiscible with water, is poured into one side until it stands at a distance of 10 mm above the water level on the other side. Meanwhile the water rises by 65 mm from its original level (see diagram). The density of the oil is :



(1) 928 kg m^{-3} (2) 650 kg m^{-3} (3) 425 kg m^{-3} (4) 800 kg m^{-3}

Students may find similar question in CP exercise sheet :

[*Chapter : Fluid Mechanics, Exercise # 1(B), Page No.227, Q.21*]

Ans. **[1]**

Sol. $P_B = P_C$

$Pa + \rho_{oil}\ g\ (140\ mm) = Pa + \rho_{water}\ g\ (130\ mm)$

$$\rho_{oil} = \rho_{water} \times \frac{130}{140}$$

Q.176 Young's double slit experiment is first performed in air and then in a medium other than air. It is found that 8^{th} bright fringe in the medium lies where 5^{th} dark fringe lies in air. The refractive index of the medium is nearly :

(1) 1.78 (2) 1.25 (3) 1.59 (4) 1.69

Students may find similar question in CP exercise sheet :

[*Chapter : Interference of light, Exercise # 2, Page No.92, Q.24*]

Ans. **[1]**

Sol. According to question

$$\frac{8\lambda D}{\mu d} = \frac{9\lambda D}{2d}$$

$$\mu = \frac{16}{9} = 1.78$$

Q.177 The de-Broglie wavelength of a neutron in thermal equilibrium with heavy water at a temperature T (Kelvin) and mass m, is :

(1) $\frac{2h}{\sqrt{mkT}}$ (2) $\frac{h}{\sqrt{mkT}}$ (3) $\frac{h}{\sqrt{3mkT}}$ (4) $\frac{2h}{\sqrt{3mkT}}$

Students may find similar question in CP Class notes of Chapter : Matter Waves

Ans. **[3]**

Sol. $\lambda = \frac{h}{\sqrt{2mKE}}$ $\left(K.E = \frac{3}{2}kT\right)$

$$\lambda_{Neutron} = \frac{h}{\sqrt{2m\left(\frac{3}{2}kT\right)}}$$

$$\lambda_N = \frac{h}{\sqrt{3mkT}}$$

Q.178 The x and y coordinates of the particle at any time are $x = 5t - 2t^2$ and $y = 10\ t$ respectively, where x and y are in meters and t in seconds. The acceleration of the particle at $t = 2s$ is :

(1) $-8\ m/s^2$ (2) 0 (3) $5\ m/s^2$ (4) $-4\ m/s^2$

Students may find similar question in CP exercise sheet :

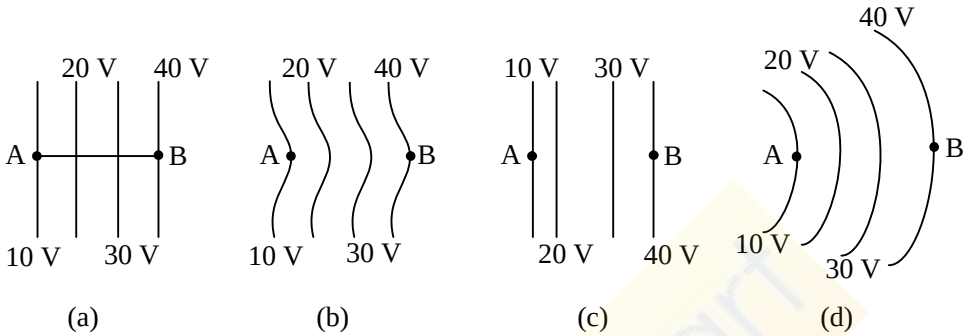
[*Chapter : One Dimension Motion, Exercise # 3(A), Page No.113, Q.5*]

Ans. **[4]**

$a_x = \frac{\quad}{dt} = -4$ $\qquad$ $a_y = \frac{\quad}{dt} = 0$

$a = a_x = -4 m/s^2$

Q.179 The diagrams below show regions of equipotentials.



(a) (b) (c) (d)

A positive charge is moved from A to B in each diagram.

(1) Maximum work is required to move q in figure (b).

(2) Maximum work is required to move q in figure (c).

(3) In all the four cases the work done is the same .

(4) Minimum work is required to move q in figure (a).

Students may find similar question in CP exercise sheet :

[*Chapter : Electrostatics, Exercise # 1, Page No.43, Q.101 & 102*]

Ans. **[3]**

Sol. $W = q [V_B - V_A]$

Does not depend on path. Depends on initial and final points only

$\therefore$ same work in all diagram

Q.180 A spring of force constant k is cut into lengths of ratio 1 : 2 : 3. They are connected in series and the new force constant is k'. Then they are connected in parallel and force constant is k". Then k' : k" is :

(1) 1 : 14 (2) 1 : 6 (3) 1 : 9 (4) 1 : 11

Students may find similar question in CP exercise sheet :

[*Chapter : S.H.M., Exercise # 3(B), Page No.252, Q.3*]

Ans. **[4]**

Sol. For first past

$\frac{k_1}{k} = \frac{6\ell}{\ell}$

$k_1 = 6k$

For third part $k \quad 3\ell$

$k_3 = 2k$

When they are connected in series $\frac{1}{k'} = \frac{1}{2k} + \frac{1}{3k} + \frac{1}{6k}$

$k' = k$ ...(i)

When they are connected in parallel $k'' = 2k + 3k + 6k = 11\,k$ ...(ii)

From (i)/(ii) $\frac{k'}{k''} = \frac{k}{11k} = \frac{1}{11}$