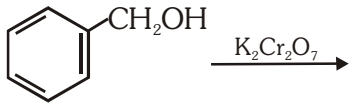
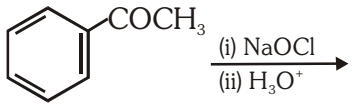
NEET(UG)–2019 (ODISHA) FINAL EXAMINATION

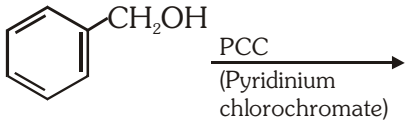
(Held On Monday 20th MAY, 2019)

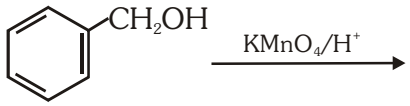
CHEMISTRY | **TEST PAPER WITH ANSWER & SOLUTION**

91. The reaction that **does not** give benzoic acid as the major product is :-

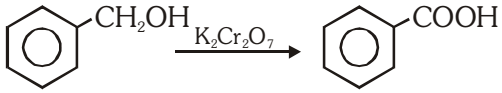
(1) 

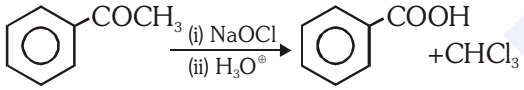
(2) 

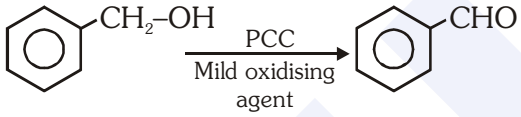
(3) 

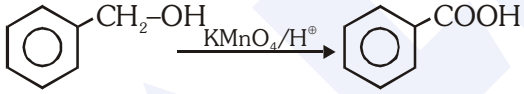
(4) 

Ans. (3)

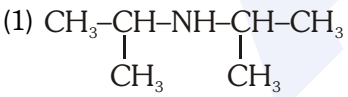
Sol. (1) 

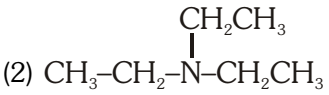
(2) 

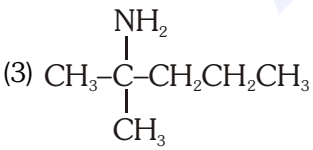
(3) 

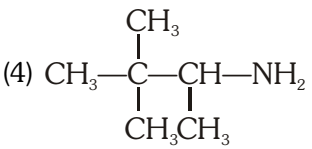
(4) 

92. The amine that reacts will Hinsberg's reagent to give an alkali insoluble product is :-

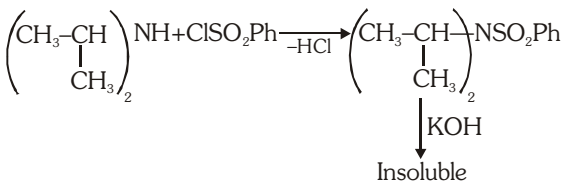
(1) 

(2) 

(3) 

(4) 

Ans. (1)

Sol. 

93. Which structure(s) of proteins remains(s) intact during denaturation process ?

(1) Both secondary and tertiary structures (2) Primary structure only

(3) Secondary structure only (4) Tertiary structure only

Ans. (2)

Sol. During denaturation 2° and 3° structures are destroyed but 1° structure remains intact.

94. The polymer that is used as a substitute for wool in making commercial fibres is :-

(1) Melamine (2) nylon-6, 6 (3) polyacrylonitrile (4) Buna-N

Ans. (3)

Sol. Polyacrylonitrile is used as substitute for wool in making commercial fibres as Orlon or Acrilan.

95. The artificial sweetner stable at cooking temperature and does not provide calories is :-

(1) Saccharin (2) Aspartame (3) Sucralose (4) Alitame

Ans. (3)

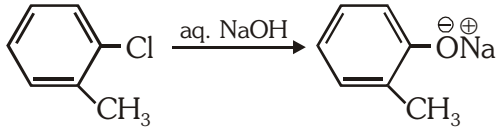
Sol. Sucralose is stable at cooking temperature and does not provide calories.

96. The liquified gas that is used in dry cleaning along with a suitable detergent is :-

(1) Water gas (2) Petroleum gas (3) NO_2 (4) CO_2

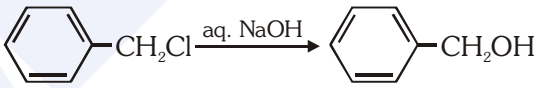
Ans. (4)

97. The hydrolysis reaction that takes place at the slowest rate, among the following is :-

(1) 

(2) $H_3C–CH_2–Cl \xrightarrow{\text{aq. NaOH}} H_3C–CH_2–OH$

(3) $H_2C=CH–CH_2Cl \xrightarrow{\text{aq. NaOH}} H_2C=CH–CH_2OH$

(4) 

Ans. (1)

Sol. Aryl halides don't show NSR easily at room temperature.

98. When vapours of a secondary alcohol is passed over heated copper at 573 K, the product formed is :-

(1) a carboxylic acid (2) an aldehyde (3) a ketone (4) an alkene

Ans. (3)

Sol. $\underset{\text{2°Alcohol}}{CH_3–\underset{\displaystyle CH_3}{\underset{|}{CH}}–OH} \xrightarrow{Cu/573K} \underset{\text{Ketone}}{CH_3–\underset{\displaystyle CH_3}{\underset{|}{C}}=O}$

99. The major products C and D formed in the following reactions respectively are :-

$$H_3C–CH_2–CH_2–O–C(CH_3)_3 \xrightarrow[\Delta]{\text{excess HI}} C + D$$

(1) $H_3C–CH_2–CH_2–I$ and $I–C(CH_3)_3$

(2) $H_3C–CH_2–CH_2–OH$ and $I–C(CH_3)_3$

(3) $H_3C–CH_2–CH_2–I$ and $HO–C(CH_3)_3$

(4) $H_3C–CH_2–CH_2–OH$ and $HO–C(CH_3)_3$

Ans. (1)

Sol. $CH_3–CH_2–CH_2–O–C(CH_3)_3 \xrightarrow[\Delta]{\text{excess HI}}$

$$CH_3 – CH_2 – CH_2 –OH + (CH_3)_3C – I$$

$$\Delta \downarrow HI$$

$$CH_3 – CH_2 – CH_2 – I$$

100. Match the oxide given in column A with its property given in column B:

Column-A	**Column-B**
(i) Na_2O	(a) Neutral
(ii) Al_2O_3	(b) Basic
(iii) N_2O	(c) Acidic
(iv) Cl_2O_7	(d) Amphoteric

Which of the following options has all correct pairs?

(1) (i)-(b), (ii)-(a), (iii)-(d), (iv)-(c)

(2) (i)-(c), (ii)-(b), (iii)-(a), (iv)-(d)

(3) (i)-(a), (ii)-(d), (iii)-(b), (iv)-(c)

(4) (i)-(b), (ii)-(d), (iii)-(a), (iv)-(c)

Ans. (4)

Sol. $Na_2O \rightarrow$ Basic

$Al_2O_3 \rightarrow$ Ampheteric

$N_2O \rightarrow$ Neutral

$Cl_2O_7 \rightarrow$ Acidic

101. Match the catalyst with the process :-

Catalyst	**Process**
(i) V_2O_5	(a) The oxidation of ethyne to ethanal
(ii) $TiCl_4+Al(CH_3)_3$	(b) Polymerisation of alkynes
(iii) $PdCl_2$	(c) Oxidation of SO_2 in the manufacture of H_2SO_4
(iv) Nickel complexes	(d) Polymerisation of ethylene

Which of the following is the correct option ?

(1) i-c, ii-d, iii-a, iv-b

(2) i-a, ii-b, iii-c, iv-d

(3) i-a, ii-c, iii-b, iv-d

(4) i-c, ii-a, iii-d, iv-b

Ans. (1)

102. The most stable carbocation, among the following is :-

(1) $(CH_3)_3C-\overset{\oplus}{C}H-CH_3$

(2) $CH_3-CH_2-\overset{\oplus}{C}H-CH_2-CH_3$

(3) $CH_3-\overset{\oplus}{C}H-CH_2-CH_2-CH_3$

(4) $CH_3-CH_2-\overset{\oplus}{C}H_2$

Ans. (3)

Sol. Due to +H effect of alkyl group (more αH)

103. The alkane that gives only one mono-chloro product on chlorination with Cl_2 in presence of diffused sunlight is :-

(1) 2,2-dimethylbutane (2) neopentane

(3) n-pentane (4) Isopentane

Ans. (2)

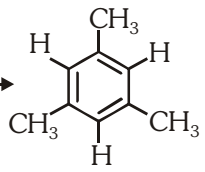
104. In the following reaction,

$H_3C–C\equiv CH \xrightarrow[873\ K]{\text{red hot iron tube}} A,$

the number of sigma(σ) bonds present in the product A is :-

(1) 21 (2) 9 (3) 24 (4) 18

Ans. **(1)**

Sol. $CH_3 - C\equiv CH \xrightarrow[873\ K]{\text{Red hot iron tube}}$ 

(21 σ)

105. Aluminium chloride in acidified aqueous solution forms a complex 'A', in which hybridisation state of Al is 'B'. What are 'A' and 'B', respectively ?

(1) $[Al(H_2O)_6]^{3+}$, sp^3d^2

(2) $[Al(H_2O)_4]^{3+}$, sp^3

(3) $[Al(H_2O)_4]^{3+}$, dsp^2

(4) $[Al(H_2O)_6]^{3+}$, d^2sp^3

Ans. **(1)**

Sol. $AlCl_3$ in acidified aqueous solution form a $[Al(H_2O)_6]^{3+}$

Al^{+3} = [Ne]

sp^3d^2

106. Which of the following compounds is used in cosmetic surgery?

(1) Silica (2) Silicates (3) Silicones (4) Zeolites

Ans. **(3)**

107. Identify the incorrect statement.

(1) The scientific and technological process used for isolation of the metal from its ore is known as metallurgy

(2) Minerals are naturally occurring chemical substances in the earth's crust

(3) Ores are minerals that may contain a metal

(4) Gangue is an ore contaminated with undesired materials

Ans. **(4)**

Sol. Contaminated undesired material present in an ore is called gangue.

108. A compound 'X' upon reaction with H_2O produces a colorless gas 'Y' with rotton fish smell. Gas 'Y' is absorbed in a solution of $CuSO_4$ to give Cu_3P_2 as one of the products. Predict the compound 'X'

(1) Ca_3P_2 (2) NH_4Cl (3) As_2O_3 (4) $Ca_3(PO_4)_2$

Ans. **(1)**

Sol. $Ca_3P_2 + H_2O \rightarrow Ca(OH)_2 + PH_3$

(x) Colourless gas (y)

$CuSO_4 + PH_3 \rightarrow Cu_3P_2 + H_2SO_4$

(y)

hence X is Ca_3P_2 (Calcium phosphide)

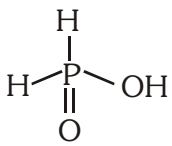
109. Which of the following oxoacids of phosphorus has strongest reducing property?

(1) $H_4P_2O_7$ (2) H_3PO_3 (3) H_3PO_2 (4) H_3PO_4

Ans. **(3)**

Sol. Reducing property ∝ no. of P-H bond

H_3PO_2 contains maximum P–H bond,



110. Identify the correct formula of oleum from the following

(1) $H_2S_2O_7$ (2) H_2SO_3 (3) H_2SO_4 (4) $H_2S_2O_8$

Ans. **(1)**

Sol. Oleum $\rightarrow$ pyrosulphuric acid ($H_2S_2O_7$)

111. When neutral or faintly alkaline $KMnO_4$ is treated with potassium iodide, iodide ion is converted into 'X'. 'X' is-

(1) I_2 (2) IO_4^- (3) IO_3^- (4) IO^-

Ans. **(3)**

Sol. $KMnO_4 + I^- + OH^- \longrightarrow \underset{(x)}{MnO_2} + IO_3^- + H_2O$

112. The Crystal Field Stabilisation Energy (CFSE) for $[CoCl_6]^{4-}$ is 18000 cm^{-1}. The CFSE for $[CoCl_4]^{2-}$ will be-

(1) 6000 cm^{-1} (2) 16000 cm^{-1} (3) 18000 cm^{-1} (4) 8000 cm^{-1}

Ans. **(4)**

Sol. $\Delta_{tetrahedral} = \frac{4}{9} \times \Delta_{octahedral}$

$= \frac{4}{9} \times 18000$

$= 8000\ cm^{-1}$

113. Following limiting molar conductivities are given as

$\lambda^0_{m(H_2SO_4)} = x\ S\,cm^2\,mol^{-1}$

$\lambda^0_{m(K_2SO_4)} = y\ S\,cm^2\,mol^{-1}$

$\lambda^0_{m(CH_3COOK)} = z\ S\,cm^2\,mol^{-1}$

λ^0_m (in $S\,cm^2\,mol^{-1}$) for CH_3COOH will be-

(1) x – y + 2 z (2) x + y – z (3) x – y + z (4) $\frac{(x-y)}{2} + z$

Ans. **(4)**

Sol. $CH_3COOH \rightarrow CH_3COO^- + H^+$ ...(1)

$H_2SO_4 \rightarrow 2H^+ + SO_4^{-2}$ ...(2)

$K_2SO_4 \rightarrow 2K^+ + SO_4^{-2}$ ...(3)

$CH_3COOK \rightarrow CH_3COO^- + K^+$ ...(4)

According to Kohlrausch's law-

$\lambda^\circ_{CH_3COOH} = \lambda^\circ_{CH_3COO^-} + \lambda^\circ_{H^+}$

eq. (1) = eq. (4) + eq. $\frac{(2)}{2}$ – eq. $\frac{(3)}{2}$

$\therefore \quad \lambda^\circ_{CH_3COOH} = z + \frac{x}{2} - \frac{y}{2}$

$\lambda^\circ_{CH_3COOH} = \frac{(x-y)}{2} + z\,(S \times cm^2 mol^{-1})$

114. A first order reaction has a rate constant of $2.303\times10^{-3}\ s^{-1}$. The time required for 40g of this reactant to reduce to 10 g will be-

[Given that $\log_{10} 2=0.3010$]

(1) 230.3 s (2) 301 s (3) 2000 s (4) 602 s

Ans. (4)

Sol. For a first order reaction; $t_{1/2} = \frac{0.693}{K}$

$$t_{1/2} = \frac{0.693}{2.303\times10^{-3}} = 301\ s$$

The time required for 40 g of reactant to reduce to 10g

$t_{75\%} = 2 \times t_{1/2}$

$t_{75\%} = 2 \times 301 =$ **602 s**

115. For a reaction, activation energy $E_a=0$ and the rate constant at 200K is $1.6\times10^{6}s^{-1}$. The rate constant at 400K will be-

[Given that gas constant]

R= 8.314 J K^{-1} mol^{-1}

(1) $3.2\times10^{4}\ s^{-1}$ (2) $1.6\times10^{6}\ s^{-1}$ (3) $1.6\times10^{3}\ s^{-1}$ (4) $3.2\times10^{6}\ s^{-1}$

Ans. (2)

Sol. $$\log\left(\frac{K_2}{K_1}\right) = \frac{E_a}{2.303R}\left(\frac{1}{T_1}-\frac{1}{T_2}\right)$$

Ea = 0

$$\log\left(\frac{K_2}{K_1}\right) = 0$$

$$\frac{K_2}{K_1} = 10^{\circ} = 1$$

$\Rightarrow K_2 = K_1$

K_2 = 1.6 $\times10^{6}$ s^{-1} at 400K

116. The correct option representing a Freundlich adsorption isotherm is

(1) $\frac{x}{m} = kp^{0.3}$ (2) $\frac{x}{m} = kp^{2.5}$ (3) $\frac{x}{m} = kp^{-0.5}$ (4) $\frac{x}{m} = kp^{-1}$

Ans. (1)

Sol. Freundlich adsorption isotherm is $\frac{x}{m} = K(P)^{1/n}$

In it, value of 1/n lies in between 0 to 1. So, correct option is $\mathbf{\frac{x}{m} = KP^{0.3}}$

117. Which of the following is paramagnetic ?

(1) N_2 (2) H_2 (3) Li_2 (4) O_2

Ans. (4)

Sol. According to MOT

118. Which of the following is the correct order of dipole moment ?

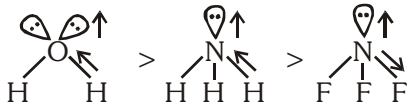
(1) $NH_3 < BF_3 < NF_3 < H_2O$

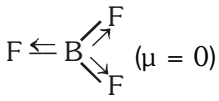
(2) $BF_3 < NF_3 < NH_3 < H_2O$

(3) $BF_3 < NH_3 < NF_3 < H_2O$

(4) $H_2O < NF_3 < NH_3 < BF_3$

Ans. (2)

Sol. 



119. Crude sodium chloride obtained by crystallisation of brine solution does not contain

(1) $MgSO_4$ (2) Na_2SO_4 (3) $MgCl_2$ (4) $CaSO_4$

Ans. (1)

Sol. Crude NaCl obtained by crystalisation of brine solution contains Na_2SO_4, $CaCl_2$, $MgCl_2$ & $CaSO_4$.
(hence ans is $MgSO_4$. not present as impurities)

120. Which of the alkali metal chloride (MCl) forms its dihyrate salt ($MCl.2H_2O$) easily ?

(1) LiCl (2) CsCl (3) RbCl (4) KCl

Ans. (1)

Sol. Li^+ having maximum hydration tendency.
LiCl forms dihydrated salt $LiCl.2H_2O$ in IA group.

121. The pH of 0.01 M NaOH (aq) solution will be

(1) 7.01 (2) 2 (3) 12 (4) 9

Ans. (3)

Sol. NaOH(aq) is strong base solution
So, $[OH^-] = N = 10^{-2}N$
$pOH = -\log[OH^-] = -\log 10^{-2} = 2$
$pH = 14 - pOH = 14 - 2$
$pH = 12$

122. Which of the following cannot act both as Bronsted acid and as Bronsted base ?

(1) HCO_3^- (2) NH_3 (3) HCl (4) HSO_4^-

Ans. (3)

Sol. HCl cannot act both as Bronsted acid and Bronsted base because HCl can only donate proton.

123. The molar solubility of CaF_2 ($K_{sp} = 5.3 \times 10^{-11}$) in 0.1 M solution of NaF will be

(1) 5.3×10^{-11} mol L^{-1} (2) 5.3×10^{-8} mol L^{-1}
(3) 5.3×10^{-9} mol L^{-1} (4) 5.3×10^{-10} mol L^{-1}

Ans. (3)

Sol. $CaF_2(s) \rightleftharpoons Ca^{+2}(aq) + 2F^-(aq)$

(a –s')	s'	2s'

$NaF(aq) \rightarrow Na^+(aq) + F^-(aq)$

C	0	0
0	C	C

In solution- $[F^-] = (2s' + C)$
$[F^-] \approx C$ (due to common ion effect)

$K_{sp(CaF_2)} = [Ca^{+2}].[F^-]^2$

$K_{sp(CaF_2)} = s'.C^2$

$$s' = \frac{5.3\times10^{-11}}{(10^{-1})^2}$$

$s' = 5.3 \times10^{-9}$ mol L^{-1}

124. The oxidation state of Cr in CrO_6 is :

(1) −6 (2) +12 (3) +6 (4) +4

Ans. (3)

125. The number of hydrogen bonded water molecule(s) associated with $CuSO_4.5H_2O$ is :-

(1) 3 (2) 1 (3) 2 (4) 5

Ans. (2)

Sol. In $CuSO_4 \cdot 5H_2O$, only one water molecule take part in hydrogen bonding.

126. Formula of nickel oxide with metal deficiency defect in its crystal is $Ni_{0.98}O$. The crystal contains Ni^{2+} and Ni^{3+} ions. The fraction of nickel existing as Ni^{2+} ions in the crystal is

(1) 0.96 (2) 0.04 (3) 0.50 (4) 0.31

Ans. (1)

Sol. Let, Ni^{+2} in the crystal $Ni_{0.98}O$ be x.

$\therefore$ Ni^{+3} in the crystal $Ni_{0.98}$ will be (0.98 − x)

$Ni_x^{+2}Ni_{(0.98-x)}^{+3}O$

By law of conservation of charge

$2x + 3\times(0.98 - x) - 2 = 0$

$x = 0.94$

So, the fraction of Ni^{+2} ions in the crystal $= \frac{0.94}{0.98}$

$\simeq$ **0.96**

127. Which of the following statements is correct regarding a solution of two compounds A and B exhibiting positive deviation from ideal behaviour?

(1) Intermolecular attractive forces between A-A and B-B are stronger than those between A-B.

(2) $\Delta_{mix}H = 0$ at constant T and P

(3) $\Delta_{mix}V = 0$ at constant T and P

(4) Intermolecular attractive forces between A-A and B-B are equal to those between A-B.

Ans. (1)

Sol. If, intermolecular attractive forces between **A – A and B – B** are **stronger** than those **A – B** then it show positive deviation from ideal behaviour.

128. In water saturated air the mole fraction of water vapour is 0.02. If the total pressure of the saturated air is 1.2 atm, the partial pressure of dry air is :

(1) 1.18 atm (2) 1.76 atm (3) 1.176 atm (4) 0.98 atm

Ans. (3)

Sol. $X_{H_2O} = 0.02$

$\therefore X_{gas} = 0.98$

$P_{total} = 1.2$ atm

partial pressure of dry-air = $P_T \times$ mole fraction of dry-air

Partial pressure of dry-air = 1.2 atm $\times$ 0.98

= **1.176 atm.**

129. The standard electrode potential (E^-) values of Al^{3+}/Al, Ag^+/Ag, K^+/K and Cr^{3+}/Cr are –1.66 V, 0.80V, –2.93 V and –0.74 V, respectively. The correct decreasing order of reducing power of the metal is :

(1) Ag > Cr > Al > K (2) K > Al > Cr > Ag

(3) K > Al > Ag > Cr (4) Al > K > Ag > Cr

Ans. (2)

Sol. Reducing power of metal $\propto \frac{1}{SRP}$

K > Al > Cr > Ag.

130. The density of 2 M aqueous solution of NaOH is 1.28 g/cm^3. The molality of the solution is [Given that molecular mass of NaOH = 40 g mol^{-1}]

(1) 1.20 m (2) 1.56 m (3) 1.67 m (4) 1.32 m

Ans. (3)

Sol. 2 M solution of NaOH menas 2 mole NaOH is present in 1 L solution;

density = 1.28 g/ml

mass of solution = volume of solution ×density

= 1200 × 1.28

= 1280 g

mass of solvent = mass of solution – mass of solute

= 1280 – 80

= 1200 g

molality = $\frac{2}{1200}\times 1000 = \frac{20}{12} = \frac{10}{6} = \frac{5}{3}$ = **1.67 m**

131. Orbital having 3 angular nodes and 3 total nodes is :-

(1) 5 p (2) 3 d (3) 4 f (4) 6 d

Ans. (3)

Sol. Orbital having angular node (ℓ) = 3

Total node = Radial node + angular node

= n – ℓ – 1 + ℓ

3 = n – 1

n = 4

Subshell "nℓ" = **4f**

132. In hydrogen atom, the de Broglie wavelength of an electron in the second Bohr orbit is :-

[Given that Bohr radius, a_0 = 52.9 pm]

(1) 211.6 pm (2) 211.6 π pm

(3) 52.9 π pm (4) 105.8 pm

Ans. (2)

Sol. $n\lambda = 2\pi r$

$n\lambda = 2\pi\frac{n^2}{z}a_0$

$n\lambda = 2\pi \times \frac{n^2}{Z}\times 52.9$ pm

$\lambda = 2\pi \times 52.9 \times 2$ pm

= **211.6 π pm**

133. The volume occupied by 1.8 g of water vapour at 374 °C and 1 bar pressure will be :-
[Use R = 0.083 bar L $K^{-1}mol^{-1}$]
(1) 96.66 L (2) 55.87 L (3) 3.10 L (4) 5.37 L

Ans. (4)

Sol. PV = nRT
n = 1.8/18 = 0.1 mole
P = 1 bar
T = 374 + 273
= 647 K

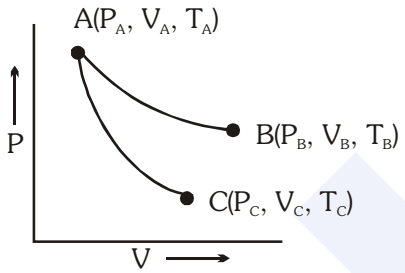
$$V = \frac{nRT}{P} = \frac{0.1 \times 0.083 \times 647}{1} = \mathbf{5.37\ L}$$

134. An ideal gas expands isothermally from 10^{-3} m^3 to 10^{-2} m^3 at 300 K against a constant pressure of 10^5 Nm^{-2}. The work done on the gas is :-
(1) +270 kJ (2) –900 J (3) +900 kJ (4) –900 kJ

Ans. (2)

Sol. $w_{pv} = -P_{ext}(V_f - V_i)$
$= -10^5\ Nm^{-2}(10^{-2}\ m^3 - 10^{-3}\ m^3)$
$= -10^5\ Nm^{-2} \times 10^{-3}\ [10 - 1]m^3$
$= \mathbf{-900\ J}$

135. Reversible expansion of an ideal gas under isothermal and adiabatic conditions are as shown in the figure.



AB → Isothermal expansion
AC → Adiabatic expansion
Which of the following options is **not** correct ?
(1) $\Delta S_{isothermal} > \Delta S_{adiabatic}$
(2) $T_A = T_B$
(3) $W_{isothermal} > W_{adiabatic}$
(4) $T_c > T_A$

Ans. (4)

Sol. In adiabatic expansion cooling effect will take place, T_C will be less then T_A.
in adiabatic expansion q = 0
$\Delta U = w$
$w_{pv} < 0$
$\Delta U < 0$
$nC_{vm}\Delta T < 0$
$\Delta T < 0$
$T_C - T_A < 0$
$\mathbf{T_C < T_A}$