DIRECTORATE OF SCHOOL EDUCATION TAMILNADU

12NPCB14 **(2023-24)**	**NEET PRACTICE QUESTIONS** **(TEST-14)**	**Class : XII** **Time : 1.15 hrs** **Total Marks : 240**

Answer key

12TH Physics

1. Ans: C)

   Intensity is directly proportional to the square of amplitude

   $I \propto A^2$

   $I_1 \propto A_1^2,\ I_2 \propto A_2^2$

   $\frac{I_1}{I_2} = \frac{A_1^2}{A_2^2}$

   $\frac{A_1}{A_2} = \sqrt{\frac{I_1}{I_2}}$

   Let the Intensity of individual Sources be I_1 and I_2

   The net intensity,

   $I_{net} = I_1 + I_2 + 2\sqrt{I_1}\sqrt{I_2}\cos\phi$

   $I_{\max} = \left(\sqrt{I_1}\sqrt{I_2}\right)^2$

   Given

   $\frac{I_{max}}{I_{mic}} = \frac{36}{16}$

   $\frac{\left(\sqrt{I_1}+\sqrt{I_2}\right)^2}{\left(\sqrt{I_1}-\sqrt{I_2}\right)^2} = \frac{36}{16}$

   $\frac{\left(\sqrt{I_1}+\sqrt{I_2}\right)}{\left(\sqrt{I_1}-\sqrt{I_2}\right)} = \frac{6}{4}$

   $4\sqrt{I_1} + 4\sqrt{I_2} = 6\sqrt{I_1} - 6\sqrt{I_2}$

$10\sqrt{I_2} = 2\sqrt{I_1}$

$5\sqrt{I_2} = \sqrt{I_1}$

$\frac{\sqrt{I_1}}{\sqrt{I_2}} = \frac{5}{1}$

2. Ans: A) 20 cm

$y_1 = 10\sin(wt + \pi/3)$

$y_2 = 5\times 2\frac{\sqrt{3}}{2}\cos wt + \frac{1}{2}\sin wt) + = 10(\cos wt \times \frac{\sqrt{3}}{2} + \frac{1}{2}\sin wt)$

$y_2 = 10sin(wt + \pi/3)[\sin(A+B)]$

$y_2 = 10sin(wt + \pi/3)[\sin(A+B)]$

$Y_{net} = y_1 + y_2$

$= 10\sin(wt + \pi/3) + 10\sin(wt + \pi/3) = 20\sin = \sin(wt + \pi/3)$

So the net amplitude of the wave = A = 20 cm

3. Ans: B) 2

$\frac{I_1}{I_2} = \frac{1}{4}$

$I_{max} = I_1 + I_2 + \sqrt{I_1}\sqrt{I_2}$

$I_{max} = I_1 + 4I_1 + 2\sqrt{I_1 \times 4I_1} = 9I_1$

$I_{mci} = I_1 + 4I_1 - 2\sqrt{I_1 \times 4I_1} = I_1$

$\frac{I_{max} + I_{mci}}{I_{max} - I_{mci}} = \frac{9I_1 + I_1}{9I_1 - I_1} = \frac{10I_1}{8I_1} = 10/8$

$\frac{2\alpha + 1}{\beta + 3} = \frac{5}{4}$

$2\alpha + 1 = 5$ $\qquad$ $\beta + 3 = 4$

$2\alpha = 4$ $\qquad$ $\beta = 4 - 3$

$\alpha = 2$ $\qquad$ $\beta = 1$

$\frac{\alpha}{\beta} = \frac{2}{1} = 2$

4. Ans: A)

Position of nth maxima from central maximum

$X_n = \frac{n\lambda D}{d}$

$$xn \propto n\lambda$$
$$n_1\lambda_1 \propto d_1 \Rightarrow 6\lambda_1 \propto d_1$$
$$n_2\lambda_2 \propto d_2 \Rightarrow 4\lambda_2 \propto d_2$$
$$\frac{d_1}{d_2} = \frac{6\lambda_1}{4\lambda_2} = \frac{3\lambda_1}{2\lambda_2}$$
$$\frac{d_1}{d_2} = \frac{3\lambda_1}{2\lambda_2}$$

5. Ans: B)

Fringe width (β) = $\frac{D\lambda}{d}$

From question

$$\frac{nD\lambda_1}{d} = \frac{(n+1)D\lambda_2}{d}$$
$$n\lambda_1 = (n+1)\lambda_2$$
$$\frac{n}{n+1} = \frac{\lambda_2}{\lambda_1}$$
$$\frac{n+1}{n} = \frac{\lambda_1}{\lambda_2}$$
$$n = \frac{\lambda_2}{\lambda_1 - \lambda_2}$$

6. Ans: B) 100 nm

Refraction under (μ) = 1.33

λ= 532 nm = 532 × 10^{-9} m

2μt = $(n - 1/2)\lambda = (2n-1)\lambda/2$

For minimum thickness, n = 1

$$2\mu t = (1 - 1/2)\lambda$$
$$2 \times 1.33 = \left(1 - 1/2\right)\lambda$$
$$t = \frac{\lambda}{2 \times 2 \times 1.33}$$
$$t = \frac{532 \times 10^{-9}}{4 \times 1.33} = \frac{532 \times 10^{-9}}{5.32}$$

t = *100* × *10*$^{-9}$ *m*

t = *100 nm*

7. Ans: A)

   $\lambda = 500\ nm = 500 \times 10^{-9}\ m$

   $D = 1.8\ m,\ d = 0.4\ mm = 0.4 \times 10^{-3}\ m$

   Speed (u) = 4 ms^{-1}

$$B = \frac{\lambda D}{d}$$

   on differentiating both sider,

$$\frac{dB}{dt} = \lambda \frac{dD}{dt}$$

$$V_B = \frac{500 \times 10^{-9}}{4 \times 10^{-4}} \times 4$$

$$V_B = 5 \times 10^{-3} ms^{-1}$$

$$V_B = 5mm/s$$

8. Ans: B) 450 nm

   d = 0.6 mm = 6 × 10^{-4} m

   D = 80 cm = 0.8 m

$$\gamma = d/2$$

   For first dark fringe

$$\Delta x = \gamma \frac{d}{D} \qquad \Delta x = (dn - 1)\ \lambda/2$$

$$\lambda/2 = \frac{d}{2} \times \frac{d}{D} = \frac{d^2}{2D} \qquad \Delta x = \lambda/2 \ \ (n = 1)$$

$$\lambda = d^2/D = \frac{(6 \times 10^{-4})^2}{2D}$$

$$\lambda = 45 \times 10^{-8} m$$

$$\lambda = 450nm$$

9. Ans: C) 2089 J

   By first law of thermo dynamics

   $\Delta Q = \Delta u + \Delta w$

   $mL = = \Delta u + p\ (V_{steam} - V_{water})$

   $1 \times 2256 = \Delta u + 10^5\ (1671 - 1)\ 10^{-6}$

   $2256 = \Delta u + 167$

   $\Delta u = 2089$ J

10. Ans: A) 236.5W

$$\frac{Q_2}{W} = \frac{T_2}{T_1 - T_2}$$

Here T^2 = 4˚C = 277K

T_1 = 303 K

Q_2 = 600 Cal

$$\frac{600}{w} = \frac{277}{303 - 277}$$

$$w = \frac{600}{10.65} = 56.33 Cal$$

$$P = \frac{w}{t} = \frac{56.33}{1} \times 4.2$$

P = 236.5 W

11. Ans: A) 560 J

Since internal change is a state function eh change in internal energy during the process AC will be same as that of during the process AB and BC.

Total work done = $W_{AB} + W_{BC}$

= 0 + P_B (V_C – V_A) ($\therefore V_B = V_A$)

= 8 × 10^4 [(5-2)× 10^{-3}]

W = 240 J

Total heat supplied to the system

600 + 200 = 800 J

dV = dQ – dW = 800 – 240

dV = 560 J

12. Ans: C)

Work done by the gas is negative

For isothermal process, du = 0

$$W = nRT \log_e \left(\frac{V_2}{V_1} \right)$$

$$W = nRT \log_e \left(\frac{1}{2} \right)$$

$$\Rightarrow W < 0$$

13. Ans: B) $2\sqrt{2} = 1 : 2$

Let P_A, P_B and P_C be the initial pressure and P be the final pressure

For A,

The process is adiabatic

$$\therefore P_A(V)^{3/2} = P(2V)^{3/2}, \quad P_A = P_2^{3/2}$$

For B

the process is isobaric

PB = P

For C,

the process is isothermal

$$\therefore P_C(v) = P(2v), P_C = 2P$$

Hence

$P_A : P_B : P_C = 2^{3/2} : 1 : 2 \quad = 2\sqrt{2} : 1 : 2$

14. Ans: D) 73.25 K

Since gas is suddenly expanded, it means the process is adiabatic process, then

Putting $T_1 = 273 + 20 = 293K$, $v_2 = 8v_1$

$$293(v_1)^{v-1} = T_2(8v_1)^{\gamma-1}$$

$$293 = T_2 8^{\gamma-1}$$

$$T_2 = \frac{293}{8^{\gamma-1}} = \frac{293}{8^{5/3-1}}$$

$$T_2 = \frac{293}{8^{2/3}} = \frac{293}{(2^3)^{2/3}} = \frac{293}{4}$$

T_2 = 73.25 K

15. Ans: A) *6.25×10^5 J*

Here T_1 = 500 K, T_2 = 375K, $Q_1 = 25 \times 10^5$J

$$\therefore \int = 1 - \frac{T_2}{T_1}$$

$$= 1 - \frac{375}{500} = 0.25 = 25\%$$

$$W = \int Q_1$$

$= 0.25 \times 25 \times 11^5$

$W = 6.25 \times 10^5$J

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   $\Delta Q = \Delta u + \Delta w$
   $mL = = \Delta u + p\,(V_{steam} - V_{water})$
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   $2256 = \Delta u + 167$
   $\Delta u = 2089$ J

2. Ans: A) 236.5W
   $$\frac{Q_2}{W} = \frac{T_2}{T_1 - T_2}$$
   Here $T^2 = 4°C = 277K$
   $T_1 = 303$ K
   $Q_2 = 600$ Cal
   $$\frac{600}{w} = \frac{277}{303 - 277}$$
   $$w = \frac{600}{10.65} = 56.33\,Cal$$
   $$P = \frac{w}{t} = \frac{56.33}{1} \times 4.2$$
   P = 236.5 W

3. Ans: A) 560 J
   Since internal change is a state function eh change in internal energy during the process AC will be same as that of during the process AB and BC.

Total work done $= W_{AB} + W_{BC}$

$= 0 + P_B (V_C - V_A)$ $\quad (\therefore V_B = V_A)$

$= 8 \times 10^4 [(5-2) \times 10^{-3}]$

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   For A,

   The process is adiabatic

$$\therefore P_A (V)^{3/2} = P(2V)^{3/2}, \quad P_A = P_2^{3/2}$$

   For B

   the process is isobaric

   PB = P

   For C,

   the process is isothermal

$$\therefore P_C (v) = P(2v), P_C = 2P$$

   Hence

   $P_A : P_B : P_C = 2^{3/2} : 1 : 2 \quad = 2\sqrt{2} : 1 : 2$

6. Ans: D) 73.25 K

Since gas is suddenly expanded, it means the process is adiabatic process, then

Putting $T_1 = 273 + 20 = 293K$, $v_2 = 8v_1$

$$293(v_1)^{\nu-1} = T_2(8v_1)^{\gamma-1}$$

$$293 = T_2 8^{\gamma-1}$$

$$T_2 = \frac{293}{8^{\gamma-1}} = \frac{293}{8^{5/3-1}}$$

$$T_2 = \frac{293}{8^{2/3}} = \frac{293}{(2^3)^{2/3}} = \frac{293}{4}$$

$$T_2 = 73.25\ K$$

7. Ans: A) $6.25 \times 10^5\ J$

Here $T_1 = 500\ K$, $T_2 = 375K$, $Q_1 = 25 \times 10^5 J$

$$\therefore \int = 1 - \frac{T_2}{T_1}$$

$$= 1 - \frac{375}{500} = 0.25 = 25\%$$

$$W = \int Q_1$$

$$= 0.25 \times 25 \times 11^5$$

$$W = 6.25 \times 10^5 J$$

8. Ans: *C) 6.27×10^5 Col*

Here $Q_1 = 900\ K\ Cal = 9 \times 10^5\ Cal$

$T_1 = 723^\circ C = 723 + 273 = 996\ K$

$T_2 = 30^\circ C = 30 + 273 = 303\ K$

$$\frac{Q_1}{Q_2} = \frac{T_1}{T_2}$$

$$Q_2 = \frac{T_1}{T_2} Q_1 = \frac{303}{996} \times 9 \times 10^5$$

$$Q_2 = 2.73 \times 10^5\ Cal$$

Work done $w = Q_1 - Q_2$

$= 9 \times 10^5 - 2.73 \times 10^5$

$= (9 - 2.73) \times 10^5$

$w = 6.27 \times 10^5$ cal

9. Ans: A) -2.70×10^3 J

$$w = nRT\log\left(\frac{V_2}{V_1}\right) = P_oV_o l\,n\left(\frac{V_2}{V_1}\right)$$

$$= 10^5 \times 10 \times 10^{-3} \ln\left(\frac{1}{15}\right)$$

$W = -2.70 \times 10^3$ J

10. Ans: C) 5.76 J/K

Here $P_1 = 1.0 \times 10^5$ P_a

$P_2 = 0.5 \times 10^5$ P_a

n = 1 and R = 8.3 J mol^{-1} K^{-1}

Change in entropy of the gas is

$$\Delta S = nR\ln\left(\frac{P_1}{P_2}\right)$$

$$1 \times 8.3 \times \ln\left(\frac{1.0 \times 10^5}{0.5 \times 10^5}\right)$$

$8.3 \times ln\ (2)$

$DS = 5.76$ J/K

11. Ans: B) $\frac{3}{5}$

By first law of thermo dynamics

Q = v = w

$$= \frac{f}{2}nRt + p\int dv = \frac{f}{2}nRT + pv$$

or Q = $\frac{f}{2}nRT + nRT$

$$Q = \frac{3}{2}nRT + nRT = \frac{5}{2}nRT$$

Fraction of heat energy supplied = $\frac{v}{Q}$

$$= \frac{(3/2)nRT}{(5/2)nRT} = \frac{3}{5}$$

12. Ans: B) 1.16˚C

H = 500 m, c = 4.2 kJ/kg = 4.2×10^3 J / kg

$\Delta v = mc\Delta T$

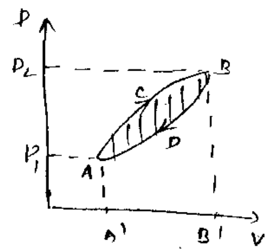
$mgh = mc\,\Delta T$

$1 \times 10 \times 500 = 1 \times 4.2 \times 10^3 \times \Delta T$

$$\Delta T = \frac{500 \times 10}{4.2 \times 10^3} = \frac{50}{42} = 1.19°C$$

$$\Delta T \simeq 1.16°C$$

13. Ans: B) ACBDA



Work done during the path ACB

W_{ACB} = Area under the curve ACB o

V = axis (A_1)

Work done during the path BDA

W_{BDA} = Area under the curve BDA on

V-axis (A_2)

Work done during the complete cycle is

$W_{ACB} - W_{BDA} = A_1 - A_2$

= Area under the curve ACBDA

14. Ans: A)

76.34 cm Hg

For tiny glass tube

$P_1V_1 = P_2V_2$

$$P_2 = \frac{P_1V_1}{V_2} = \frac{4.5 \times 0.5}{500} = 0.0045\,atm$$

Thus, P = 1 atm + 0.0045 atm

= 1.0045 atm

= 76.34 cm Hg

15. Ans: D)

$L - P\ (V_2 - V_1)$

$Q = mL = 1\times L = L$

$W = P\ (V_2 - V_1)$

$Now\ Q = \Delta v + w$

$Or\ L = \Delta v + P(V_2 - V_1)$

$\Delta v = L - P\ (V_2 - V_1)$

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$$I_1 \propto A_1^2,\ I_2 \propto A_2^2$$

$$\frac{I_1}{I_2} = \frac{A_1^2}{A_2^2}$$

$$\frac{A_1}{A_2} = \sqrt{\frac{I_1}{I_2}}$$

Let the Intensity of individual Sources be I_1 and I_2

The net intensity,

$$I_{net} = I_1 + I_2 + 2\sqrt{I_1}\sqrt{I_2}\cos\phi$$

$$I_{\max} = \left(\sqrt{I_1}\sqrt{I_2}\right)^2$$

Given

$$\frac{\mathrm{I}_{max}}{\mathrm{I}_{mic}} = \frac{36}{16}$$

$$\frac{\left(\sqrt{I_1}+\sqrt{I_2}\right)^2}{\left(\sqrt{I_1}-\sqrt{I_2}\right)^2} = \frac{36}{16}$$

$$\frac{\left(\sqrt{I_1}+\sqrt{I_2}\right)}{\left(\sqrt{I_1}-\sqrt{I_2}\right)} = \frac{6}{4}$$

$$4\sqrt{I_1} + 4\sqrt{I_2} = 6\sqrt{I_1} - 6\sqrt{I_2}$$

$10\sqrt{I_2} = 2\sqrt{I_1}$

$5\sqrt{I_2} = \sqrt{I_1}$

$\frac{\sqrt{I_1}}{\sqrt{I_2}} = \frac{5}{1}$

2. Ans: A) 20 cm

$y_1 = 10\sin(wt + \pi/3)$

$y_2 = 5\times 2\frac{\sqrt{3}}{2}\cos wt + \frac{1}{2}\sin wt) + = 10(\cos wt \times \frac{\sqrt{3}}{2} + \frac{1}{2}\sin wt)$

$y_2 = 10 sin(wt + \pi/3)[\sin(A+B)]$

$y_2 = 10 sin(wt + \pi/3)[\sin(A+B)]$

$Y_{net} = y_1 + y_2$

$= 10\sin(wt + \pi/3) + 10\sin(wt + \pi/3) = 20\sin = \sin(wt + \pi/3)$

So the net amplitude of the wave = A = 20 cm

3. Ans: B) 2

$\frac{I_1}{I_2} = \frac{1}{4}$

$I_{max} = I_1 + I_2 + \sqrt{I_1}\sqrt{I_2}$

$I_{max} = I_1 + 4I_1 + 2\sqrt{I_1 \times 4I_1} = 9I_1$

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$\frac{2\alpha + 1}{\beta + 3} = \frac{5}{4}$

$2\alpha + 1 = 5$ $\qquad$ $\beta + 3 = 4$

$2\alpha = 4$ $\qquad$ $\beta = 4 - 3$

$\alpha = 2$ $\qquad$ $\beta = 1$

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$$n_1\lambda_1 \propto d_1 \Rightarrow 6\lambda_1 \propto d_1$$

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From question

$$\frac{nD\lambda_1}{d} = \frac{(n+1)D\lambda_2}{d}$$

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$$\frac{n+1}{n} = \frac{\lambda_1}{\lambda_2}$$

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Refraction under (μ) = 1.33

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For minimum thickness, n = 1

$$2\mu t = (1 - \tfrac{1}{2})\lambda$$

$$2 \times 1.33 = \left(1 - \tfrac{1}{2}\right)\lambda$$

$$t = \frac{\lambda}{2 \times 2 \times 1.33}$$

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For first dark fringe

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$$\lambda/2 = \frac{d}{2} \times \frac{d}{D} = \frac{d^2}{2D} \qquad \Delta x = \lambda/2\ \ (n = 1)$$

$$\lambda = d^2/D = \frac{(6 \times 10^{-4})^2}{2D}$$

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   $\Delta Q = \Delta u + \Delta w$
   $mL = = \Delta u + p\,(V_{steam} - V_{water})$
   $1 \times 2256 = \Delta u + 10^5\,(1671 - 1)\,10^{-6}$
   $2256 = \Delta u + 167$
   $\Delta u = 2089$ J

2. Ans: A) 236.5W
   $\frac{Q_2}{W} = \frac{T_2}{T_1 - T_2}$
   Here $T^2 = 4^\circ C = 277K$
   $T_1 = 303$ K
   $Q_2 = 600$ Cal
   $\frac{600}{w} = \frac{277}{303 - 277}$
   $w = \frac{600}{10.65} = 56.33\,Cal$
   $P = \frac{w}{t} = \frac{56.33}{1} \times 4.2$
   P = 236.5 W

3. Ans: A) 560 J
   Since internal change is a state function eh change in internal energy during the process AC will be same as that of during the process AB and BC.

Total work done $= W_{AB} + W_{BC}$

$= 0 + P_B (V_C - V_A)$ $(\therefore V_B = V_A)$

$= 8 \times 10^4 [(5-2) \times 10^{-3}]$

$W = 240$ J

Total heat supplied to the system

600 + 200 = 800 J

$dV = dQ - dW = 800 - 240$

$dV = 560$ J

4. Ans: C)

Work done by the gas is negative

For isothermal process, du = 0

$$W = nRT \log_e \left(\frac{V_2}{V_1} \right)$$

$$W = nRT \log_e \left(\frac{1}{2} \right)$$

$$\Rightarrow W < 0$$

5. Ans: B) $2\sqrt{2} = 1 : 2$

Let P_A, P_B and P_C be the initial pressure and P be the final pressure

For A,

The process is adiabatic

$$\therefore P_A (V)^{3/2} = P(2V)^{3/2}, \quad P_A = P_2^{3/2}$$

For B

the process is isobaric

PB = P

For C,

the process is isothermal

$$\therefore P_C (v) = P(2v), P_C = 2P$$

Hence

$P_A : P_B : P_C = 2^{3/2} : 1 : 2 \quad = 2\sqrt{2} : 1 : 2$

6. Ans: D) 73.25 K

Since gas is suddenly expanded, it means the process is adiabatic process, then

Putting $T_1 = 273 + 20 = 293K$, $v_2 = 8v_1$

$$293(v_1)^{\nu-1} = T_2(8v_1)^{\gamma-1}$$

$$293 = T_2 8^{\gamma-1}$$

$$T_2 = \frac{293}{8^{\gamma-1}} = \frac{293}{8^{5/3-1}}$$

$$T_2 = \frac{293}{8^{2/3}} = \frac{293}{(2^3)^{2/3}} = \frac{293}{4}$$

$$T_2 = 73.25\ K$$

7. Ans: A) *6.25×10^5 J*

Here $T_1 = 500$ K, $T_2 = 375$K, $Q_1 = 25 \times 10^5$J

$$\therefore \int = 1 - \frac{T_2}{T_1}$$

$$= 1 - \frac{375}{500} = 0.25 = 25\%$$

$$W = \int Q_1$$

$$= 0.25 \times 25 \times 11^5$$

$$W = 6.25 \times 10^5 J$$

8. Ans: *C) 6.27×10^5 Col*

Here $Q_1 = 900$ K Cal $= 9 \times 10^5$ Cal

$T_1 = 723^\circ C = 723 + 273 = 996$ K

$T_2 = 30^\circ C = 30 + 273 = 303$ K

$$\frac{Q_1}{Q_2} = \frac{T_1}{T_2}$$

$$Q_2 = \frac{T_1}{T_2} Q_1 = \frac{303}{996} \times 9 \times 10^5$$

$$Q_2 = 2.73 \times 10^5 \ Cal$$

Work done $w = Q_1 - Q_2$

$$= 9 \times 10^5 - 2.73 \times 10^5$$

$$= (9 - 2.73) \times 10^5$$

$$w = 6.27 \times 10^5 \text{ cal}$$

9. Ans: A) *-2.70×10^3 J*

$$w = nRT \log\left(\frac{V_2}{V_1}\right) = P_o V_o l\,n\left(\frac{V_2}{V_1}\right)$$

$$= 10^5 \times 10 \times 10^{-3} \ln\left(\frac{1}{15}\right)$$

$W = -2.70 \times 10^3\ J$

10. Ans: C) 5.76 J/K

Here $P_1 = 1.0 \times 10^5\ P_a$

$P_2 = 0.5 \times 10^5\ P_a$

n = 1 and R = 8.3 J $mol^{-1}\ K^{-1}$

Change in entropy of the gas is

$$\Delta S = nR \ln\left(\frac{P_1}{P_2}\right)$$

$$1 \times 8.3 \times \ln\left(\frac{1.0 \times 10^5}{0.5 \times 10^5}\right)$$

$8.3 \times \ln(2)$

$DS = 5.76\ J/K$

11. Ans: B) $\frac{3}{5}$

By first law of thermo dynamics

Q = v = w

$$= \frac{f}{2} nRt + p\int dv = \frac{f}{2} nRT + pv$$

or Q = $\frac{f}{2} nRT + nRT$

$$Q = \frac{3}{2} nRT + nRT = \frac{5}{2} nRT$$

Fraction of heat energy supplied = $\frac{v}{Q}$

$$= \frac{(3/2)nRT}{(5/2)nRT} = \frac{3}{5}$$

12. Ans: B) 1.16˚C

H = 500 m, c = 4.2 kJ/kg = 4.2×10^3 J / kg

$\Delta v = mc\Delta T$

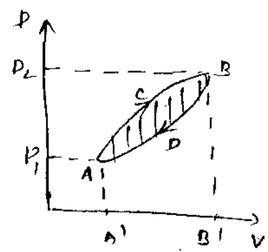
$mgh = mc\,\Delta T$

$1 \times 10 \times 500 = 1 \times 4.2 \times 10^3 \times \Delta T$

$$\Delta T = \frac{500\times10}{4.2\times10^3} = \frac{50}{42} = 1.19°C$$

$$\Delta T \simeq 1.16°C$$

13. Ans: B) ACBDA



Work done during the path ACB

W_{ACB} = Area under the curve ACB o

V = axis (A_1)

Work done during the path BDA

W_{BDA} = Area under the curve BDA on

V-axis (A_2)

Work done during the complete cycle is

$W_{ACB} - W_{BDA} = A_1 - A_2$

= Area under the curve ACBDA

14. Ans: A)

76.34 cm Hg

For tiny glass tube

$P_1V_1 = P_2V_2$

$$P_2 = \frac{P_1V_1}{V_2} = \frac{4.5\times0.5}{500} = 0.0045\,atm$$

Thus, P = 1 atm + 0.0045 atm

= 1.0045 atm

= 76.34 cm Hg

15. Ans: D)

$L - P\,(V_2 - V_1)$

$Q = mL = 1\times L = L$
$W = P\,(V_2 - V_1)$
Now $Q = \Delta v + w$
Or $L = \Delta v + P(V_2 - V_1)$
$\Delta v = L - P\,(V_2 - V_1)$