NEET PHYSICS

Topic: Thermodynamics

Q.1 A water fall is 84 m high. Assuming that half the kinetic energy of the falling water gets converted to heat, the rise in temperature of water is -

(1) 0.098ºC (2) 0.98ºC

(3) 9.8ºC (4) 0.0098ºC

Q.2 A lead bullet at 27ºC just melts when stopped by an obstacle . Assuming that 25% of heat is absorbed by the obstacle, then the velocity of the bullet at the time of striking- (M.P. of lead = 327ºC specific heat of lead= 0.03cal/gm/ºC, latent heat of fusion of lead = 6cal/gm and J = 4.2 Joule/cal)

(1) 410 m/sec (2) 1230 m/sec

(3) 307.5 m/sec (4) none of these

Q.3 Two bullets of same metal and mass 10gm and 5gm respectively collide against a target with the same velocity. If the whole energy of the bullets is used up in increasing their temperatures then greater increase of temperature will be in -

(1) first bullet (2) second bullet

(3) equal in both bullets (4) none of these

Q.4 An object of 5kg mass falls from a height of 30m. If the whole amount of mechanical energy is converted into heat, the number of calories generated is -

(1) 150 (2) 60 (3) 350 (4) 6

Q.5 A lead sphere of mass one kg falls from a height of 126m. If the whole kinetic energy is converted into heat, then increase in its temperature will be- (specific heat of lead is 30 calorie/kgºC and g = 9.8 m/sec^2)

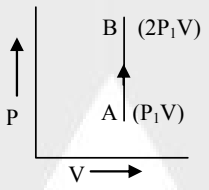
(1) 9.8ºC (2) 4.2ºC (3) 4.7 ºC (4) 37ºC

Q.6 A body of 10 kg mass falls form a height of 25m and gets rebound to 0.50m. If the loss in energy is converted to heat the body, then rise in temperature will be - (sp. heat of material is 25.2 J/kgºK)

(1) 9.8 K (2) 0.095 K

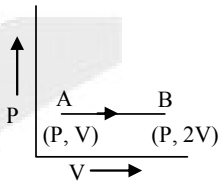
(3) 0.0095 K (4) none of these

Q.7 A thermodynamical system goes from one state to another state (as shown in fig) the external work done is given by-



(1) PV (2) 2PV (3) zero (4) $2P^2V^2$

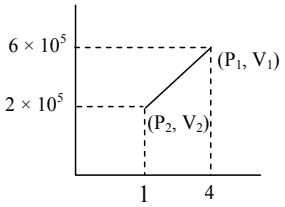
Q.8 A thermodynamical system goes from state A to state B (as shown figure), the work done is given by-



(1) PV (2) 2PV (3) zero (4) $2P^2V^2$

Q.9 A system changes from the state (P_1, V_1) to (P_2, V_2) as shown in the figure below.

What is the work done by the system ?

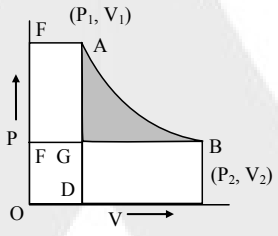


(1) 7.5×10^5 joule (2) 7.5×10^4erg

(3) 12×10^5 joule (4) 6×10^5 joule

Q.10 An ideal gas is transformed from state $A(P_1, V_1)$ to the state $B(P_2, V_2)$ through path AB.

In this process the work done by the gas is-



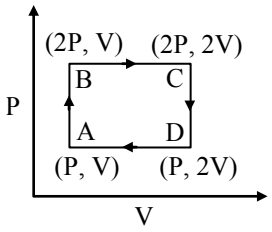
(1) W = area ABCDA

(2) W = area ABEFA

(3) W = area ABGA

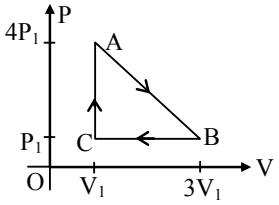
(4) W = area ABCOFA

Q.11 An ideal monoatomic gas is taken round the cycle ABCDA as shown P-V diagram. The work-done during the cycle is -



(1) PV (2) 2PV (3) PV/2 (4) zero

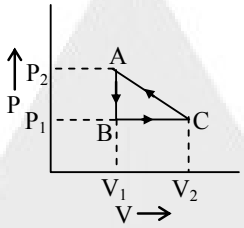
Q.12 An ideal gas is taken through series of changes ABCA. The amount of work involved in the cycle is -



(1) $12P_1V_1$ (2) $6P_1V_1$

(3) $3P_1V_1$ (4) P_1V_1

Q.13 As shown in the diagram, for a closed path ABCA -



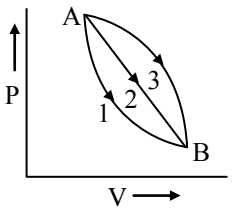
(1) the amount of work done by the system is zero

(2) the amount of work done by the system is $= -\frac{1}{2}(P_2 - P_1)(V_2 - V_1)$

(3) the amount of work done on the system is $= (P_2 - P_1)(V_1 - V_2)$

(4) the amount of work done by the system is $= \frac{1}{2}(P_2 - P_1)(V_2 - V_1)$

Q.14 A gas of given mass, is brought from stage A to B along three paths 1, 2 and 3, as shown in the figure. If the amount of work done in these three processes is respectively equal to W_1, W_2 and W_3, then -



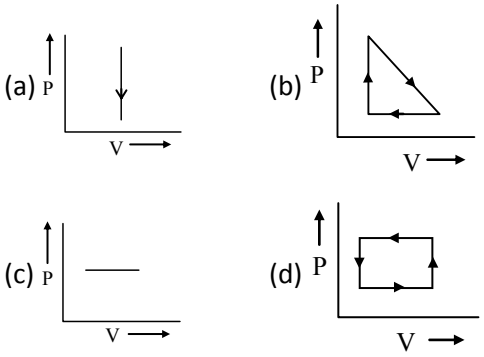
(1) $W_1 > W_2 > W_3$

(2) $W_1 < W_2 < W_3$

(3) $W_1 = W_2 = W_3$

(4) $W_1 < W_2, W_3 < W_2$

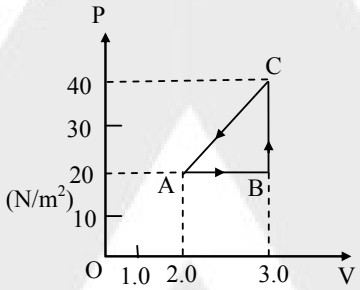
Q.15 The indicator diagrams representing minimum and maximum amounts of work done are respectively.



(1) c and a (2) a and c

(3) b and a (4) d and b

Q.16 In the indicator diagram shown, the work done along path AB is -



(1) Zero (2) 20 Joule

(3) – 20 Joule (4) 60 Joule

Q.17 In the above problem**(Q.No.16)** work done along path BC is-

(1) Zero (2) (40 – 20) = 20 J

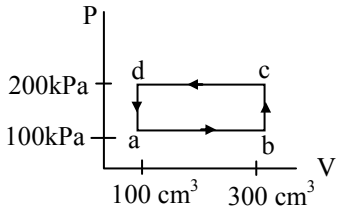
(3) 40 J (4) 60 J

Q.18 In the above question**(Q.No.16)** the work done along path CA is –

(1) 20 Joule (2) 30 Joule

(3) – 30 Joule (4) Zero

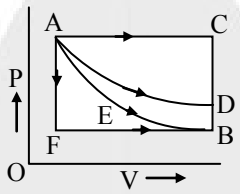
Q.19 A thermodynamic system is taken through the cycle abcda, find the total heat rejected by the gas during the process –



(1) – 10J (2) – 20J

(3) – 30J (4) – 40J

Q.20 An ideal system can be brought from stage A to B through four paths as shown in the figure. The energy given to the system is minimum in -



(1) path ACB (2) path ADB

(3) path AEB (4) path AFB

Q.21 A system is given 400 calories of heat and 1000 Joule of work is done by the system, then the change in internal energy of the system will be -

(1) 680 Joule (2) 680 erg

(3) 860 Joule (4) – 860 Joule

Q.22 For a thermodynamic process $\delta Q = -50$ calorie and $W = -20$ calorie.

If the initial internal energy is – 30 calorie then final internal energy will be -

(1) 191.20 Calorie (2) – 60 Calorie

(3) 100 Calorie (4) – 100 Calorie

Q.23 The differential form of first law of thermodynamics is -

(1) $\delta Q = \delta W + \delta U$

(2) $\delta Q = \delta W - \delta U$

(3) $\delta Q = \delta U - \delta W$

(4) $\delta Q + \delta U + \delta W = 0$

Q.24 When an ideal diatomic gas is heated at constant pressure then what fraction of heat given is used to increase internal energy of gas ?

(1) $\frac{5}{7}$ (2) $\frac{3}{7}$

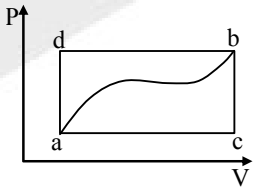
(3) $\frac{3}{5}$ (4) $\frac{2}{5}$

Q.25 A system absorbs 10^3 calories of heat and the system does 1675 Joule work. The internal energy of the system increases by 2515 Joule. The value of J is -

(1) 4.18 Cal/Joule (2) 420 Joule/cal

(3) 42 Joule/cal (4) 4.19 Joule/cal

Q.26 In the adjoined figure the indicator diagram of an ideal thermodynamic gas system is represented. If the change in internal energy along the path **acb** is 10 calorie then change in internal energy along the path **bda** will be -



(1) 10 Calorie

(2) – 10 Calorie

(3) more than 10 Calorie

(4) less than 10 Calorie

Q.27 In the above problem, if the work done along path ac is 20 calorie then the heat given to the system along path acb will be-

(1) 20 Cal. (2) 10 Cal.

(3) 30 Cal. (4) – 10 Cal.

Q.28 A gas is compressed from 10 m^3 volume to 4m^3 volume at constant pressure of 50 N/m^2. Then the gas is heated by giving it 100 Joules of energy. The internal energy of the gas will-

(1) Increase by 100 Joule

(2) increase by 200 Joule

(3) increases by 400 Joule

(4) decrease by 200 Joule.

Q.29 The pressure of given mass of a gas in a thermodynamic system is changed in such a way that 20 joule of heat is released from the gas and 8 joule of work is done on the gas. If the initial internal energy of the gas was 30 joule then final internal energy will be-

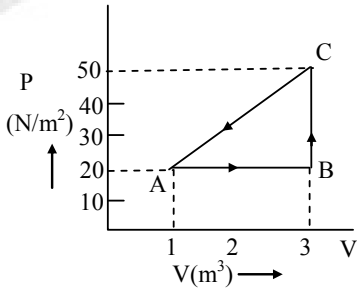
(1) 2 Joule

(2) 42 Joule

(3) 18 Joule

(4) 58 Joule

Q.30 In the diagram, the graph between volume and pressure for a thermodynamical process in shown. If $U_A = 0$, $U_B = 20J$ and the energy given from B to C is 30J, then at the stage of C, the internal energy of the system is -



(1) 50J (2) 60J

(3) 30J (4) 10J

ANSWER KEY

Que.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Ans.	1	1	3	3	1	1	3	1	3	1
Que.	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Ans.	1	3	2	2	2	2	1	3	2	4
Que.	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Ans.	1	2	1	1	4	2	3	3	3	1