Physicsaholics

Q 1. An ideal gas with adiabatic exponent $\gamma = 2$ goes through a cycle as shown in figure in which absolute temperature varies 4 times. Find efficiency of cycle ?
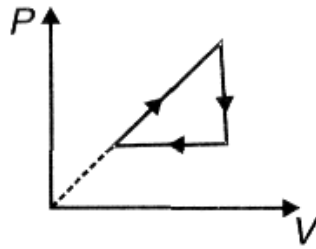

(a) 1/9
(b) 1/8
(c) 1/6
(d) 1/5

Q 2. A carnot engine is made to work first between 200 K and 100 K and then between 400 K and 200 K. The ratio of efficiencies in two cases is
(a) 1 : 15
(b) 1 : 1
(c) 1 : 2
(d) 1.73 : 1

Q 3. If in refrigerator, the lower temperature coils of evaporator are -23°C and compressed gas in condenser has a temperature of 77°C. The coefficient of performance is
(a) 70
(b) 20
(c) 23
(d) 2.5

Q 4. STATEMENT-1 : Efficiency of engine with sink temperature 0 K is 100%.
because
STATEMENT-2 : Keeping sink at ice point and source at 100° C will bring 100% efficiency.

Q 5. STATEMENT-1 : A refrigerator transfers heat from lower temprature to higher temperature.

Because

STATEMENT-2 : Heat cannot be transferred from lower temperature to higher temperature without doing any external work.

Q 6. An ideal heat engine working at source temperature 327°C is attached to a machine which is in turn performs a work of 3.6×10^7 Joule in 1 hr. Assuming the efficiency of heat engine and machine to be 50% each and no loss of heat. Find the sink temperature of heat engine and the power supplied to engine in the form of heat.

Q 7. An ideal monoatomic gas undergoes a cyclic process as shown in the P-V diagram. find efficiency of the cycle?
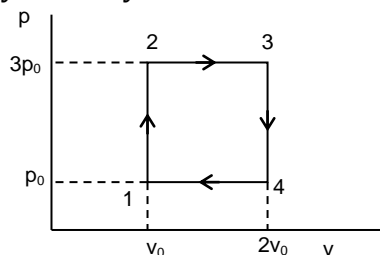
(a) 10%
(b) 17%
(c) 19%
(d) 21%

Q 8. A carnot engine takes 3000 k-cal of heat from a reservoir at 627°C and gives it to a sink at 27°C. The work done by the engine is
(A) 4.2×10^6 J   (B) 8.4×10^6 J
(C) 16.8×10^6 J   (D)   zero

Q 9. A Carnot engine working between 300 K and 600 K has a work output of 800 J per cycle. The amount of heat energy supplied from the source to the engine in each cycle is -
(A) 800 J   (B) 3200 J
(C) 1600 J   (D) 6400 J

Q 10. An ideal gas heat engine operates Carnot cycle between 227°C and 127°C. It absorbs 6×10^4 calories at the higher temperature. The quantity of heat converted into work is equal to-
(A) 4.8×10^4 cal   (B) 3.5×10^4 cal
(C) 1.6×10^4 cal   (D) 1.2×10^4 cal

Q 11. A Carnot engine, having an efficiency of $h = 1/10$ as heat engine, is used as a refrigerator. If the work done on the system is 10 J, the amount of energy absorbed from the reservoir at lower temperature is
(A) 99 J   (B) 90 J
(C) 1 J   (D) 100 J

Q 12. 100 g water at 273K is placed in a carnot refrigerator. Find approximate work done by refrigerator to freeze the water if temperature of surrounding is 300k?
(a) 3323J
(b) 2323J
(c) 1323J
(d) 323J

Answer Key

Q.1 a	Q.2 b	Q.3 d	Q.4 c	Q.5 b
Q.6 300K,40kW	Q.7 c	Q.8 b	Q.9 c	Q.10 d
Q.11 b	Q.12 a			