

1. An extensive properties among the following are

Temperature, specific volume, specific heat, Volume, Pressure, Mass, 2, 3 4. 4 and 5. 5 and 6.

2. For a polytropic process represented by $PV = \text{constant}$ and shown in PV diagram, higher the polytropic process

Higher the slope of curve, lower the the slope of curve, curve is horizontal

3. A gas contained inside a piston cylinder arrangement receives 50J of heat from some source. After some time it loses heat of 20J to surrounding. Meanwhile, a work of 15J also supplied to the gas through piston. There is also one more unknown work interaction. If the system comes back to initial state after all these processes, find the value and direction of unknown work interaction(**+ 45J**)

4. Gas inside a rigid container, supplied with 100J of heat and in the process it loses 20J of heat to the atmosphere. The specific volume of the gas

Decreases, increases, increase first and then decreases, **None of these answers.**

5. Gas inside a rigid container, supplied with 100J of heat and in the process it loses 20J of heat to the atmosphere, while a 40 J of work also being done by the system. The change of internal energy of the system is(**+40J**)

6. the work done by a piston (10 cm dia) when it moves out through a distance of 0.2 m at a constant pressure of 100kPa.(**157J**)

7. Pressure inside a cylinder reduces from 2MPa to 0.1MPa while, volume increases from 0.2m^3 to 0.6m^3 . the process is polytropic represented in a PV diagram. The work done by the gas is(**$n=2.72$**) (**$W=197.7\text{kJ}$**)

8. A pipe carries gas at an enthalpy of 3000kJ/Kg, at a velocity of 10m/s is fitted with a adiabatic nozzle at the end. The enthalpy at the exit of nozzle is 2000kJ/kg. the velocity at the exit of the nozzle is(**45.8 m/s**)

9. Example of steady flow energy devices turbine, compressor, nozzle, piston-cylinder arrangement, 1 2 3, 2 3 4, 3 and 4 alone.

10. Maximum possible efficiency of reversible heat engine which receives heat from source at temperature of 200 degree celcius and rejects heat to sink at 27 degree celcius is 0.86
0.36 0.13 None of these

11. COP of heat pump which runs on 1kw power while heating a closed space maintained at 30 degree celcius while atmosphere is at -10 degree celcius is, 3, 1.5 , 6, **None of these(answer is 7.5)**

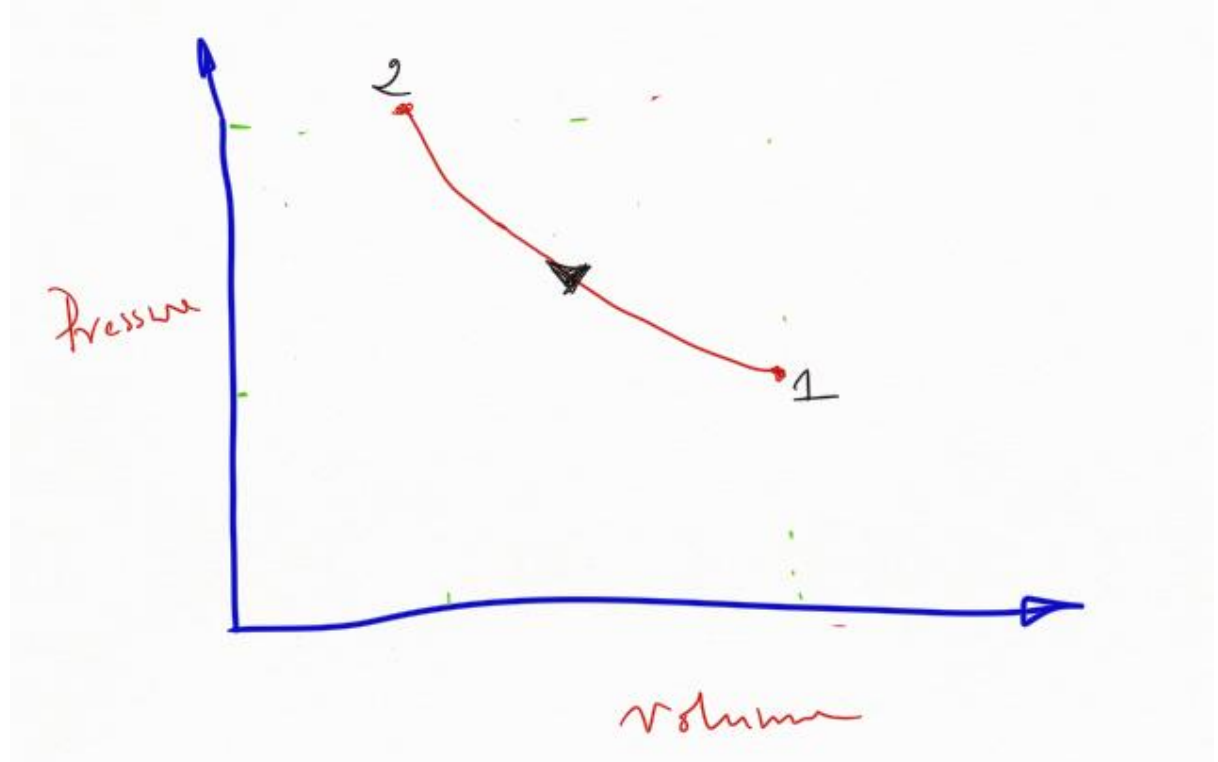
12. COP of refrigerator which runs on 1.5kW power while removing heat from closed space maintained at -10 degree and rejecting heat to atmosphere at 30 degree celcius I **6.5** 5.5
 1.5 3.5

13. An engine is developed by a scientists who claims, that engine receiving heat from 450 Kelvin and rejecting heat at 300 Kelvin , develops 50Kw of power out of every 100Kw of heat supplied to it. Is the claim True **false** depends on how efficiently the heat engine works , more data needed to substantiate the claim (**efficiency of heat engine is only 0.33**)

14. how much energy could be saved if heat pump is used instead of direct heating by a heating coil, if a room requires 10kW of heating to maintain it at 30 degree celcius when outside temperature is 10 degree celcius? **Power required will be 0.66kW**

15. For the piston-cylinder process shown in the PV diagram below , work is

Done by the system, **done on the system**, more data needed,



16. Latent heat of vaporization of water 200KPa pressure is

2201.5kJ/kg 2706.2 kJ/Kg 504.7 kJ/Kg 2529.1 kJ/ Kg

17. Dryness fraction of saturated water vapor is 0.5 0.75 **1** None of these

18. Latent heat of vaporization of water _____ with increase in pressure

Decreases, increases, remains same, increases the decreases

19. Water is heated at 300kPa pressure till it turns into 50% wet steam. The internal energy of the 50% wet steam is

1552.15 kJ/Kg 2543.2 kJ/Kg

561.11 kJ/Kg

1982.34 kJ/Kg

20. Enthalpy of atmospheric air which is at 101.325KPa pressure, 40 degree dry bulb temperature and 50% relative humidity **102kJ/Kg** 92Kj/Kg 52 kJ/kg 45 kJ/kg

21. Atmospheric air at 101.325 kPa pressure, is at 40 degree Celsius and 50% is cooled at constant pressure.. at what temperature the water content in air starts condensing?

27.5 37.5 20 10

22. 40 degrees Celsius, 40 % RH atmospheric air is heated using a heating coil till temperature reaches 45 degree Celsius. The change in absolute humidity of the air is 12 gms/kg, 8 gm/kg, 14 gms/kg **No change in absolute humidity**

23. Cycle on which petrol engine works is a **Gas power cycle** vapour power cycle refrigeration cycle Brayton cycle

24. Efficiency of Carnot cycle is given by **1-sink temperature/source temperature**

1-source temperature/sink temperature (source temperature-sink temperature)/ Source temperature 1 and 2 **1 and 3**

25. Compression ratio in Otto and diesel cycle is ratio **of maximum volume to minimum volume**

ratio of minimum volume to maximum volume

ratio of maximum pressure to minimum pressure

ratio of minimum pressure to maximum pressure

26. In Brayton cycle, the heating and cooling of working fluid is done at Constant volume **constant pressure** constant temperature none of these

27. In refrigeration cycle, the refrigerant passing through the condenser gets **Expanded**
Compressed, heated none of these

28. Components of refrigeration cycle are in the following order

Compressor to condenser to expansion valve to evaporator

Expansion valve to compressor to condense to evaporator

Expansion valve to Evaporator to Compressor to Condenser

1 only

1 and 2

1 and 3

29. The heat from exhaust of turbine is used to is utilized to increase the efficiency of
Brayton cycle by preheating the working fluid before it enters combustion chamber. This
process is called

Pre-heating

Regeneration

Intercooling

30. For the same compression ratio, **efficiency of Otto cycle is greater than efficiency of
diesel cycle, efficiency** of diesel cycle is greater than efficiency of otto cycle, both efficiency
are same

Part B