476

April 2018

Time – Three hours
(Maximum Marks: 75)

[N.B: (1) Q.No. 8 in PART – A and Q.No. 16 in PART – B are compulsory.
Answer any FOUR questions from the remaining in each PART - A
and PART – B.

(2) Answer division (a) or division (b) of each question in PART - C.

(3) Each question carries 2 marks in PART - A, 3 marks in Part – B
and 10 marks in PART – C.]

PART – A

1. Define specific weight of a fluid.

2. State Boyle's law.

3. What is reversible process?

4. Define Air-Standard efficiency.

5. Define Pascal's law.

6. Convert 15m of water gauge pressure into absolute pressure when
the atmospheric pressure is 10.33 m of water.

7. What is wetted perimeter?

8. Define second law of thermodynamics.

PART – B

9. Define path function with example.

10. Differentiate between intensive and extensive properties.

11. Define characteristic gas equation.

12. What are the various processes involved in Carnot cycle?

13. Differentiate vacuum, atmospheric and absolute pressures.

14. Briefly explain about Dead weight pressure gauge.

15. Define hydraulic co-efficient C_c, C_v and C_d.

16. Explain any three minor losses occurred in fluid flow.

[Turn over.....

PART – C

17. (a) (i) An input of 1kW-hr of work into a system (closed) increases the internal energy by 2000kJ. Determine how much heat is lost from the system.

    (ii) During compression stroke of an engine the work done on the fluid is 80kJ/kg and 40kJ/kg heat is rejected to the surroundings, determine the change in internal energy.

    (Or)

    (b) During a flow process 5kW paddle wheel work is supplied while the internal energy of the system increases in one minute is 200kJ. Find the heat transfer when there is no other form of energy transfer.

18. (a) 0.5kg of air at a pressure of 1 bar occupies a volume of 0.4m³. If this air expands insentropically to a volume of 0.8m³, Find (i)Initial temperature, (ii)External work done, (iii)change in internal energy. Assume R=0.29 kJ/kg °K.

    (Or)

    (b) 1 kg of air at 11 bar and 80°C expanded to 10 times of original volume by (i)Iso-thermal process and (ii)Isentropic process. Determine the work done in each cases. R=287 J/kg°K and γ=1.4.

19. (a) Compare the ideal and actual P-V diagrams of Otto and Diesel cycles.

    (Or)

    (b) With a neat sketch explain the working principle of centrifugal pump.

20. (a) Explain the construction and working principle of hydraulic jack with a sketch.

    (Or)

    (b) Explain the construction and working of diaphragm type pressure gauge with a neat sketch.

21. (a) Calculate the flow of water in litres per hour through a 40cm X 15cm venturi-meter when the differential gauge connected to the mouth and throat reads 25cm of mercury. Assume the co-efficient of the meter as 0.98.

    (Or)

    (b) Prove that the maximum efficiency of power transmission through fluid is 66.7%.

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