Total No. of Pages -2

Roll No. .....

FIRST SEMESTER

B.Tech.

END SEMESTER EXAMINATION

NOV-*2017*

ME-101 BASIC MECHANICAL ENGG.

Time: 3:00 Hours

Max. Marks: 50

Note: Write Part A and Part B separately in the same sheet.
Answer any 5 questions from part A and any 5 questions from part B.
All questions carry equal mark.
Assume suitable missing data, if any.

Part A

1. Give the Kelvin-Plank and Clausius statements of second law of thermodynamics and prove the equivalence of the two statements. (5)

2. A gas in a piston cylinder assembly undergoes an expansion process for which the relationship between pressure and volume is given by PV^n=Constant. The initial pressure is 0.3 MPa, the initial volume is 0.1 $m^3$and the final volume is 0.2 m^3. Determine the work done for the process in kJ if (a) n=1.5 (b) n=1 (c) n=0. (5)

3. Draw P-V and T-S diagram of a diesel cycle and derive complete expression for its efficiency. (5)
4. An oil of viscosity 5 poise is used for lubrication between a shaft and sleeve. The diameter of shaft is 0.5m and it rotates at 200rpm. The sleeve length is 100mm. The thickness of the oil film is 1.0mm. Calculate tangential velocity, area , shear force, torque and power lost in the oil. (5)

5. (a)State and prove the Pascal's law (b) Derive an expression for pressure variation in a fluid at rest. (5)
6. A reversible heat engine operates with two different thermal reservoirs A and B separately. In A it draws 12000kw from a thermal source of 400°C and in B, it draws 25000kw from a source of 100°C. In both the cases, the engine rejects heat to a thermal sink at 20°C. Determine the work output and heat rejection in both the cases and find out in which case the engine delivers more power. (5)

7. Write short notes on any two (a)Hydro electric power plant (b) Nuclear Power Plants(c) Bernoulli's Theorem with equations and their units. (5)

P.T.O.

Part B

1. Name any five types of cast irons. Write their composition, properties, advantages, limitations and applications. (5)
2. Explain the following (i) Blind Riser (ii) Core Print (iii) Chaplet (iv) Loose piece pattern (v) Chamber allowance (5)
3. Sketch and write on the various welding positions. Explain any five functions of coating in electrode. (5)
4. Differentiate between GTAW and GMAW welding process with figure. Write their applications. (5)
5. Discuss any five turning operations with figure. (5)
6. Write the difference Blanking and piercing operation with figure. Name any five sheet metal materials name and write their properties & applications. (5)
7. Discuss the following (a) Vernier Height gauge (b) Mechanical comparator (5)

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