Hall Ticket Number:

Code No. : 13110 BME

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (CBCS) III-Semester Main Examinations, December-2017

Basic Mechanical Engineering

Time: 3 hours   Max. Marks: 70

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

1. Define Stefan - Boltzman law of radiation.

2. List the applications of heat exchangers.

3. Show the p-v diagram of a 4 stroke petrol engine.

4. List the applications of Gas turbines.

5. Categorize Refrigeration systems.

6. Define wet bulb temperature and wet bulb depression.

7. Distinguish brazing and Soldering.

8. Differentiate Counter bore and counter sink.

9. Compare spur gear with helical gear.

10. List the terms involved in gear nomenclature.

Part-B (5 × 10 = 50 Marks)

11. a) Define Fourier's law of conduction.   [2]

    b) A reactor's wall 320mm thick, is made up of an inner layer of fire brick (k=0.84 W/m°C)   [8]
covered with a layer of insulation(k=0.16 W/m°C). The reactor operates at a temperature
of 1325°C and the ambient temperature is 25°C.

    i) Determine the thickness of fire brick and insulation which gives minimum heat loss.

    ii) Calculate the heat loss presuming that the insulation material has a maximum
temperature of 1200°C.

12. a) Elaborate the working of 2 stroke petrol engine with the help of a neat sketch.   [6]

    b) A 4 stroke four cylinder, S.I. engine develops a maximum brake torque of 160 Nm   [4]
at 3000rpm. Estimate the engine displacement, bore and stroke. The brake mean effective
pressure at maximum engine torque point is 960kPa. Assume bore is equal to stroke.

13. a) List various Psychrometric processes.   [2]

    b) Explain the working of Air refrigeration system along with representation of the cycle   [8]
on T-S diagram.

14. a) Explain 'Shaping' with a neat sketch.   [5]

    b) Explain the principle of gas welding and types of gas welding.   [5]

15. a) Differentiate open belt drive and cross belt drive.   [3]

    b) Write a brief note on different types of gear trains.   [7]

16. a) Develop an expression for LMTD for parallel flow heat exchanger   [5]

    b) Discuss valve timing diagram of a 4 stroke petrol engine.   [5]

17. Answer any *two* of the following:

    a) List and describe the properties of ideal refrigerant.   [5]

    b) Classify the types of arc welding and explain one of them.   [5]

    c) Two pulleys, one 450mm diameter and the other 200mm diameter are on parallel shafts   [5]
       1.95m apart and are connected by a flat open belt. Estimate the length of the belt
       required. Also find angle of contact and ratio of tension if coefficient of friction is 0.25.

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