Code No. 5065 / N / S

FACULTY OF ENGINEERING

B.E. 2/4 (ECE) I – Semester (New)(Suppl.) Examination, June 2016

Subject: Elements of Mechanical Engineering

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (25 Marks)

1 Discuss the effect of clearance volume on the work done in reciprocating air compressor.
2 Define Indicated power and Indicated specific fuel consumption.
3 What is the difference between recuperative and regenerative type heat exchangers?
4 Discuss various modes of heat transfer and mention one example in each case.
5 Compare air refrigeration system with vapor compression refrigeration system.
6 Define COP and Ton of Refrigeration.
7 Write various applications of Welding, Brazing and soldering.
8 Draw the neat sketch of any one grinding machine.
9 Write the classification of gears.
10 Define slip of Belt and Creep of belt.

PART – B (50 Marks)

11 a) Derive the expression for the work done of reciprocating air compressor with clearance volume. 4
b) A 4 cylinder 4 stroke S.I engine has compression ratio of 6:1.A test on this engine has the data load on the brake drum=200N, brake drum diameter=1m, IMEP=$8x10^5 N/m^2$, speed=3000 rpm, fuel consumption =10 kg/hr, C.V=44,565kJ/kg, Bore=80 mm, L=100 mm. Determine i] mechanical efficiency ii] BMEP iii] Brake thermal efficiency. 6

12 a) Consider a slab of thickness L=0.25m. One surface is kept at 100°C and the other surface at 10°C. Determine the net heat flux across the slab if the slab is made from pure copper. Thermal conductivity of copper is taken as 387.6W/m K. 5
b) Derive the expression for the LMTD of Parallel flow heat exchangers. 5

13 a) What are the safe working properties of a good refrigerant. 3
b) Describe with a neat sketch working of any one refrigeration system and mention its limitations and applications. 7

14 a) Explain the principle of Arc welding process. 5
b) Sketch various rolling processes and write its applications. 5

15 a) Describe the working of compound gear train . 5
b) A pulley is driven by a flat belt running at a speed of 700 m/min. The coefficient of friction between the pulley and belt is 0.3 and angle of lap is 160°. If the maximum tension in the belt is 1200N. Find the power transmitted by the belt. 5

16 a) Explain various Psychrometric processes. 5
b) Find the work required to compress one kg of air from 15°C and 1 bar to 40 bar in two- stage compressor. The law of compression is $pv^{1.25}$=const and inter cooling is perfect. 5

17 Write short notes on ***any two*** of the following: 5+5
a) Steady flow energy equation
b) Different parts of a Lathe Machine
c) Epicyclic gear trains

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