FACULTY OF ENGINEERING

B.E. 2/4 (ECE) I – Semester (Suppl.) Examination, July 2014

Subject: Elements of Mechanical Engineering

Time: 3 Hours

Max.Marks: 75

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Note: Answer all questions from Part A. Answer any five questions from Part B. PART – A (25 Marks)

- 1 Explain zeroth law of thermodynamics. What is the importance?
- 2 What is specific fuel consumption? Explain.
- 3 Explain Stefan-Boltzamn law of radiation.
- 4 What are the advantages of multistage compressors?
- 5 What is the importance of LMTD?
- 6 What are the desirable properties of an ideal refrigerant?
- 7 What are the properties of moulding sand?
- 8 How do you specify a grinding wheel?
- 9 What is the condition for maximum power transmission for flat belt?
- 10 differentiate simple and compound gear train.

PART – B (50 Marks)

- 11 a) Explain clausius inequality.
 - b) A reversible engine receives heat from a reservoir at 700°C and rejects heat at temp. T₂. S second reversible engine receives the heat rejected by the first engine and rejects to a sink at temperature 37°C. Calculate the Temp. T₂ for equal work output of both the engines.
- 12 a) Prove that for the same compression ratio Otto cycle is more efficient than the diesel cycle.
 - b) Derive the equation for LMTD in paraller flow heat exchanger.
- 13 a) What are the advantages and disadvantages of air cycle refrigeration over vapour compression cycle.
 - b) A simple vapour compression refrigerator plant produces 5 tonnes of refrigeration, the enthalpy values at inlet to the compressor, at exit from the compressor, and at exit from the condenser are 183.19, 209.41 and 74.59 kJ/kg respectively. Estimate (i) the refrigerant flow rate (ii) the cop (iii) the power required to derive the compressor.
- 14 a) Explain die casting process and state advantages and limitations of the process.
 b) What are the different types of gas flames used in gas welding? Mention their applications.
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- 15 a) What are the different operations carried out an a lathe? Explain taper turning in detail.
 - b) Explain the difference between forward and backward extrusion process.
- 16 a) Derive expression for belt lengths for open belt drives.
 - b) Explain epi-cycle gear train and mention its advantages.
- 17 Write a short note on the following:
 a) Milling operations
 b) Forging operations
 c) Multistage compressor