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M S RAMAIAH INSTITUTE OF TECHNOLOGY

(AUTONOMOUS INSTITUTE, AFFILIATED TO VTU)

BANGALORE – 560 054

SEMESTER END EXAMINATIONS – JANUARY 2015

Course & Branch	: **B.E: (Common to All Branches)**	**Semester**	: **I**
Subject	: **Elements of Mechanical Engineering**	**Max. Marks**	: **100**
Subject Code	: **ME101**	**Duration**	: **3 Hrs**

Instructions to the Candidates:

- Answer one full question from each unit.

UNIT – I

1. a) What are the advantages and disadvantages of renewable energy sources? (06)
   b) Explain with a neat sketch working of Lancashire boiler (2 views). (10)
   c) What are boiler mountings? Name the boiler mountings. (04)

2. a) With a neat sketch explain the working of an impulse turbine. (06)
   b) What is compounding of steam turbines? Explain pressure velocity compounding. (06)
   c) A steam engine obtains steam from a boiler at a pressure of 15 bar and 0.98 dry. Steam loses 2.1KJ of heat per kg as it flows through the pipeline, pressure remaining constant. Calculate the quality of steam at the end of pipeline. (08)

UNIT – II

3. a) With the help of a PV diagram, explain the working of 4-stroke diesel engine. (08)
   b) In a test on single cylinder, 4 stroke cycle oil engine with bore 30cm, stroke 45cm, the following observations were made; duration of trial = 1hr, total fuel consumption = 7.6 kg, calorific value of fuel = 45000KJ/Kg, total revolutions made = 12000, Indicated mean effective pressure = 6bar, net brake load = 1.47KN, brake drum diameter = 1.8m, rope dia = 3cm. Determine the indicated power ,brake power, indicated thermal efficiency and BMEP. (12)

4. a) Define the following : (04)
   i) Unit of refrigeration ii) Co-efficient of performance
   iii) Brake Power iv)SFC

b) Explain with neat sketch the working of vapour absorption refrigerator (08)

c) Explain the working of a window air-conditioner with a neat sketch (08)

UNIT – III

5. a) Sketch the centre lathe and name the parts and briefly explain the main parts of the lathe. (08)

b) With neat sketches explain the following lathe operations: (08)

i) Facing ii) Cylindrical turning

c) List the main difference between a lathe and a milling machine. (04)

6. a) List the various drilling operations and explain any one with a neat sketch. (06)

b) Explain up milling and down milling with neat sketches. (06)

c) i) Name the various bonding methods in manufacturing grinding wheels. (08)

ii) Explain with a neat sketch centerless grinding.

UNIT – IV

7. a) Differentiate between CNC and NC machines. (04)

b) List out the main differences between welding, brazing and soldering. (08)

c) How do you classify welding processes? Explain arc welding. (08)

8. a) What are bearings? Give the classification with examples. (07)

b) What do you understand by antifriction bearings? Explain any one with a neat sketch. (07)

c) Sketch and explain foot step bearing (06)

UNIT – V

9. a) Derive an expression for length of belt for an open belt drive. (08)

b) Sketch and explain spur gear and bevel gear (06)

c) In an open belt drive, the driver and driven pulleys are 800mm and 400mm diameter respectively of maximum tension 0.6KN and co-efficient of friction=0.3. If the belt velocity is 4.5 m/s and centre distance between pulleys is 1200mm, find the power transmitted. (06)

10. a) Explain the spur gear terminology with a neat sketch. (08)

b) List out the properties of a good lubricant (04)

c) Sketch and explain screw cap lubricator and siphon wick lubricator (08)

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