Code No: R161232 **R16** SET - 1

I B. Tech II Semester Supplementary Examinations, December - 2020
ELEMENTS OF MECHANICAL ENGINEERING
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is Compulsory
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) What is the function of an economizer in a steam power plant? (2M)
   b) Define soldering and brazing. (2M)
   c) Write the applications of air compressors. (2M)
   d) Draw the pressure Vs Volume plot of a diesel cycle and indicate all the processes involved. (2M)
   e) Write the advantages of rope drives. (2M)
   f) Define pitch circle and pressure angle of a gear. (2M)
   g) Define indicated power and brake power of an IC engine. (2M)

PART -B

2. a) With the help of a neat sketch explain the working of steam turbine power plant. (7M)
   b) How are Boilers classified? Discuss the factors to be considered in selecting a steam boiler. (7M)

3. a) Explain the working of electric arc welding. Write its advantages. (7M)
   b) What are the common allowances provided on patterns? Why and how they are provided? Give suitable examples. (7M)

4. a) Differentiate between reciprocating and rotary air compressors. (7M)
   b) With a neat sketch explain the working of simple vapour compressor refrigeration system. (7M)

5. a) Differentiate between (8M)
   (i) Two stroke engine and four stroke petrol engine.
   (ii) SI engine and CI engine
   b) A Four cylinder two stroke cycle petrol engine develops 30 kW at 2500 r.p.m. The mean effective pressure on each piston is 8 bars and mechanical efficiency is 80%. Calculate the diameter and Stroke of each cylinder with stroke bore ratio 1.5. Also calculate the fuel consumption of the engine, If broke thermal efficiency is 28%. The calorific valve of fuel is A 3900 kJ/kg. (6M)

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6. a) Derive the expression to calculate the length of an open belt drive. (7M)

   b) A leather belt is required to transmit 7.5 kW from a pulley 1.2 m in diameter, running at 250 r.p.m. The angle embraced is 165^0 and the coefficient of friction between the belt and the pulley is 0.3. If the safe working stress for the leather belt is 1.5 MPa, density of leather 1 Mg/m^3 and thickness of belt 10 mm, determine the width of the belt taking centrifugal tension into account. (7M)

7. a) How are gears classified? Write the advantages and disadvantages of Gear drives. (7M)

   b) A compound train consists of six gears. The number of teeth on the gears are as follows : (7M)

Gear :	A	B	C	D	E	F
No. of teeth :	60	40	50	25	30	24

The gears B and C are on one shaft while the gears D and E are on another shaft. The gear A drives gear B, gear C drives gear D and gear E drives gear F. If the gear A transmits 1.5 kW at 100 r.p.m. and the gear train has an efficiency of 80 per cent, find the torque on gear F.

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