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

I B. Tech II Semester Supplementary Examinations, Nov/Dec - 2018
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) In what circumstances the water tube boilers are used in preference to the fire tube boilers? Give reasons in support of your answer. (2M)
   b) Explain the principle of working of rolling process. (2M)
   c) Discuss the types of refrigeration. (2M)
   d) What do you mean by stroke, clearance volume of an IC engine? (2M)
   e) Explain the effect of centrifugal tension on the power transmitted. (2M)
   f) Define the terms, pitch diameter and pitch point of a gear. (2M)
   g) What do you understand by specific fuel consumption and brake thermal efficiency of an internal combustion engine? (2M)

PART –B

2. a) Why mountings are essential in boilers? Name different mountings and give functions of each. (7M)
   b) Sketch and describe the working of a locomotive boiler. Show the positions of various mountings. (7M)

3. a) Explain using simple sketches the following pattern types: i) split pattern, ii) cope and drag pattern. (7M)
   b) Explain the working principle of arc welding with a neat sketch. (7M)

4. a) Indicate the important uses of compressed air for engineering purposes. (5M)
   b) Derive an expression for the work done in a single-stage compressor neglecting the effect of clearance, when the compression is isothermal. (9M)

5. a) Describe the operating principle of a four stroke diesel engine and describe the process entailed in each stroke. (7M)
   b) A diesel engine has a brake thermal efficiency of 28%. If the calorific value of fuel is 42000kJ/kg. Find its brake specific fuel consumption. (7M)

6. a) What is meant by cross-belt drive? Find the length of belt in a cross-belt drive. (7M)
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b) Two parallel shafts, connected by a crossed belt, are provided with pulleys 480mm and 640mm in diameters. The distance between the centre lines of the shafts is 3m. Find by how much the length of the belt should be changed if it is desired to alter the direction of rotation of the driven shaft. (7M)

7. a) State and derive the law of gearing. (7M)

b) A compound train consists of four gears. The number of teeth on gears A, B, C and D are 54, 75, 36 and 81 respectively. Gears B and C constitute a compound gear. Determine the torque on the output shaft if the gear A transmits 9kW at 200 rpm and the train efficiency is 80%. (7M)