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

I B. Tech II Semester Supplementary Examinations, Nov/Dec - 2019
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 the fundamental difference is between internally fired and externally fired boilers? (2M)
   b) Discuss the basic characteristics of the extrusion process. (2M)
   c) Explain the principle involved in refrigeration. (2M)
   d) What is meant by compression ratio, piston displacement of an IC engine? (2M)
   e) Discuss the effect of slip of belt on the pulleys on the velocity ratio of a belt drive. (2M)
   f) Define the terms: (2M)
   (i) Pitch diameter and
   (ii) Module of a gear.
   g) What do you understand by Indicated power and mechanical efficiency of an internal combustion engine? (2M)

PART –B

2. a) Name and give the functions of essential accessories provided for the operation of boilers. (7M)
   b) Sketch and describe the working of a Babcock and Wilcox water tube boiler. Show the arrangements of water tubes and furnace and indicate path of the furnace gases and water circulation by arrows. (7M)

3. a) Mention the advantages and disadvantages of casting process. Briefly explain the steps involved in making a casting. (7M)
   b) How is brazing different from soldering? Compare them with regard to methods adopted and their applications. (7M)

4. a) Explain the classification of air compressors. (7M)
   b) With the help of sketches, explain the working of a single-stage reciprocating air compressor. (7M)

5. a) Discuss in detail, the fundamental differences between S.I and C.I engines. (7M)
   b) Draw a neat sketch of four stroke petrol engine and label various parts and give their material and describe their functions. (7M)
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6. a) Derive the relation for ratio of belt tensions in a flat-belt drive. (7M)

   b) A belt runs over a pulley of 800mm diameter at a speed of 180 rpm. The angle of lap is 165^0 and the maximum tension in the belt is 2kN. Determine the power transmitted if the coefficient of friction between the belt and the pulley is 0.3. (7M)

7. a) What are the main tooth profiles of gear teeth which fulfill the law of gearing? Compare them. (7M)

   b) What is the difference between a simple gear train and a compound gear train? Explain with the help of sketches. (7M)