SEM 2 – 4 (RC)

# F.E. (Sem. – II) Examination, November 2010
## (Revised in 2007-08)
## BASIC MECHANICAL ENGINEERING

Duration: 3 Hours Total Marks: 100

***Instructions :*** *1) Answer **five** questions. Selecting **one** from **each** Module.*
*2) Illustrate your answers with **neat** figures/sketches **if required**.*
*3) Assume and data if found **necessary** and state **clearly**.*

MODULE – I

1. A) Answer the following :
   i) What you understand by path function ? What are the exact and inexact differentials ?
   ii) What is the difference between work transfer and heat transfer ?
   iii) How can a closed system can interact with surroundings ? What is the effect of such interaction on the system ?
   iv) State the limitations of the first law of thermodynamics. **(4×3=12)**

   B) It is desired to compress 15 kg of gas from 18 $m^3$ to 0.3 $m^3$ at a constant pressure of 13 bar. During this compression process, the temperature rise from 20°C to 180°C and the increae in internal energy is 3250 kJ. Calculate the work done, heat interaction and change in enthalpy during the process. Draw the process on P-V diagram. **8**

2. A) Answer the following :
   i) List down the assumption made for analysis of air stander cycle.
   ii) What you understand by flow work ? Is it different from displacement work ?
   iii) Define :
      i) Efficiency of heat engine and
      ii) Coefficient of performance of heat pump and refrigerator.
   iv) Define the terms compression ratio, clearance volume swept volume and total volume. **(4×3=12)**

**P.T.O.**

B) The following data pertains to petrol engine :

Cylinder bore (Dia.) = 14 cm; stroke length = 11 cm

Clearance volume = 280 $cm^3$

Calculate the air standard efficiency of the engine. **8**

## MODULE – II

3. A) Distinguish between two stroke and four stroke engine.

B) Write a short note on Multi-Point Fuel Injection (MPFI).

C) What is function of carburetor and fuel pump in I.C. Engine ?

D) A diesel engine has brake thermal efficiency of 26 per cent. If calorific value of fuel is 42000 kJ/kg, find its brake specific fuel consumption. **(5+5+5+5)**

4. A) Explain with neat sketch the working principle of steam power plant.

B) Define coefficient of performance and tonne of refrigeration.

C) Write a short note on Domestic Refrigerator.

D) Define specific fuel consumption and brake thermal efficiency. **(6+4+6+4)**

## MODULE – III

5. A) Give the classifications of automobiles and discuss about its applications.

B) What is clutch ? Where is clutch located ? And what are the features of good quality clutch ?

C) What is universal joint ? Where is it used ? **(8+8+4)**

6. A) Describe with a neat sketch the construction and working of a single plate clutches.

B) What are "power brakes" ? What are the main features of the brake system ?

C) What are the requirements of transmission systems ?

D) Write a short notes on the following :

i) Propeller shaft ii) Universal joints. **(5+6+5+4)**

## MODULE – IV

7. A) Describe the various patterns in casting.

   B) Elaborate the various forging operations.

   C) Explain briefly with help of neat sketches of the following lathe operations :

   i) Turing
   ii) Drilling
   iii) Tapping
   iv) Boring
   v) Taper turning and
   vi) Knurling. **(5+5+10)**

8. A) Define extrusion process. Explain forward and backward extrusion process.

   B) Describe briefly the equipment used in soldering. How is soldering process carried out ?

   C) Define 'soldering'. Name types of solder.

   D) Describe laser beam welding process.

   E) Write a short note on "Mechanical Fastning". **(4+4+4+4+4)**

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