# B.Tech. Degree I & II Semester (Combined) Examination June 2003

## IT/CS/EC/CE/ME/SE/EB/EI/EE/MRE 107
## FUNDAMENTALS OF ENGINEERING - I

## b) Mechanical Engineering

*(1998 Admissions onwards)*

Time: 1 ½ Hours | Maximum Marks: 50

I. (a) Describe open, closed and isolated systems. (6)

(b) Write down the equation of state of a perfect gas. What is Universal Gas Constant? (4)

(c) $1.3m^3$ of air at 0.1MPa is compressed isothermally to 0.7MPa. Find the work done during the process. (7)

**OR**

II. (a) Explain:
(i) Free expansion
(ii) Throttling expansion (6)

(b) State the first law of thermodynamics as applied to an open system. (4)

(c) A gas enters a steady flow compressor at 25°C, 0.1MPa and an enthalpy of 395KJ/Kg. The gas leaves the compressor at 250°C, 0.6MPa and an enthalpy of 540KJ/Kg. Estimate the work done per Kg of gas. (7)

III. (a) Obtain the air standard efficiency of the Diesel cycle. (10)

(b) A diesel engine has a compression ratio of 15. The cut off takes place at 6% of the stroke. Find the air standard efficiency. (7)

**OR**

IV. (a) Describe the working of a four stroke petrol engine. (9)

(b) With the help of sketches, describe the ignition system used in a six-cylinder petrol engine. (8)

V. (a) Explain the following terms in respect of steam:
(i) Saturation temperature
(ii) Dryness fraction
(iii) Enthalpy and
(iv) Specific volume (8)

(b) Describe with a neat sketch, the working of a Cochran Boiler. (8)

**OR**

VI. (a) What are boiler mountings and accessories? Describe any three of them. (8)

(b) How are steam turbines classified? Describe with a neat sketch, the working of a simple impulse turbine with velocity compounding. (8)

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