

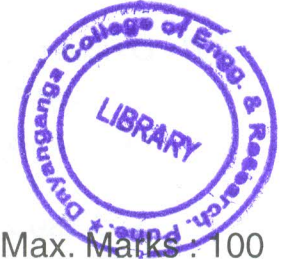


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[4161] – 111

May - June - 2012

F.E. (Semester – II) Examination, 2012
BASIC MECHANICAL ENGINEERING
(2008 Pattern)



Time : 3 Hours

Max. Marks : 100

- Instructions:**
- 1) Answer **any one** question from **each** Unit.
 - 2) Answer to the **two** Sections should be written in **separate** answer books.
 - 3) Black figures to the **right** indicate full marks
 - 4) **Neat** diagrams must be drawn **wherever** necessary.
 - 5) **Use** of electronic pocket calculator is **allowed**.
 - 6) Assume suitable data, if necessary.

SECTION – I

UNIT – I

1. A) What do you understand by Reversible and Irreversible process ? State the causes which make any process Irreversible . 6
B) Define and write equations for the following :
i) Adiabatic Index
ii) Enthalpy. 4
C) A system contains 0.15 m^3 of air at 5 bar and 350° K . A reversible adiabatic expansion takes place till the pressure falls to 1 bar . The gas is then heated at constant pressure till enthalpy increases by 70 KJ. Calculate
i) Work done in individual process.
ii) Index of expansion if the above processes are replaced by a single reversible polytropic process giving the same initial and final states.

Take for air, $C_p = 1.005 \text{ KJ/kgK}$, $C_v = 0.718 \text{ kJ/kgk}$,
 $R = 0.287 \text{ kJ/kgk}$. 6

OR

P.T.O.



2. A) State and explain Second Law of Thermodynamics. 6
- B) Define the following :
i) Heat Engine
ii) Heat Pump. 4
- C) A 'Closed vessel' contains 2 kg of carbon dioxide at temperature 20°C and pressure 0.7 bar. Heat is supplied to the vessel till the gas acquires a pressure of 1.4 bar. Calculate
i) Final temperature
ii) Work done on or by gas
iii) Heat added
iv) Change in internal energy. 6
- Assume, $C_v = 0.657 \text{ kJ/kg. K.}$

UNIT – II

3. A) Give classification of I.C. Engine with applications. 6
- B) Explain with neat sketch working of Window Air Conditioning System. How does split Air conditioner differ from Window Air conditioner ? 10
- OR**
4. A) How Boilers are classified ? State any four mounting and their functions. 6
- B) Describe with a block diagram and state the applications of the following : 10
i) Double Acting Reciprocating Pump
ii) Reciprocating Air compressor.

UNIT – III

5. A) Explain concept of series and parallel thermal resistances in composite slab. 5
- B) Derive an expression for heat conduction through an infinitely long hollow cylinder. 5
- C) Compare Thermal and Nuclear Power plants on any four parameters. Draw sketch of Nuclear power plant. 8

OR

