

B. Tech. 3rd Semester (M.E.) F- Scheme
Examination, December – 2016

THERMODYNAMICS
Paper-ME-201-F

Time allowed : 3 hours] [Maximum marks : 100

Note : Attempt five questions. All question carry equal marks. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Use steam Table.

1. (a) Define intensive and Extensive properties. Give examples. 2×10
- (b) What is Zeroth law of Thermodynamics ? Give its applications.
- (c) Differentiate between Throttling Process and Free Expansion Process.
- (d) Explain second law of thermodynamics and also define Entropy.
- (e) Describe Steady flow Energy Equation.
- (f) Differentiate between Heat Pump and Refrigeration.
- (g) Describe Gibson Dalton's law.
- (h) Differentiate between Otto cycle and Diesel cycle.
- (i) Explain Availability and Irreversibility.
- (j) Describe van-der-Waal's equation of state.

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Section-1

2. What is point and path functions ? Give examples. A 1m^3 rigid tank initially contains air whose density is 1.18kg/m^3 . The tank is connected to a high-pressure supply line through a valve. The valve is opened and air is allowed to enter the tank until the density in the tank rises to 7.20kg/m^3 . Determine the mass of air that has entered the tank. 20

3. In the gas turbine unit the gases flow through the turbine is 17kg/s and the power developed by the turbine is 1000KW . The enthalpies of the gases at inlet and outlet are 1200kJ/kg and 360kJ/kg respectively and velocities of the gases at inlet and outlet are 60m/s and 150m/s respectively. Calculate the rate at which the heat is rejected from the turbine. Find also the area of the inlet pipe given that the specific volume of the gases at inlet is $0.5\text{m}^3/\text{kg}$. 20

Section-2

4. Explain Causes of Irreversibility. Give the expression for change in entropy during isothermal processes and polytropic processes. 20
5. What is the difference between adiabatic and isentropic process ? A block of copper with a mass of 1.5kg is initially at 700K . It is allowed to cool by means of heat transfer to the surrounding air at 300K . Determine the change in entropy of the copper and change in entropy of the universe after copper reaches

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thermal equilibrium. Assume specific heat of copper is 0.39kJ/kgK . 20

Section-3

6. Describe P-V-T surface. A steam plant operates on a simple ideal Rankine cycle between the pressure limits of 3MPa and 50kPa . The temperature of the steam at the turbine inlet is 300°C , and the mass flow rate of steam through the cycle is 35kg/s . Show the cycle on a T-s diagram with respect to saturation lines, and determine (a) the thermal efficiency of the cycle and (b) the net power output of the power plant. 20

7. Express Dalton's law of additive pressures. Consider a gas mixture that consists of 3kg of O_2 , 5kg of N_2 , and 12kg of CH_4 . Determine (a) the mass fraction of each component, (b) the mole fraction of each component and (c) the average molar mass and gas constant of the mixture. 20

Section-4

8. Describe Joule-Thomson coefficient. Using the Maxwell relations, $(\frac{\partial s}{\partial p})_T$ determine a relation for a gas whose equation of state is $P(v-b) = RT$. 20
9. Describe the Clapeyron equation. Derive the expression $C_p - C_v = R$ for an ideal gas. 20

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B. Tech. 3rd Semester Civil Engg. F- Scheme
Examination, December-2016

BUILDING CONSTRUCTION MATERIALS

Paper-CE-203-F

Time allowed : 3 hours]

[Maximum marks : 100

Note : (i) Question No. 1 is compulsory. Attempt one question from each section.

- (ii) All questions carry equal marks.
(iii) Assume missing data, if any, suitably.

1. Describe the following :

- (a) Bonds in brick work
- (b) Types of non-bearing partitions
- (c) Purlin roofs
- (d) Transmission of sound
- (e) Prevention of dampness
- (f) Sawing and polishing of stones
- (g) Testing of bricks
- (h) Classification of lime
- (i) Fire proofing of timber
- (j) Types of paints.

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Section-A

2. (a) How is stone masonry classified ? Give safe permissible loads on any four types of stone masonry. 10
(b) What are the various defects in brick masonry ? 10
3. (a) What are the advantages of cavity walls ? What precautions should be taken while constructing cavity wall ? 10
(b) What are the functions of a foundation ? Describe shallow foundation and its different types. 10

Section-B

4. (a) Define a flat roof and mention its advantages and disadvantages. 10
(b) Describe , with neat sketches, various types of composite floors. 10
5. (a) Describe the provisions of doors and windows w.r.t locations and sizes. 10
(b) Describe briefly the following types of doors and windows
(i) Pivoted window
(ii) Gable window
(iii) Bay window
(iv) Double-hung window 10

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Section-C

6. (a) What is damp-proofing ? Describe the defects and causes of dampness in detail. 10
(b) Write a short note on "water-proofing treatment of roofs". 10
7. (a) What do you mean by acoustics ? Describe the different types of absorbent material in detail. 10
(b) What are the characteristics of an ideal fire-resisting material ? 10

Section-D

8. (a) What are the requirements of good structural stones ? Explain in detail. 10
(b) Describe the classification of bricks in detail. 10
9. Describe the following :
(i) Different types of cement in detail
(ii) Various defects in timber
(iii) Mortars for masonry and plastering
(iv) Basic constituents of paints. 20

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