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B. Tech. 2nd Semester F. Scheme Examination,  
May-2014

**BASICS OF MECHANICAL ENGINEERING**

**Paper-ME-101-F**

**Common for all branches**

*Time allowed : 3 hours ] [Maximum marks : 100*

*Note : Attempt any five questions in total at least one question from each section. Question no. 1 is compulsory. Each question carries equal marks (20 marks).*

1. Discuss the following : 5×4
- (a) Types of Milling machines
  - (b) Vapour refrigeration cycle
  - (c) Relationship between elastic constants
  - (d) Straight line system.

**Section-A**

2. (a) What is the principle of planer ? Discuss different types of planer machines. 10
- (b) A system exists with  $0.2\text{m}^3$  of a gas at 4 bar and 425K. It is expanded adiabatically to 1 bar. The gas is then heated at constant pressure till its enthalpy increases by 70KJ. Calculate the total work done. 10

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3. (a) What is the principle element of metal cutting ?  
What is the single point and multi point cutting tool ? 10
- (b) Steam at pressure 15bar and 0.95 dry is generated in a boiler and is made to pass through its super heater where additional quantity of heat is supplied to steam at constant pressure. Consequently the temperature of steam increases to 350°C. Determine the following :
- (i) Heat supplied in the super heater
- (ii) Change in internal energy. 10

**Section-B**

4. (a) An air refrigeration system working on Bell Coleman cycle draws air from the cold chamber at 5°C and 1 bar. The air is compressed to 7 bar and then cooled to 25°C before sent to the expansion cylinder. If compression and expansion are isentropic, find the COP of the system and refrigerating effect for 1 JKg/s mass flow rate of air. 10
- (b) Explain the constructional details of Kaplan

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5. (a) How would you classify the pumps ? What is priming and why it is important ? 10  
(b) Discuss Psychrometric processes in detail. 10

**Section-C**

6. (a) Derive an expression for centrifugal tension for flat belt drive. What is the initial tension in belt ? 10  
(b) Discuss bending equation in detail. 10
7. (a) Discuss Hook's law. Also discuss stress strain diagram in detail. 10  
(b) What is the function of a clutch ? Explain the working of friction clutch with the help of a neat sketch. 10

**Section-D**

8. (a) What do you understand by automation ? Explain the components of a manufacturing system. 10  
(b) What is the procedure of Numerical control ? How are numerical control systems classified ? 10
9. (a) Discuss computer numerical control in detail. 10  
(b) Discuss DNC and absolute system. 10

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