

Registration No:

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Total Number of Pages : 02

B.Tech  
RBM1B001

1<sup>st</sup> Semester Regular / Back Examination: 2021-22  
BASIC MECHANICAL ENGINEERING  
BRANCH(S): AEIE, AERO, AG, AME, AUTO, BIOMED,  
BIOTECH, C&EE, CHEM, CIVIL, CIVIL, CSE,  
CSE, CSEAI, CSEAIME, ECE, ECE, EEE, EEE,  
EIE, ELECTRICAL, ELECTRICAL, ELECTRICAL & C.E,  
ELECTRONICS & C.E, ETC, ETC, IT, MANUTECH,  
MANUTECH, MECH, MECH, METTA, METTA, MINERAL,  
MINING, MINING, MME, PLASTIC, PLASTIC, PT, PT

Time : 3 Hour

Max Marks : 100

Q.Code : OF734

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

Part-I

- Q1 Answer the following questions : (2×10)
- State zeroth law of thermodynamics.
  - A sample of nitrogen collected in the laboratory occupies a volume of 720 mL at a Pressure of 1 atm. What volume will the gas occupy at a pressure of 2 atm, assuming the temperature remains constant?
  - Define boiler according to IBR.
  - Name the five basic components of a refrigeration system.
  - State the law of gearing.
  - What is coupling?
  - What is the function of clutch? How it operates?
  - Write two applications of Robots.
  - Name two instruments used for low pressure measurement.
  - What are the basic types of errors in mechanical measurement?

Part-II

- Q2 Answer Any Eight out of Twelve (6×8)
- Define open, closed and isolated systems. Classify each with example.
  - Derive  $C_p - C_v = R$ , with usual notations.
  - Differentiate between S.I. engine and C.I. engine.
  - Write down working of two-stroke petrol engine with neat sketch.
  - Explain with a neat sketch the working of a vapor compression refrigerator.
  - Classify the air compressor. Differentiate between reciprocating compressor and rotary compressor.
  - What is belt drive? Describe briefly types of belt drives.
  - Explain the phenomena interference and undercutting in gear drive.
  - Describe the working of centrifugal clutch with a neat sketch.

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- j) Define Robot. Explain the classification based on robot physical configuration.
  - k) Explain the principle of working of a thermocouple for temperature measurement.
  - l) Explain the method of pointer and scale for torque measurement.

**Part-III**

**Only Long Answer Type Questions (Answer Any Two out of Four)**

- Q3** - An ideal gas is heated from 25° C to 145° C. The mass of the gas is 2kg. (16)  
331 Determine: 331 331 331
- i) Specific heats,
  - ii) Change in internal energy,
  - iii) Change in enthalpy. Assume  $R = 287 \text{ J/kgK}$  and  $\gamma = 1.4$  for the gas.
- Q4** - Name all the mountings and accessories of a steam boiler and describe with neat sketch, the working of any one of each. (16)
- Q5** 331 What is the use of the braking system in a vehicle? Describe the working of internal shoe expanding brake with a neat sketch. (16)
- Q6** Explain the working of a load cell for force and strain measurement. (16)