B. TECH (SEM I)
Model Paper-2 (2023-24)
SUBJECT (Sub Code): FME (BME101)
SECTION-A

Q.1	Attempt all parts	(10×2=20)

a.	State Hooke's law.	**CO1**
b.	Write the principle of transmissibility.	**CO1**
c	Draw p-v diagram for four stroke SI engine & CI engine.	**CO2**
d	Discuss the terms used in IC engine - TDC, BDC, Stroke and Bore.	**CO2**
e	List the components of a vapor compression refrigeration system and show them in sequence on a block diagram.	**CO3**
f	Explain COP of refrigerator.	**CO3**
g	Explain continuity equation.	**CO4**
h	Define: Density, weight density and specific volume and specific gravity	**CO4**
i	Define the term accuracy, precision & resolution.	**CO5**
j	Define autotronics, bionics & avionics.	**CO5**

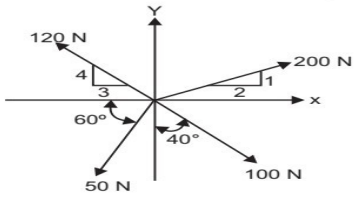
SECTION-B

Q.2	Attempt any three parts	(3×7=21)

a	At an axial load of 22 kN, a 45-mm-wide by 15-mm thick polyimide polymer bar elongates 3.0 mm while the bar width contracts 0.25 mm. The bar is 200 mm long. At the 22-kN load, the stress in the polymer bar is less than its proportional limit. Determine- 1. The modulus of elasticity. 2. Poisson's ratio. 3. The change in the bar thickness.	**CO1**
b	Discuss any four important components of an IC Engine and the major functions of those components.	
c	Draw a neat sketch and explain the working of window air conditioning system. Give the some applications of air conditioning system.	**CO2**
d	Describe the Pascal Law. Explain the working of Hydraulic Lift with the help of a neat diagram.	**CO3**
e	What do you mean by actuation system? Write its classification & explain mechanical actuators.	**CO4**

SECTION-C

Q.3	Attempt any one part	(1×7=7)

a.	Develop the relationship between E (Young's modulus), C (Shear modulus), K (Bulk modulus) and μ (Poisson ratio).	**CO1**
b	A system of four forces acting on a body is as shown in figure. Determine the magnitude and direction of resultant. 	

Q.4	Attempt any one part	(1×7=7)

a.	Explain the working of four stroke CI engine with P-V diagram and with suitable sketch.	**CO2**
b.	What are the main components of electric vehicles? Write down their advantages and disadvantages.	**CO2**

Q.5	Attempt any one part	(1×7=7)
a.	Explain the following terms related to air conditioning: i. Dry bulb temperature ii. Wet bulb temperature iii. Dew point temperature iv. Relative humidity	**CO3**
b.	What do you mean by refrigeration? Explain basic components and working of domestic refrigerator with suitable sketch.	**CO3**
Q.6	**Attempt any one part**	**(1×7=7)**
a	Write short notes on:- (i) Kinematic viscosity (ii) Continuity equation (iii)Pascal's law (iv)Specific gravity (v)Newton's law of viscosity	**CO4**
b	Describe the working principle of a reciprocating pump. Why these pumps are called positive displacement pump?	**CO4**
Q.7	**Attempt any one part**	**(1×7=7)**
a	What is error & its sources? Explain in detail Prony brake dynamometer for torque measurement with neat sketch.	**CO5**
b	Explain the Seebeck effect and the working principle of thermocouples with help of a neat sketch. Also discuss their advantages and disadvantages	**CO5**