



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

Q.1	Attempt all parts	(10×2=20)
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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)
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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)
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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. <div style="text-align: center;"> </div>	

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