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BTECH**(SEM I) THEORY EXAMINATION 2023-24****FUNDAMENTALS OF MECHANICAL ENGINEERING & MECHATRONICS****TIME: 3HRS****M.MARKS: 100****Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt all questions in brief.****2 x 10 = 20**

Q no.	Question	Marks	CO
a.	Differentiate active and passive transducers.	2	5
b.	Define the scavenging process.	2	2
c.	Explain Hook's law.	2	1
d.	Discuss the continuity equation.	2	3
e.	Define accuracy and precision.	2	5
f.	Define Ton of refrigeration.	2	2
g.	Explain the superposition theorem.	2	1
h.	Define specific gravity and specific weight.	2	3
i.	Define DBT, WBT and DPT.	2	2
j.	Discuss the significance of calibration.	2	4

SECTION B**2. Attempt any three of the following:****10 x 3 = 30**

a.	Explain the construction and working of four stroke petrol engine.	10	2
b.	Explain the construction and working of optical pyrometer with the help of neat diagram.	10	4
c.	What is Mechanical Actuation. Explain any four mechanical actuations systems.	10	5
d.	Draw the SFD and BMD for the cantilever beam shown in figure. 	10	1
e.	Define pressure and its types. State and prove Pascal's Law.	10	3

SECTION C**3. Attempt any one part of the following:****10 x 1 = 10**

a.	Explain the construction and working of a domestic refrigerator.	10	2
b.	i) Differentiate between 4-stroke and 2-stroke I.C. Engines ii) Discuss the modes of Hybrid Electric Vehicle.	10	2

4. Attempt any one part of the following:**10 x 1 = 10**

a.	What are sensors and transducers? Enumerate the various types of sensors and transducers.	10	5
b.	Define Mechatronics. Write the advantages, disadvantages and scope of Mechatronics.	10	5



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BTECH**(SEM I) THEORY EXAMINATION 2023-24****FUNDAMENTALS OF MECHANICAL ENGINEERING & MECHATRONICS****TIME: 3HRS****M.MARKS: 100****5. Attempt any *one* part of the following:****10 x 1 = 10**

a.	Derive the relationship between E (Young's modulus), C (Shear modulus), K (Bulk modulus) and μ (Poisson ratio).	10	1
b.	Explain the stress strain curve for mild steel with the help of diagram.	10	1

6. Attempt any *one* part of the following:**10 x 1 = 10**

a.	Discuss the classification of turbines. Explain construction details of Pelton Turbine with diagram.	10	4
b.	Explain the working and construction details of reciprocating pump with the help of neat well labelled diagram.	10	4

7. Attempt any *one* part of the following:**10 x 1 = 10**

a.	Explain the working of following measurement device: i) Bourdon tube pressure gauge ii) Thermocouple	10	
b.	Explain the errors in measurement and measures to control the errors.	10	