

BTECH
(SEM II) THEORY EXAMINATION 2021-22
FUNDAMENTALS OF MECHANICAL ENGINEERING & MECHATRONICS

Time: 3 Hours

Total 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.	Questions	CO
a.	Define Young's modulus, Bulk modulus and Poisson's ratio.	1
b.	Define point of contra flexure.	1
c.	Define scavenging process in IC Engine.	2
d.	List the components of a vapor compression refrigeration system and draw them in sequence as a block diagram.	2
e.	Define specific gravity of a fluid.	3
f.	Describe the range and uses of a measuring instrument.	3
g.	Explain the calibration in measurement.	4
h.	Differentiate between gauge pressure and absolute pressure.	4
i.	Define mechatronics and its key elements.	5
j.	Write any four mechanical actuators.	5

SECTION B

2. Attempt any three of the following:

10 x 3 = 30

Q. No.	Questions	CO
a.	Draw S.F.D. and B.M.D. for cantilever beam carrying a uniformly distributed load W (kN/m) throughout its length L (m). What is the maximum bending moment?	1
b.	Explain the working of four stroke CI engine with P-V diagram and with suitable sketch.	2
c.	Describe the turbine and its classification with example. Explain the working and construction details of Kaplan Turbine.	3
d.	Define Pressure. Explain the construction and working of Bourdon Tube pressure gauge.	4
e.	Define mechanical actuators. Explain the following in brief: (i) Kinematic chain (ii) Gear and its types (iii) Cam-Follower, and its types.	5

SECTION C

3. Attempt any one part of the following:

10 x 1 = 10

Q. No.	Questions	CO
(a)	Calculate the shear force and bending moment for the beam subjected to the loads as shown in the figure then draw the shear force diagram (SFD) and bending moment diagram (BMD).	1