Subject Code: KME101T

PAPER ID-411599

Roll No: | | | | | | | | | | | | | |

BTECH

(SEM I) 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.	Question	Marks	CO
a.	State Hooke's law.	2	1
b.	Discuss about superposition theorem.	2	1
c.	Discuss the terms used in IC engine - TDC, BDC, Stroke and Bore.	2	2
d.	Write the any six components of IC Engine.	2	2
e.	Discuss the equation of continuity.	2	3
f.	Write any four properties of fluid.	2	3
g.	Differentiate between precision and accuracy.	2	4
h.	What is the absolute pressure experienced by a pressure sensor, if the atmospheric pressure of a fluid is 2 atm, gauge pressure is 5 atm and differential pressure is 3 atm?	2	4
i.	Differentiate active and passive transducers.	2	5
j.	What is the function of an accumulator?	2	5

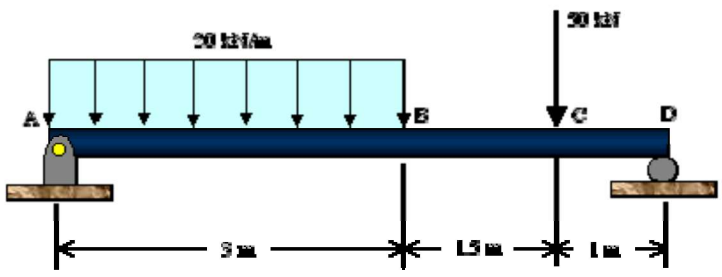
SECTION B

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

Q. no.	Question	Marks	CO
a.	Draw S.F.D. and B.M.D. for simply supported beam carrying uniformly distributed load W (KN/m) throughout its length L (m). What is the maximum bending moment?	10	a 1
b.	Explain the working of four stroke petrol engine with diagram.	10	2
c.	Explain the working and construction details of reciprocating pump.	10	3
d.	Explain the construction and working of optical pyrometer.	10	4
e.	Discuss the various key elements of a mechatronics system and write any four-mechatronics system.	10	5

SECTION C

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

Q. no.	Question	Marks	CO
a.	Draw S.F.D. & B.M.D. for fig. shown below- 	10	1
b.	Develop the relationship between E (Young's modulus), C (Shear modulus), K (Bulk modulus) and μ (Poisson ratio)	10	1

PAPER ID-411599

Subject Code: KME101T

Roll No: | | | | | | | | | | | | | |

BTECH

(SEM I) THEORY EXAMINATION 2021-22

FUNDAMENTALS OF MECHANICAL ENGINEERING & MECHATRONICS

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

Q. no.	Question	Marks	CO
a.	Compare the following- (i) SI Engine and CI Engine (ii) 4-stroke Engine and 2-stroke Engine	10	2
b.	Explain the working of vapour compression refrigeration system by T-S diagram with related block diagram.	10	2

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

Q. no.	Question	Marks	CO
a.	What are the parts of venture meter? Derive a formula to measure the rate of flow of a liquid through venturi meter. $$Q = \frac{a_1 a_2}{\sqrt{a_1^2 - a_2^2}} \sqrt{2gh}$$	10	3
b.	What is Turbine? Explain construction details of Pelton Turbine with diagram.	10	3

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

Q. no.	Question	Marks	CO
a.	Explain in detail with suitable diagram – (i) Limit and their types (ii) Fits and their types.	10	4
b.	Define pressure. Write the classification of pressure measurement instruments. Explain the working of bourdon tube pressure gauge with neat sketch.	10	4

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

Q. no.	Question	Marks	CO
a.	What is Sensor? Explain classification of sensors based on various Inputs and Outputs.	10	5
b.	Explain different types of "Mechanical Actuation system" based on power inputs.	10	5