



MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

DEPARTMENT OF MECHATRONICS
VII SEMESTER B.TECH. MECHATRONICS
END SEMESTER MAKE-UP EXAMINATIONS, DECEMBER 2022
SUBJECT: ENGINEERING MATERIALS [MTE 4071]
(Date: 29/12/2022)

Time: 3 Hours

MAX. MARKS: 50

Instructions for the Candidates:

- ❖ Answer **ALL** questions.
- ❖ Data did not provide any, may be suitably assumed.

Q. No		M	CO	PO	LO	BL
1A.	Explain hard-drawn and soft-drawn metals and mention their applications for electrical purposes.	04	5	1	1	2
1B.	Explain Burger's vector for edge dislocation.	03	3	4	4	2
1C.	List the applications of brass and bronze in electrical appliances.	03	5	4	4	1
2A.	With the help of a diagram, explain the working principle of the electrical fuse and mention the requirements of fusible materials.	05	5	1	1	3
2B.	Determine the expected diffraction angle for the first-order reflection from the (310) set of planes for BCC chromium when monochromatic radiation of wavelength 0.0711 nm is used.	03	3	1	3	3
2C.	In what way does a shape memory alloy assists in the reinforcement of arteries and veins?	02	4	4	4	2
3A.	Define magnetostriction and explain its working principle.	05	5	4	4	2
3B.	For the below-mentioned materials, mention their applications: i. Indium Antimonide ii. Silicon Carbide iii. Lead Sulphide	03	5	4	4	2
3C.	Define one-way and two-way shape memory effects.	02	4	4	4	1
4A.	Explain the characteristics of high-resistivity materials for electrical applications.	05	5	1	4	2
4B.	Electrical Co. has been given the contract to install overhead conductors and high-voltage cables for an electrical system. The company found copper as a suitable material to solve the problem. Amongst annealed and hard-drawn copper, suggest a suitable copper type and mention its features.	03	5	4	4	2
4C.	Explain how piezoelectric sensors are used in the measurement of pressure.	02	4	1	1	2
5A.	The polymerization of dimethyl terephthalate and ethylene glycol (also used as radiator coolant) to produce polyester is an important example of addition polymerization. Explain the steps involved in it.	05	4	4	4	3

5B.	Explain the function of fusible metal in an automatic fire sprinkler application.	03	5	4	4	2
5C.	Discuss the phenomenon occurring in Al_2O_3 , Cu, Au, Si, and Zn in magnetic materials.	02	5	4	4	2