## CBCS SCHEME



18ME34

USN

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020 **Material Science** 

	Tin	ne:	3 hrs.	Max. Marks: 100
		N	Notes Anguar any FIVE full avertions observing ONE full avertion from	aaah madula
		1	Note: Answer any FIVE full questions, choosing ONE full question from	euch mounte.
nk pages. will be treated as malpractice.			Module-1	
orac	1	a.	Define APF. Calculate the APF for BCC Unit cell.	(07 Marks)
nalţ		b.	Explain edge dislocation and screw dislocation.	(08 Marks)
as r		c.	State and explain Fick's 1 <sup>st</sup> law of diffusion.	(05 Marks)
ited			State and emplant Field & F. Managaritasion.	(ob Interno)
trea			OR	
ages 1 be	2	a.	Define Stiffness, Yield strength, Toughness and Ultimate tensile strength	n. (08 Marks)
k pë wil		b.	Explain Plastic deformation by Slip and twinning.	(06 Marks)
blan 50,		c.	Explain strain hardening and solid state hardening process of strengthening	g of metals.
mg = 8-			Has the reason of Committee and the same of the same o	(06 Marks)
42+8				
eg,	Peter		Module-2	
the	3	a.		(04 Marks)
wri		b.	Derive and expression for stress relaxation.	(04 Marks)
ines		c.	Draw the Iron carbon diagram indicating the phase temperatures. Ex	
, your answers, compulsorily draw diagonal cross lines on the remaining blank pages, of identification, appeal to evaluator and /or equations written eg, $42+8=50$ , will be			phases in Iron carbon diagram,	(12 Marks)
al cr or ec			OR O	
y pu	4	a.	State and explain Hume Rothery Rules.	(06 Marks)
dia or a		b.	Explain the effect of any 4 alloying elements in steel.	(06 Marks)
raw		c.	Two metals A & B are alloyed in the proportion of 60% A and 40	
ly d eva			temperature of A & B are 650°C and 450°C. When they are alloyed to	
sori			form any compound or intermediate phase, but form an Eutetic of comp	
upul			60% B which solidifies at 300°C. The maximum and minimum solid so	lubilities of B in A
con			and A in B are 10% at 300°C and remains constant till 0°C. Assume so	lidus, liquidus and
ers,			solves lines to be straight.	
nsw ifica			i) Draw the equilibrium diagram and label all the fields.	
ur a dent		1	ii) The temperature at which solidification start and complete.	
of ic		G	iii) Percentage of Eutectic at room temperature.	(08 Marks)
ting		4		
nple	_		Module-3	(O( Manla)
On completing Any revealing o	5	a.	Define Heat treatment and give its classification.	(06 Marks)
		b.	Explain how a TTT diagram is drawn.	(08 Marks)
.1.		c.	Explain Austempering and Martempering.	(06 Marks)
rtant Note: 1.			OR	
nt N	6	a.	Draw the TTT diagram for Eutectoid steel and explain it.	(07 Marks)
rta	U	h	With next elected explain induction hardening process	(05 Marks)

b. With neat sketch, explain induction hardening process.

(05 Marks)

Explain the composition, properties and uses of Gray Cast Iron, White Cast Iron and SG Iron and Malleable Iron. (08 Marks)



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7	а	Define Composite. Give its classification.	(06 Marks)
,	h.	Explain metal matrix composites and ceramic matrix composites.	(06 Marks)
	U.	Explain metal matrix competers and the state of the state	(08 Marks)
	C.	List the advantages, disadvantages and applications of composite materials.	(00 Marks)

8	2	Derive an expression for	Young's modulus for ISO str	ess and 180 strain condit	1011.
O	u.	Berrye an empression for		4	(12 Marks)
			-A7670b-	A	

b. With neat sketch, explain Pultrusion process.

(08 Marks)

	b. With neat sketch, explain Pultrusion process.	(00 11111115)
	Madula 5	
0	Module-5  De Son Commis Fundain the trans of coronics	(05 Marks)
9	a. Define Ceramic. Explain the types of ceramics.	(05 Marks)
	b. Differentiate between Thermoplastic and Thermosetting plastics.	(10 Marks)
	c. With neat sketch, explain Processing of plastic by Injection Moulding method.	(10 Marks)
	O.D.	
	OR A	1 life
10	a. Explain the different Non - destructive testing methods used for accessing residua	(10 Marks)
	1 D. C. G. A. Matarial Familia the types of smart materials	(10 Marks)
	b. Define Smart Material. Explain the types of smart materials.	(10 1120110)
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