Total No. of Questions - [3]

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G.R./PRNNo.	

PAPER CODE	U112-209B/RE-Exam

DECEMBER 2022(INSEM+ ENDSEM) EXAM

F.Y. B. TECH. (SEMESTER - I)

COURSE NAME: MATERIAL SCIENCE

COURSE CODE: -[ES10209B]

(PATTERN 2020)

Time: [2Hr]

[Max. Marks: 60]

(*) Instructions to candidates:

1) **Figures to the right indicate full marks.**
2) **Use of scientific calculator is allowed**
3) **Use suitable data where ever required**

Question No.	Question Description	Marks	CO mapped	Blooms Taxonomy Level
Q.1	**Solve the following:** 1)---------- is an example of shape memory alloy and ---------- is an example of piezoelectric material respectively a) INVAR, Nitinol, b) INVAR , Polyvinylidene fluoride, c) INVAR ,Terfinol -D, d) Terfinol -D,PZT	[2]	1	K
	2)Match the following:	[2]	1	A

1	CaO	e	initial setting time
2	Silica	f	imparts soundness
3	Calcium sulphate	g	Quick-setting.
4	Iron oxide	h	imparts strength
5	Sulphur trioxide	i	Colour, strength and hardness

a) 1-g, 2-e,3-h,4-f,5-i
b) 1-g,2-h,3-e,4-i,5-f
c) 1-f, 2-g,3-h,4-i,5-e
d) 1-h,2-i, 3-e,4-f,5-g

	3) Tricalcium silicate, the compound present in cement,is responsible for which of the following. i. It develops high ultimate strength rapidly	[2]	1	U

ii. Resistance to chemical attack
iii. It has medium rate of hydration.
iv. Slow hardening
v. Slow rate of reaction.

a) only i
b) i and ii
c) i, and iii
d) i,ii,iii,iv,v

4)Match the following [2] 1 R

1	Commercial brass	e	Cu=80%, Zn=20%
2	Dutch metal	f	Cu=25-50%, Zn=10-35%
3	Cartridge brass	g	Cu=90%, Zn=10%.
4	German silver	h	Cu=70%, Zn=30%

a) 1-g, 2-e,3-h,4-f
b) 1-g, 2-h, 3-e, 4-f
c) 1-f, 2-g, 3-h, 4-e
d) 1-h,2-g, 3-e,4-f

5) Which of the following statementsare false [2] 1 U

i. Fly ash bricks are of cement colour
ii. Fly Ash bricks are cast in moulds hence are always of uniform shape
iii. Fly ash bricks are more porous
iv. Fly ash bricks Heavy, Costly
v. Fly Ash bricks have a very smooth finish

a) ii and iii
b) i and ii
c) i, ii, iv
d) iv and v

6) Magnetostriction is a property of ---------- materials which causes them to expand or contract in response to a ---------- field. [2] 1 R

a) Electrical , Electric
b) Non-magnetic, magnetic
c) Ferromagnetic, magnetic
d) Ferromagnetic, Electric

7) Match the following 1 Heat resistant steels — e Used for household utensil, dental and surgical instruments 2 Shock resistant steels — f Used for Parts of boilers, Steam lines and Gas turbines 3 Magnetic steels — g Used for hammers, drills and dies for drawing wires 4 Stainless steel — h Used for laminated springs, leaf springs and coil springs 5 Tool steels — i Used for Transformer core, Dynamos and Loud-speakers a) 1-e, 2-g,3-h,4-f,5-i b) 1-f, 2-h, 3-e, 4-i, 5-g c) 1-f, 2-h,3-i,4-e,5-g d) 1-h, 2-g, 3-e, 4-f, 5-i		[2]	1	A
8) Which of the following statements are correct: i. piezoelectricity is also called pressure electricity ii. The piezoelectric effect is often used to convert electrical energy into mechanical energy and vice versa iii. Piezoelectricity is shown by the substances which are asymmetric iv. Examples of naturally occurring piezoelectric materials are barium titanate, cane sugar, and lithium niobate v. Piezoelectric effect is isotropic a) i and iii b) ii and iii c) i, ii and iii d) all the above		[2]	1	U
9)Identify the correct statement a) Polymer above T_g is rigid and below T_g is brittle. b) Polymer above T_g is flexible and below T_g is brittle. c) Polymer below T_m is rigid and belowT_g		[2]	1	U

isbrittle.

d) Polymer above T_g is brittle and above T_m is viscous.

10) ..... can be calculated by study of colligative property and ..... can be calculated by study of light scattering property. [2] 2 U

a) Number Average molecular weight; viscosity average molecular weight.
b) Weight Average molecular weight; Number average molecular weight.
c) Wt. Average molecular weight; Viscosity average molecular weight.
d) Number average molecular weight; weightaverage molecular weight.

11) Match the following [2] 2 A

1	Poly Vinyl Chloride	e	Bumpers, headlamp lenses, security screens, aircraft panels
2	Polystyrene	f	Gears, bushes, cams, bearings, weather proof coatings
3	Polymer Optical Fiber	g	Large diameter pipes for sewage and drainage
4	Polyamide	h	Insulation and packaging
5	Polycarbonate	i	Endoscope, bronchoscope, laproscope

a) 1-g, 2-e, 3-h, 4-f, 5-i
b) 1-g, 2-h, 3-i, 4-f, 5-e
c) 1-h, 2-f, 3-i, 4-e, 5-g
d) 1-e, 2-g, 3-i, 4-f, 5-h

12) Which of the following statements are true for Poly paraphenylenevinylene [2] 2 U

i. it is electroluminescent material
ii. it gives bright yellow fluorescence
iii. it has high tensile strength
iv. its conductivity increases on doping

	a) i, ii and iii b) i, iii and iv c) i, ii and iv d) None of the above			
	13) The correct sequence of the steps followed in recycling of polymers i) It involves manufacturing new product from the melted plastic ii) Plastic wastes are collected together iii) They are reprocessed (involves melting) iv) They are sorted and separated depending upon types of plastics and their codes a) i, ii, iii, iv b) iv, I, iii, ii c) ii, iv, iii, i d) iii, I, iv, ii	[2]	2	U
	14)A monomer of molecular weight 42 forms the polymer of average molecular weight 12600; the degree of polymerization of the polymer is, a)100 b) 200 c) 300 d) 400	[2]	2	A
	15)Select the correct statements: Polymer composites shows i) High tensile strength ii) Good electrical properties at high temperature iii) Lower densities iv) easy moulding property v) Resistance to corrosion and chemicals. a) i, ii and iv b) i and iii c) i, iv and v d) i, iii and v	[2]	2	A
Q2	**Solve any three out of four**			
	a) What is dry corrosion? Give the nature of oxide film for Na, Cr, Au and Mo with reaction.	[5]	3	U
	b) Define Cathodic protection. Explain sacrificial anodic protection with diagram, advantages and application.	[5]	3	R
	c) Explain any five factors that affect the rate of corrosion related to metal.	[5]	3	R
	d)Identify the method of coating applied in the following example i. coating of tin on iron	[5]	3	A

	ii. sheet of duralimin is sandwiched between layer of Al iii. gold is coated over steel spoon iv. Coating of nickel on iron without using electricity v. metal screw coated with Zn			
Q.3	**Solve any three out of four**			
	a) i)Give any three application of XRD ii) How will you distinguish between ethylene and butadiene by UV Visible spectroscopy?	[3] [2]	4	U
	b) Show different types of electronic transitions in UV Visible spectroscopy with the help of diagram. Explain any four transitions with example.	[5]	4	U
	c) What are the conditions of absorption of IR radiations by the molecule? Explain any two applications	[5]	4	R
	d) Compare SEM and TEM (Give any five points)	[5]	4	R