	Sanjay Ghodawat University, Kolhapur Established as State Private University under Govt. of Maharashtra. Act No XL, 2017		2019-20
	Year and Program: 2019-20 T. Y. B.Sc.	School of Science	Department of Chemistry
Course Code: CHS 307	Course Title: Chemistry of Materials	Semester – Odd (V) 10-30 am to 11 am	
Day and Date: <u>Saturday</u> <u>23/11/19</u>	End Semester Examination	Time $\frac{1}{2}$ hrs, Max Marks: 100	
PRN:	Seat No:	Section A - Marks out of 20:	
Jr. Supervisor Sign:		Student Sign:	

Section A

- Instructions:** 1) All Questions are compulsory.
 2) For MCQs mark tic (✓) for correct answer. No marks for multiple tics (✓).
 3) Section A should be submitted to Jr. Supervisor immediately after first 30 min.


Q.1	Choose the correct answer for following.	Marks 20	Level	CO
1	Which of the following is example of molecular magnet a) Mn_{12} b) Fe_4 c) V_{15} d) all of these	1	L2	1
2	The solids materials having high conductivity for cation or anions and electronically insulators are called as a) solid electrolyte b) pigments c) molecular magnet d) inorganic liquid crystals	1	L1	1
3	The reversible process of insertion of molecules or ions in a materials having a layered structure is known as a) ion exchange method b) intercalation method c) Sol-gel method d) Hydrothermal method	1	L2	1
4	Choose the correct statement for nanomaterials a) they have high surface to volume ratio b) in nano form they shows different property	1	L3	2

- as compared with bulk
- c) they interact with light differently than bulk materials
- d) all of these

- | | | | | |
|----|--|---|----|---|
| 5 | The quantum dots is found in the range of | 1 | L3 | 2 |
| | a) 1-10 cm | | | |
| | b) 10-100 nm | | | |
| | c) 1-10 nm | | | |
| | d) 0.1-1 nm | | | |
| | | | | |
| 6 | Band gap of nanoparticles is increased with | 1 | L1 | 2 |
| | a) increasing particle radius | | | |
| | b) decreasing particle radius | | | |
| | c) not affected with particle size | | | |
| | d) none of the above | | | |
| | | | | |
| 7 | The group of materials that are used in the construction of manmade structures and components is known as | 1 | L2 | 3 |
| | a) engineering materials | | | |
| | b) nanomaterials | | | |
| | c) bulk materials | | | |
| | d) all of these | | | |
| | | | | |
| 8 | Differential metal corrosion is also known as | 1 | L2 | 3 |
| | a) Pitting corrosion | | | |
| | b) Galvanic corrosion | | | |
| | c) Crevice corrosion | | | |
| | d) all of these | | | |
| | | | | |
| 9 | The exact composition of Gun-metal alloy is..... | 1 | L1 | 3 |
| | a) Cu 85%, Zn 4%, Sn 8%, Pb 3% | | | |
| | b) Cu 90% , Ni 9%, Fe 1% | | | |
| | c) Cu 25-50 %, Zn 10-35%, Sn 5-35% | | | |
| | d) Cu 59-62 %, Zn rest, Sn 0.5-1.5% | | | |
| | | | | |
| 10 | Which among the following statement about properties of plain carbon steel is incorrect when carbon content go on increasing | 1 | L2 | 3 |
| | a) brittleness increases | | | |
| | b) ductility increases | | | |
| | c) hardness increases | | | |

- d) strength increases
- | | | | | |
|----|---|---|----|---|
| 11 | Mo metal shows the excessive corrosion due to | 1 | L2 | 3 |
| | a) formation of stable compound MoO_3 | | | |
| | b) not reacted with other gas | | | |
| | c) formation of volatile compounds MoO_3 | | | |
| | d) none of the above | | | |
| 12 | Choose the correct properties of the refractory materials | 1 | L2 | 3 |
| | a) it resists the heat, corrosion and abrasion | | | |
| | b) low thermal coefficient of expansion | | | |
| | c) high fusion temperature | | | |
| | d) all of these | | | |
| 13 | The stress (σ) is defined as | 1 | L3 | 3 |
| | a) Force/Area | | | |
| | b) Area/Force | | | |
| | c) Force X Area | | | |
| | d) Area + Force | | | |
| 14 | The properties of composite materials are depend on | 1 | L2 | 4 |
| | a) geometry of the dispersed phase | | | |
| | b) concentration of constituents | | | |
| | c) distribution and orientation of constituent | | | |
| | d) all of these | | | |
| 15 | When the glass and fiber are used as dispersed phase for the reinforcement of matrices, the resultant composite is known as | 1 | L2 | 4 |
| | a) Glass-fiber reinforcement composites | | | |
| | b) Carbon-fiber reinforcement composites | | | |
| | c) Structural composites | | | |
| | d) Particle-fiber reinforcement composites | | | |
| 16 | The composite consists of two-dimensional sheet that are stacked and subsequently cemented together is known as | 1 | L2 | 4 |
| | a) Sandwich panels composite | | | |
| | b) Large particle composite | | | |
| | c) Laminar composites | | | |
| | d) Dispersion-Strengthened composite | | | |

- | | | | | |
|----|---|---|----|---|
| 17 | When fibers are used as a phase for the reinforcement of matrix then the resultant composites are known as fiber-reinforced composite | 1 | L2 | 4 |
| | a) dispersed | | | |
| | b) matrix | | | |
| | c) sandwich | | | |
| | d) gas | | | |
| 18 | The properties like light weight, corrosion resistance and easily compressible are mostly found in | 1 | L3 | 4 |
| | a) Metal matrix phase | | | |
| | b) Ceramics matrix phase | | | |
| | c) Polymer matrix phase | | | |
| | d) None of the above | | | |
| 19 | When the carbon atoms are bonded together and form a long chain fiber is known as | 1 | L3 | 4 |
| | a) Carbon fiber | | | |
| | b) Glass fiber | | | |
| | c) Aramid fiber | | | |
| | d) None of the above | | | |
| 20 | Fiber reinforced composites is not good composite when is observed. | 1 | L2 | 4 |
| | a) lack microcracking of the matrix | | | |
| | b) delamination of laminated composite | | | |
| | c) separation of fiber | | | |
| | d) all of these | | | |

	Sanjay Ghodawat University, Kolhapur Established as State Private University under Govt. of Maharashtra. Act No XL, 2017	2019-20
Year and Program: 2019-20 T. Y. B.Sc.	School of Science	Department of Chemistry
Course Code: CHS 307	Course Title: Chemistry of Materials	Semester – Odd (V) <i>11am to 1.30pm</i>
Day and Date: <i>Saturday</i> <i>23/11/19</i>	End Semester Examination	Time <i>2.5</i> hrs, Max Marks: 100
PRN:	Seat No:	Section B- Marks Out of 80

Section B

		Marks	level	CO
Q.2	Answer the following questions (Solve any Two)	12		
a)	What are the smart materials? Discuss the various applications of smart materials.	6	L3	1
b)	Discuss the white, black and inorganic pigments.	6	L1	1
c)	Give an account for solid electrolyte and its applications.	6	L2	1
Q.3	Answer the following questions (Solve any Two)	12		
a)	Explains the physical and chemical methods for synthesis of nanomaterials.	6	L2	2
b)	Give the principle of SEM. Sketch the diagram of SEM and describe its components.	6	L5	2
c)	Write a note on carbon nanotubes and inorganic nanowires.	6	L3	2
Q.4	a) Answer the following questions (Solve any Two)	12		
i)	Explain the term vulcanization and discuss its advantages.	6	L1	3
ii)	Discuss the various factors affecting on corrosion of materials.	6	L2	3
iii)	Give the purpose of making alloys.	6	L2	3

b) Answer the following questions (Solve any Four)**16**

- | | | | | |
|------|--|---|----|---|
| i) | Calculate the amount of rust ($\text{Fe}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$) that will be formed, when 100 kg of iron is completely rusted away. | 4 | L4 | 3 |
| ii) | Discuss the term alloy, and write the composition of brass, bronze, Duralumin and Magnalumin alloy. | 4 | L1 | 3 |
| iii) | Write a note on ceramics. | 4 | L3 | 3 |
| iv) | State the role of Cr, V, W, Ni, Mo and Mn metals in alloy steels. | 4 | L2 | 3 |
| v) | Explain the stress-strain curve for metal. | 4 | L2 | 3 |

Q.5 a) Answer the following questions (Solve any Two)**16**

- | | | | | |
|------|---|---|----|---|
| i) | Define the dispersed phase and give the types of dispersed phase. | 8 | L3 | 4 |
| ii) | Explain the particulate composite and structural composite with suitable example. | 8 | L1 | 4 |
| iii) | Write the advantages and applications of composite materials. | 8 | L3 | 4 |

b) Answer the following questions (Solve any Three)**12**

- | | | | | |
|------|--|---|----|---|
| i) | Explains the properties of short fiber reinforced composite. | 4 | L1 | 4 |
| ii) | Write the role of matrix phase in composite materials. | 4 | L2 | 4 |
| iii) | Differentiate the glass fibers and carbon fibers. | 4 | L2 | 4 |
| iv) | Discuss the role of interface in composite performance and durability. | 4 | L3 | 4 |
