

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: BTECH
BRANCH: CHEMICAL ENGINEERING (PE)**

**SEMESTER : V
SESSION : MO/2022**

SUBJECT: CL325 BIOMATERIALS

TIME: 3:00 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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Q.1(a)	Draw the design of any artificial mechanical heart valve. Point out the materials of construction in various parts of it.	CO1	[2]	design
Q.1(b)	What are the limitations of steel suture? Where do we prefer steel suture over other suture materials? Explain this fact with suitable example.	CO3	[3]	Explain
Q.1(c)	What are the materials used for various parts of maxillofacial implants. Illustrate the problems associated with these materials and their implantation procedure?	CO4	[5]	Illustrate
Q.2(a)	Tell the various combinations of materials used in hard tissue replacement?	CO3	[2]	Tell
Q.2(b)	Identify the requirements of materials to be used in hard tissue replacement? Give a suitable example of polymer used in maxillofacial implants which is considered as hard tissue replacement.	CO1	[3]	Identify
Q.2(c)	Draw the design of hip bone replacement .Mention the various parts of it. What are the materials used in these parts?	CO5	[5]	design
Q.3(a)	Give examples of specific uses of Ni-Ti and justify such application of it. Describe the composition of this alloys in this case of application.	CO5	[2]	Describe
Q.3(b)	How do we perform strain hardening of metals and plastics? Compare the mechanism of crystallization of polymers and metals.	CO2 &3	[3]	Compare
Q.3(c)	Write the main difficulty faced during processing of Co based alloys? Where do we use such alloys ? Mention suitable justification for such application of Co based alloys	CO2	[5]	Write
Q.4(a)	Give example of bioerodable polymer. Give specific example of use of it and cite the reason behind it's selection for such specific application?	CO3	[2]	Cite
Q.4(b)	Where do we need nonbiodegradable materials? Quote example of such material.	CO2	[3]	Quote
Q.4(c)	What is the chemical reaction responsible for corrosion of metals? What are the agents causing corrosion? Summarize the ways to we get rid of corrosion.	CO4	[5]	Summarize
Q.5(a)	What ingredients do we use to make bone cement with polyacrylates? What are the factors affecting the properties of bone cement? "Polyacrylate can absorb water more than 30% of its weight". Illustrate the fact.	CO3	[2]	Illustrate
Q.5(b)	Name a polymer that is applicable for vascular graft manufacturing. Judge your choice.	CO2	[3]	Judge
Q.5(c)	Write the name of hydrophilic polymer that is used in drug delivery application. Explain the mechanism of drug delivery by this material.	CO1	[5]	Write

:::28/11/2022:::M