

**Subject : Bio Materials**

**Examination : M-Mat-Engg, Material Engineering, 2nd Semester, 2017**

**Metallurgical & Material Engineering Department**

**Ref No. : EX/PG/Mat E/T/127A/2017**

**PART - I**

Answer Question No 1 & any 'Three' from the rest		Marks
1	a) Define bio materials	2
	b) State the advantages and disadvantages of different types of biomaterials	3
2	a) Discuss about the impact of corrosion on metals (in general & in biomedical application)	2+2
	b) Write short note on Galvanic Corrosion and Cathodic Protection	4+4
	c) Which types of corrosion are relevant for metals used in biomedical applications	3
3	a) Name three types of stainless steel.	3
	b) Discuss why 304 stainless steel is not applicable as biomaterial in prosthesis	4
	c) State which type of stainless steel is used in prosthesis & why?	4
	d) Which type of stainless steel is used for surgical equipment & why?	4
4	a) What are the different types of Titanium alloys used in biomedical. applications & describe the importance of Low Modulus Titanium Alloys	5+3
	b) Write short note on - Wolf's Law - Importance of Hydroxyapatite on Titanium Alloys	3+4
5	a) State the difference between Cast Co-Cr alloy and wrought Co-Cr alloy	6
	b) What are the drawbacks in Co-Cr alloys?	2
	c) Briefly discuss about dental metals & implants	7

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**PART - II**

Answer Question No 1 & any 'Three' from the rest		Marks
1	a) Describe the properties of biomaterials	3
	b) What are the types of biomaterials used in orthopedics?	2
2	a) What are Ceramics and describe its properties.	3
	b) Classify Ceramics	3
	c) Describe different Ceramics used as biomaterial	3
	d) Give some examples of Ceramics bio-implants in human body	3
	e) Describe different generation of Ceramics bio-implants.	3
3	a) What are the functions of Cardiac Pacemakers?	5
	b) What are the different components of Pacemaker?	5
	c) What are the materials used for construction of Pacemaker?	5
4	a) What do you understand by total hip replacement?	5
	b) What are various design used for THP (Total Hip Prothesis)?	5
	c) Discuss about the various materials used in construction of THP with diagram	5
5	Write short notes on the following (any five)	5 X 3
	a) Bioglasss	
	b) Hydroxyapatite	
	c) Morphological Fixation	
	d) Biological Fixation	
	e) Polymers used as biomaterials	
	f) Zirconia	