Total No. of Questions : 6]

SEAT No. :

P4877

[Total No. of Pages : 2

[5155] - 3
M.E. (Civil Structures)
BIO MECHANICS AND BIO MATERIALS
(2008 Pattern) (Elective - IV) (Semester - II)

Time :3 hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Solve any two questions from each section.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain Kinetics and Kinematics in the study of Biomechanics with suitable example. **[8]**

b) Explain various elastic models applicable biological tissue. Draw suitable diagram to illustrate, illustrate its suitability to type o tissue. **[9]**

c) Explain importance and applications of study of Biomechanics. **[8]**

Q2) a) Explain Bio compatibility of material and List bio compatible materials used as replacement material to biological organ. Illustrate your answer with suitable application. **[8]**

b) List the mechanical properties of bio compatible materials used for replacement prosthesis. **[9]**

c) Explain equilibrium of Hip joint. **[8]**

Q3) a) Explain bone cement, explain its functioning as biomaterial. **[8]**

b) Explain silicon rubber, UHMWPE, ultra - high molecular weight poly ethylene as biocompatible material. **[9]**

c) Explain properties of stainless steel, cobalt base alloys, and Titanium base alloys when used as prosthesis material. **[8]**

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SECTION - II

Q4) a) Explain with sketch structure of bone tissue. **[9]**

b) Sketch geometry of the articulating joint for Knee joint, and write its equilibrium equation. **[9]**

c) Explain experimental measurement of wear of cartilage on cartilage material. **[7]**

Q5) a) Explain with sketch, the term 'Gait analysis'. **[8]**

b) Explain various measurement techniques for body motion. **[9]**

c) How gait analysis helps in various applications of Biomechanics study. **[8]**

Q6) a) Explain dental prosthesis. **[8]**

b) Explain steps in structural design of a fixation device like hip or knee joint. **[9]**

c) What is the classification of prosthetics devices? Enlist prosthetics useful for human use. **[8]**