

MASTER OF BIO-MEDICAL ENGINEERING FIRST YEAR SECOND SEMESTER - 2025

DESIGN OF IMPLANTS & ARTIFICIAL ORGANS

Time: 3h

Full Marks: 100

1. Answer any five questions. 5X2=10
 - i. Differentiate between allograft, autograft, xenograft.
 - ii. What are the main causes of lever failure?
 - iii. Name two major bacteria's causes implant infection.
 - iv. What are the materials used in hemoperfusion?
 - v. What do you mean by one unit of insulin? Which cells release insulin in human body?
 - vi. How much (in %) hematocrit & blood volume loss can cause irreversible shock?
 - vii. Name one plasma expander and one synthetic material which can be used as oxygen carrier.

2. Answer any three questions. 3X10=60
 - a. Write a short note on insulin delivery system.
 - b. What are the main functions of skin? What options are present for artificial skin? Write design parameters of artificial skin graft.
 - c. Write a short note on the effect of blood corpuscles of human body on the implant material.
 - d. Why implant infection is difficult to cure (by conventional antibiotic therapy)? What are the different methods present to prevent implant infection?

3. Answer any two questions : 2X15=30
 - I. Write a short note on facilitated transport in lever failure. 15
 - II. Write a short note on bioartificial lever. Write a short note on different artificial oxygen carrier of biological source. (5+10)
 - III. Write the general parameters one should consider during design of an artificial organ. Write a short note on the designing of artificial heart or circulatory assist device. 15