

MASTER OF BIO-MEDICAL ENGINEERING FIRST YEAR SECOND SEMESTER - 2022

DESIGN OF IMPLANTS & ARTIFICIAL ORGANS

Time: 3h

Full Marks: 100

- A. Answer any five questions. 5X2=10
- i. Name two xenogenic sources of islets.
 - ii. Name material for finger joint and state which type of joint it is.
 - iii. What do you mean by Sieving Co-efficient?
 - iv. What is the cut-off molecular weight as per middle molecular theory? What is the optimum pore size range to accommodate osteons?
 - v. Name one metal and polymer which find application in artificial heart.
 - vi. Name one synthetic material which can be used as oxygen carrier and one plasma extender.
 - vii. Differentiate between Autograft, Allograft and Xenograft.
- B. Answer any nine questions. 9X10=90
1. How urea excretion rate can be increased during dialysis. Write the causes of Hip joint failure. (5+5)
 2. What are the different types of hip joint replacement present? Write their advantage and disadvantage. Write a short note on peritoneal dialysis. (1+2+7)
 3. Write a short note on different artificial oxygen carrier of biological source. 10
 4. Write a short note on artificial lung including heart-lung machine. 10
 5. What will be the minimum BUN value for the ESRD patient? What is the membrane materials used for fabrication of hemodialysis membrane? Name two nephrotoxins. 4+4+2
 6. Write a short note on artificial wearable kidney. Write a short note on bioartificial liver. What do you mean by one unit of insulin? (4+5+1)
 7. 'Shoulder joint has highest range of motion'-explain. Hip joint and Shoulder joint both are ball & socket joint- how their stability varies-explain. (5+5)
 8. Write a short note on different external methods present to treat patients with kidney failure along with mechanism wherever applicable and name materials associated with these processes. 10
 9. Write composition of peritoneal tissue and dialysis solutions. Name the different internal dialysis systems are present? Write the advantage and disadvantage of hemodialysis and peritoneal dialysis. 10
 10. Classify artificial total knee joint based on ligament stability. Name one polymer, one ceramic and one metal/alloy find application in total joint replacement. Write their application and properties. Write the reasons for premature failure of Hip joint. 3+ (1+2) +4