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Question Paper Code: 99B04

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Elective

Biomedical Engineering

19UBM904- BIOMATERIALS AND ARTIFICIAL ORGANS

(Regulations 2019)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10x 2 = 20 Marks)

1. Define Biomaterials. CO1- U
2. Schematic of interdependent engineering factors affecting the success of joint replacements. CO1- U
3. Study the thermal treatment of materials. CO3- Ana
4. Explain stainless steels and their applications. CO1- U
5. List out the factors which can influence the mechanical properties of polymers. CO1- U
6. Explain the working principles of elastin biopolymers. CO1- U
7. Explain the mechanism of Bioartificial Pancreas with schematic diagram. CO1- U
8. Explain blood clotting pathways with flow chart. CO1- U
9. Write a short note on artificial organs. CO5- U
10. What is the basic concept of immunology? CO5- U

PART – B (5 x 16= 80Marks)

11. (a) Define Biomaterials. Analyse structural and its imperfection with their various mechanical properties of biomaterials. CO3- Ana (16)
- Or
- (b) Explain the nature of in vitro assay and investigate various concepts of in vitro approaches and their applications in clinical sectors and future research. CO3- Ana (16)

12. (a) Define metals. Examine the mechanical properties of stainless steel, Cobalt-chromium alloy and Titanium based alloy? CO3- Ana (16)
- Or
- (b) Give a short note on Dental materials. Investigate various dental impression materials and their role in cavity filling. CO3- Ana (16)
13. (a) Write a brief note on Biopolymers. Investigate the mechanism of collagen polymerization and its role in clinical applications with few examples. CO1-U (16)
- Or
- (b) Define materials employed for ophthalmology and their role in biomedical applications. Narrate various eye implant approaches and their role in your point of view. CO1-U (16)
14. (a) Write a brief note on Soft tissue implants. Examine the implant process with silicone and cartilage and its role in clinical applications. CO1-U (16)
- Or
- (b) Give detailed information on bone replacement. Investigate the mechanical properties of bone and healing process by bioelectric effect. CO1-U (16)
15. (a) Explain heart anatomy and their functional system. Give a detailed note on mechanical properties of Aorta and Valves of artificial heart CO1-U (16)
- Or
- (b) Explain the nature and function of kidney with neat diagram. Describe the functional mechanism of typical dialyzers and its various types. CO1-U (16)