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Question Paper Code:UC302

B.E./B.Tech. DEGREE EXAMINATION, APRIL / MAY 2025

Professional Elective

Biotechnology

21BTV302 – TISSUE ENGINEERING

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Define the term “Totipotency”. CO1- U
2. State the minimum conditions required for a successful organ transplant. CO1- U
3. Write the difference between ‘nervous tissue’ and ‘muscle tissue’. CO1-App
4. What is a ‘BMP’? What is its role in Tissue Engineering? CO1- U
5. Angioplasty stents are having surface modification of carbon as a bone analogue material. Justify the statement. CO2-App
6. What was a Griffith finding in 1920 in the field of ceramics? CO1- U
7. List out the characteristics of ‘cancer stem cell’. CO1- U
8. Cord blood cell plays an important role in leukemia treatment. Reason out this statement. CO2-App
9. What are the essential features required for a stem cell for successful transplant? CO1- U
10. Ageing can be addressed by stem cell therapy. Provide an expert advice. CO2-App

PART – B (5 x 16= 80 Marks)

11. (a) Explain in detail the various kinds of tissues in our Human body and their characteristics. CO1- U (16)
- Or
- (b) Describe the morphology, types and functions of various types of connective tissue in detail CO1- U (16)

12. (a) Explain in detail the characteristics of a normal cell differentiation, markers, regulation of differentiation with diagrams. Explain how cell- cell interaction and cell- matrix interaction works? CO1- U (16)
- Or
- (b) Illustrate the cell migration and regulation of differentiation in detail with diagrams CO1- U (16)
13. (a) A person met with an accident. He suffered severe knee injury. His knee cap needed replacement. Suggest the doctor about the features of biomaterials to be used for bone replacement surgeries, its various characteristics and utilities. Using bottom up approach and fundamental principles of Tissue Engineering how will you produce bone? CO2- App (16)
- Or
- (b) A heart patient needs urgent stenting for a block in coronary artery. But angioplasty has lot of minus because of copper made stents. Propose the cardiologist about the need for making a 'bio compatible' material by vividly explaining its various properties. CO2- App (16)
14. (a) Explain the importance of glass transition temperature and melting point in evaluating biomaterials. CO1- U (16)
- Or
- (b) Explain in detail the principle and procedure of 'cell differentiation' in stem cell technology. CO1- U (16)
15. (a) A patient is suffering from Type-II Diabetes for quite a long time. The insulin administered subcutaneously is no more working as his Fasting sugar is beyond 200mg/dl and is suffering from cellulitis in his foot. Suggest the diabetes specialist about the importance of stem cell therapy and also apply the stages of cryogenic preservation for storage of animal cells. CO2- App (16)
- Or
- (b) A teenager suffered an acid attack. Her face is marred at places especially in cheeks with furrows and deep scars. She is very discouraged to face herself. The skin specialist wants to consult a researcher on stem cells for further treatment especially to restore the skin tone to 100% normal. Identify and describe the process of stem cell therapy for treating skin wounds to the doctor and the victim. CO2-App (16)