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MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

II SEMESTER M.Tech (BME) DEGREE MAKE-UP EXAMINATIONS, JUNE 2017

SUBJECT: TISSUE ENGINEERING (BME 5239) (Elective III) (REVISED CREDIT SYSTEM)

Thursday, 22nd June 2017: 9 AM to 12 NOON

TIME: 3 HOURS

MAX. MARKS: 100

Instructions to Candidates:

Answer all the five full questions.

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| 1A. | Classify different types of cells by their source. Mention the function of epithelial tissue. | 6 |
| 1B. | Write down the principles of dry heat sterilization, moist heat sterilization and gamma ray sterilization. | 6 |
| 1C. | How do hypotonicity and hypertonicity help in sterilization? Explain the role of membrane filters in the sterilization process. | 8 |
| 2A. | Write down the development of heart during embryogenesis (highlight the role of germ layers). | 8 |
| 2B. | Explain the working of an autoclave. | 6 |
| 2C. | Explain the basic steps associated in cell signaling process. | 6 |
| 3A. | What is the role of vasculo-endothelial growth factor in angiogenesis? Explain the working of an anti-VEGF therapy in cancer management. | 3+3 |
| 3B. | What is 'neural crest cell'? Analyze cellular signaling steps associated in keratinocyte proliferation (be specific with the answer). | 2+4 |

- 3C.** Explain the following stages of cell signaling of skin (highlight the role of different factors): **8**
- (i) Hemostasis and inflammation (ii) proliferation and (iii) remodeling.
- 4A.** Compare ‘pluripotent’ and ‘multipotent’ stem cells. Discuss factors regulating asymmetric stem cell division. **6**
- 4B.** Classify and explain stem cell niche. **6**
- 4C.** Explain the steps associated in the isolation of mouse embryonic stem cells. **8**
- 5A.** Explain the term ‘passage’ and ‘cell lines’.
Mention the major components of tissue culture medium with purpose. **4+4**
- 5B.** What is “porogen”? How does it help in making porous scaffold? Explain. **2+4**
- 5C.** Explain different gradient centrifugation techniques for cell selection. **6**