| Reg. No. | | | | | | | | | | |
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# MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

*A Constituent Institution of Manipal University*

**VII SEMESTER B. TECH (BME) DEGREE MAKE UP EXAMINATIONS, DECEMBER 2017**

**SUBJECT: TISSUE ENGINEERING (BME 4010)**
**(REVISED CREDIT SYSTEM)**
**Thursday, 28th December 2017 : 2 PM to 5 PM**

**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** |

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| **3C.** | Explain the following stages of cell signaling of skin (highlight the role of different factors):<br><br>(i) Hemostasis and inflammation (ii) proliferation and (iii) remodeling. | **8** |
| **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’.<br>Mention the major components of tissue culture medium with purpose. | **4+4** |
| **5B.** | How does ‘porogen’ help in making porous scaffold? Explain.<br>How can you convert normal fibroblast (AH927) cells to feeder cell? | **3+3** |
| **5C.** | Explain different gradient centrifugation techniques for cell selection. | **6** |