Reg. No.



MANIPAL INSTITUTE OF TECHNOLOGY MANIPAL

## V<sup>th</sup> SEMESTER B.TECH. BIOTECHNOLOGY END SEMESTER EXAMINATIONS, NOV/DEC 2017

## SUBJECT: BIOSENSORS [BIO 4017] REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

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## Instructions to Candidates:

- ✤ Answer ALL the questions.
- Missing data may be suitable assumed.

1A.	Mr. X left an experiment at the end, which involves determining a metabolite in body fluid using biosensor. Mr. Y continued the detection, but he was not aware of the fluorophore used by X. Which one do you suggest among LED and Laser diode in this experiment. Justify your answer with respect to their working principle.	2
1B.	If you are asked to select either photovoltaic diode or photoconductive diode, which one would you choose to measure light. Why? When do you prefer to use the other one? Justify your answer with respect to their working principle.	3
1C.	Design an antibody-based biosensor to detect the antigens in a serum sample. Describe the role of essential components and the order in which they should be connected.	5
2A.	8 resistors, each having a resistance of 10 $\Omega$ , are arranged below. If current flows from P to R, find the total resistance. R <sub>8</sub> R <sub>7</sub> R <sub>8</sub> R <sub>7</sub> R <sub>8</sub> R <sub>8</sub> R <sub>7</sub> R <sub>8</sub>	2
2B.	Choose the right type of bipolar junction transistor for each of these switching applications. Draw the correct transistor symbol inside each circle. Justify?	3



4C.	What is the importance of different shapes in gold nanoparticle and the method to characterize them	3
5A.	A researcher working on developing point-of-care devices is having trouble with his fluorescence approach. Suggest the root cause of the problem and suggest him an alternative. Nature of Cause Action plan / Problem Alternative	2
5B.	A science student interested in developing cost effective paper-based analytical devices for targeting cardio-vascular biomarkers. To do so, creation of hydrophobic barriers or boundary is the quintessential step. Assist him to construct a biosensor in a step-wise manner using a flow chart.	4
5C.	Construct a portable biosensor using 'lab-on-drone" approach with the advantages & disadvantages of the any two transducers.	4