**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI**
**(MID SEMESTER EXAMINATION)**

CLASS:     BE                                                              SEMESTER: VII
BRANCH:  BT/MECH/PROD/CIVIL                                SESSION : MO/2019

**SUBJECT : PE7021 MAINTENANCE ENGINEERING**

TIME:     1.5  HOURS                                                  FULL MARKS: 25

**INSTRUCTIONS:**
1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

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Q1    (a)   What do you understand by product life cycle?                                                          [2]
        (b)   With suitable example, explain the effect of maintainability on the product life cycle.      [3]

Q2    (a)   Draw the fault tree diagram for a system and show the correct location of the following      [2]
              labels on it :
              • AND-gate
              • Independent event
              • OR-gate
              • Top Level Event
              • Intermediate Event
        (b)   Make a brief note on TQM.                                                                                      [3]

Q3    (a)   A copier is expected to operate for 200 hours after repair and the mean repair time is      [2]
              expected to be two hours. Determine the availability of the copier.
        (b)   A module of an automatic machine has 10 components in series. Each component has      [3]
              an exponential time to failure distribution with a constant failure rate of 0.05 per 4000
              hours. What is the reliability of each component and the module after 2000 hours of
              operation? What is the mean time to failure of the module?

Q4    (a)   Explain why a product might have an overall reliability that is low even though its      [2]
              component have fairly high reliabilities.
        (b)   What is availability and how can it be increased?                                                      [3]

Q5    (a)   Make a comparative analysis between break down and planned maintenance.            [2]
        (b)   Explain the process of RCM with suitable example.                                                  [3]

Q6    (a)   How preventive maintenance is different from predictive maintenance?                  [2]
        (b)   Make a brief note on computer integrated maintenance.                                        [3]