

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

CLASS: BE
BRANCH: BT/PROD/CIVIL

SEMESTER: VII
SESSION : MO/2018

SUBJECT : PE7021 MAINTENANCE ENGINEERING

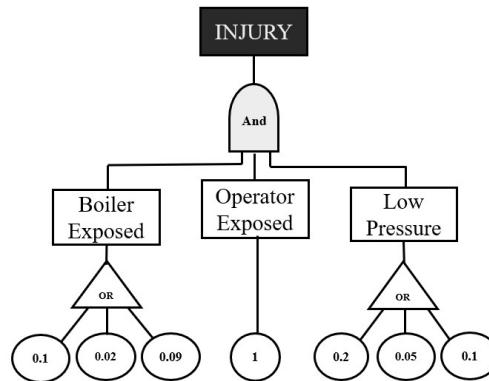
TIME: 1.5 HOURS

FULL MARKS: 25

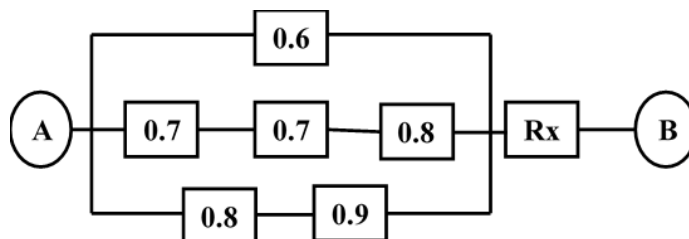
INSTRUCTIONS:

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.

- Q1 (a) Define the terms: [2]
 (i) Failure rate (ii) Hazard rate (iii) FMEA (iv) RPN
 (b) In the fault tree shown in figure, the probability of basic event is given in figure, find the top event probability in case of Operator injury [3]



- Q2 (a) Define the terms “Total Quality Maintenance”, “Continuous Process Improvement”, “Total Employment Involvement” and “zero defect”. [2]
 (b) Define Causes effect diagram with the example of excessive Typing Error. [3]
- Q3 (a) For a 1000 hour the force of a system has to calculated the mean time to failure $X_1 = 6000$ hr., $X_2 = 4500$ hr. $X_3 = 10500$ hr. $X_4 = 3200$ hr. Determine the overall reliability of the series network. [2]
 (b) What do you understand by bathtub curve? Sketch a typical curve and indicate the distinct failure zones. [3]
- Q4 (a) A system has a constant failure rate of $10^{-3}/h$ what is the probability that this system will fail before $t= 1000h$? Determine the probability that it work for at least 1000h. [2]
 (b) Find the unknown reliability of Rx adjoining figure to achieve a system reliability $R_{AB} = 0.8$. [3]



- Q5 (a) Define preventive maintenance and predictive maintenance. [2]
(b) Define the term “Improvement maintenance” and explain mistake proofing planning method. [3]
- Q6 (a) Differentiate between the preventive action and corrective action with example. [2]
(b) Define the term “Reliability based maintenance” and explain Reliability Centered Maintenance procedure. [3]

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