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Reg. No.....

Name.....



B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Electronics and Communication / Applied Electronics and Instrumentation /
Electronics and Instrumentation Engineering

RELIABILITY AND HUMANITIES (L, A, S)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

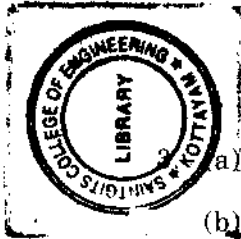
Each full question carries 20 marks.

1. (a) Define and explain (i) failure rate ; (ii) failure density ; and (iii) reliability. (6 marks)
- (b) The CFL has a uniform failure rate of 0.00002 per hour. What is its reliability for a specified period of service of (i) 2000 hours ; (ii) 5000 hours ; and (iii) 10,000 hours ? (6 marks)
- (c) A parallel system is composed of 10 identical components. If the system reliability $P(5)$ is to be 0.9, find how poor can the components be ? (8 marks)

Or

2. (a) Explain MTBF ? Explain how components may have an extremely high MTBF and a comparatively short mean life. (8 marks)
- (b) Calculate the probability of survival of SMF battery having to operate for 500 hours and which consists of four subsystems having the following MTBF a
Subsystem A : MTBF = 5000 hours.
Subsystem B : MTBF = 10000 hours.
Subsystem C : MTBF = 15000 hours.
Subsystem D : MTBF = 15000 hours. (12 marks)

Turn over



- a) Explain different periods, with reference to the bath tub curve. (10 marks)
- (b) Describe any two hazard models used for failure analysis. (10 marks)

Or

- 4. (a) Explain how Weibull model can be used for failure analysis. (10 marks)
- (b) With suitable sketches, describe the linearly increasing hazard model. (10 marks)
- 5. (a) What are the factors that has to be considered for manufacturing a quality product with reliability ? Explain with an example. (15 marks)
- (b) Mention and describe different steps of bench marking. (5 marks)

Or

- 6. (a) Explain the concept of quality function deployment. State the relationship of QFD to other tools. (15 marks)
- (b) What are the objectives of quality circles ? (5 marks)
- 7. (a) Explain the steps in constructing a C chart ? (5 marks)
- (b) Draw a P chart for the following data. Explain your conclusion :

Sample (each of 100 units)	1	2	3	4	5	6	7	8	9	10
No. of defective	13	10	8	8	7	7	9	10	11	7

(15 marks)

Or

- 8. (a) " \bar{X} and R charts always go hand in hand." Elaborate. (5 marks)
- (b) Subgroup of 5 item each are taken from a manufacturing process at regular intervals. A certain quality characteristic is measured and \bar{X} and R values computed for each subgroup. After 25 subgroup $\Sigma \bar{x} = 357.5$, $\Sigma R = 8.80$. Assume that all the points are within the control limits on both the charts. The specifications are 14.4 ± 0.4 .
 - (i) Compute the control limits for \bar{X} and R chart.
 - (ii) What is the process capability ?
 - (iii) Determine the percentage rejections, if any ?

(15 marks)



9. (a) Explain the major types of wage payment. (5 marks)
- (b) What are the causes and effects of industrial fatigue? Explain any *two* cases of elimination of fatigue. (8 marks)
- (c) Explain incentive? Describe any two wage incentive plans. (7 marks)
- Or*
10. (a) Explain the interaction between human behaviour and work environment. (5 marks)
- (b) Explain the two-factor theory of motivation. (8 marks)
- (c) What are the causes and effects of industrial disputes? (7 marks)
- [5 × 20 = 100 marks]