

[This question paper contains 2 printed pages.]

Sr. No. of Question Paper : 5387

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Your Roll No.....

Unique Paper Code : 236451

Name of the Course : **B.A. (Programme)**

Name of the Paper : Queuing and Reliability Theory

Semester : IV

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
 2. Do any **five** out of **seven** questions.
 3. **All** questions carry equal marks.
 4. Simple calculators are allowed.
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1. (a) Give different types of service disciplines in a Queuing system. Also briefly describe the various models you have studied in Queuing. (8)
(b) Show that the arrival rate in a Queuing system follows Poisson distribution. (7)
 2. (a) Megacab company has one reservation officer. Customers arrive at a rate of 8/hour and the officer can service 12 customer/hour, calculate traffic intensity, L , L_q , W , W_q . (8)
(b) Obtain the steady state equations for the Queing model $(M / M / I / K / \infty)$ and solve them for P_0 and P_n .
Here notations have their usual meanings. (7)
 3. (a) Obtain difference-differential equations for $M / M / C / \infty$ Model. (7)
(b) Show that in queuing model with unlimited number of service channels the steady state probability distributions of having n units in the system is Poisson with parameter λ/μ . (8)

P.T.O.

4. (a) Derive the Reliability, Hazard rate and mean time before failure of a system with exponential life distribution. (5)
- (b) Suppose that we have a system of n components, show that an arrangement of parallel system is better than series system. (7)
- (c) Differentiate between jockeying, balking, and renegeing, in queuing theory. (3)
5. (a) Explain the difference between age replacement, corrective maintenance and preventive maintenance. (6)
- (b) Give assumptions for standby systems and obtain the steady state solution for a two unit standby system with repair. (9)
6. (a) If $R_i(t)$ is the reliability of the i^{th} component, obtain the reliability of series – parallel system. (7)
- (b) Trains arrive at the yard every 15 minutes and the service time is 33 minutes.
- If the line capacity of the yard is limited to 4 trains, find using M/M/I/K model.
- (i) The probability that the yard is empty.
- (ii) The average number of trains in the system. (8)
7. (a) Obtain the Mean time before failure of a systems with Weibull life distribution. (6)
- (b) Write short notes any **two** of the following :
- (i) Standby systems and parallel systems.
- (ii) Finite source queues.
- (iii) Assumptions of queuing theory.
- (iv) Performance measures of M/M/I/ ∞ model. (9)