

- N.B.:- (1) Question No.1 is compulsory.
 (2) Attempt any three questions out of remaining five questions.
 (3) Assume necessary data wherever necessary.

- Q 1. Answer the following questions. 20
- a) Why there is need to study composite generation and transmission system. 5
- b) Prove that instantaneous hazard rate $\lambda(t) = \frac{f(t)}{R(t)}$ 5
- c) Draw a two state model of equipment. Define failure rate and repair rate 5
- d) Explain outage replacement rate. 5
- Q 2 a) What do you understand by load forecasting? What are The factors that affect load forecasting? 10
- Q 2 b) What do you understand by system planning? Explain main aims of different types of system planning. 10
- Q 3 a) Explain peak load forecasting. 10
- Q 3 b) Explain in detail reactive power planning. 10
- Q 4 a) Find reliability of system shown in figure-1 using minimum cut set method if reliability of each component is 0.9 10

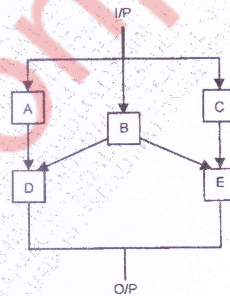


Figure-1

- Q 4 b) Consider a system consisting of two 5MW unit with outage rate of each unit 0.02 and one unit of 10MW with outage rate of 0.03. Prepare capacity outage table. 10
- Q 5 a) What is the importance of Markov Process in reliability of power system? Derive the equations for probabilities at $t = \infty$ 10
- Q 5 b) Explain PJM and Modified PJM method. 10

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- Q 6 a) A generating system consists of 2 units of 30MW and 1 unit of 60MW with $\lambda=0.01$ /day and repair $\mu=0.49$ r/day. Draw generating model. Also, find rate of departure and frequency of occurrence of each capacity outage state. 10
- Q 6 b) Explain Loss of load probability, Loss of load expectation and energy index of reliability. 10