

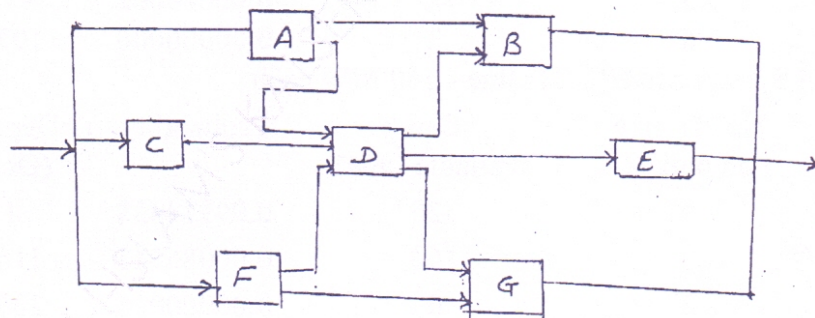
QP Code : 8285

(3 Hours)

[ Total Marks : 100

- N.B. : (1) Question No. 1 is **compulsory**.  
 (2) Solve any **four** out of remaining **six** questions.  
 (3) **Figures** to the **right** indicate **full** marks.  
 (4) **Assume** data if **necessary**.

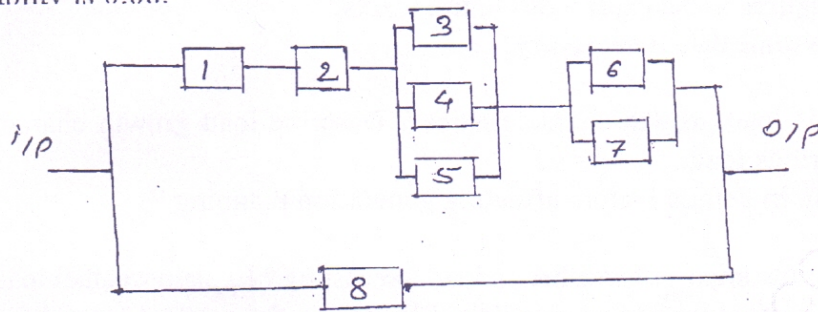
1. (a) What is load growth characteristics ? Describe load growth characteristics for various load. 10  
 (b) Explain in details factors affecting generation planning ? 10
2. (a) What is the impact of weather on load forecasting ? Explain weather load model. 10  
 (b) What is reactive power planning ? What are the method used for reactive power planning ? 10
3. (a) What is reliability ? Derive reliability function in terms of failure rate & also define causes of failure & un reliability. 10  
 (b) A system consist of five units of 40 mw and with forced outage rate 0.02. Installed capacity is 200 mw. Consider the load duration curve with peak load is 165 mw and base load is 40 % of peak load. Evaluate loss of load expectation (LOEE) 10
4. (a) Explain frequency and duration method and compare it with LOLP (Loss of load probability) 10  
 (b) System shown in figure. Calculate unreliability of the system, if all component are identical with a reliability of 0.95. 10



5. (a) Develop generator model using Binomial theorem for a five generators of 50 10  
 mw with force outage rate 0.01 , 0.03, 0.05, 0.055, 0.06 respectively. Prepare  
 capacity outage probability table.

[TURN OVER

- (b) Derive a general expression for the unreliability of Model shown in figure 10 below & hence evaluate the unreliability of the system if individual component reliability is 0.08.



6. (a) What is operating reserve ? Explain PJM method in detail. 10  
 (b) Describe a two state model and prove that M.T.T.F. is reciprocal of failure rate. 10
7. (a) For the complex system - 10  
 Generation System Model - 6 Unit - 40 MW each

| State | No. of generator on outage | Cap available (mw) | Probability | Dep. rate (Ocl/yr) |
|-------|----------------------------|--------------------|-------------|--------------------|
| 1     | 0                          | 240                | 0.88584238  | 21.9               |
| 2     | 1                          | 200                | 0.10847049  | 197.1              |
| 3     | 2                          | 160                | 0.00553421  | 372.3              |
| 4     | 3                          | 120                | 0.00015059  | 547.5              |
| 5     | 4                          | 80                 | 0.00000230  | 722.7              |
| 6     | 5                          | 40                 | 0.00000002  | 897.9              |
| 7     | 6                          | 0                  | 0.00000000  | 1073.1             |

Transmission System Model - 2 Tr.line - 160 MW each

| State | No. Tr. line on outage | Cap available (mw) | Probability | Dep. rate (Ocl/yr) |
|-------|------------------------|--------------------|-------------|--------------------|
| 1     | 0                      | 320                | 0.99914438  | 1.0                |
| 2     | 1                      | 160                | 0.00085543  | 1168.5             |
| 3     | 2                      | 0                  | 0.00000018  | 2336.0             |

Find frequency for generator system model & transmission system model also find state frequency of complex system for following outage given conditions 0G0L, 0G1L, 0G2L, 1G0L, 1G1L 1G2L, 2G1L, 2G1L, 2G2L, 3G0L, 3G1L, 3G2L.

- (b) Write short note on : 10  
 (i) Both tab curve  
 (ii) Environmental consideration in power system planning.

~~5,6,9~~ 5,6,9

**Course:** B.E. (SEM.VIII) (ELECTRICAL ENGG.)(prog-758 To 772)

**Q.P Code:** 8285

**Correction:**

---

Q5) b) Individual component reliability is 0.8 instead of 0.08

Q7) a)

0G0L,0G1L,0G2L,1G0L,1G1L,1G2L,2G0L,2G1L,2G2L,3G0L,3G1L,3G2L.

INSTEAD OF

0G0L,0G1L,0G2L,1G0L,1G1L,1G2L,2G1L,2G1L,2G2L,3G0L,3G1L,3G2L.

---

**Query Update time:** 01/06/2015 12:00 PM