**POWER SYSTEM OPERATION AND CONTROL Question paper Nov/Dec 2010 – by anirudhan**

**Part-A**  
(10\*2=20)  
  
1. Define the term "diversity factor".  
2. What do you mean by spinning reserve?  
3. Define per unit droop.  
4. Write down the equation for area control error of two area system.  
5. What is stability compensation?  
6. List the methods of voltage control?  
7. Write a few constraints in unit commitment problem.  
8. What is meant by incremental cost curve?  
9. Define state estimation.  
10. Mention the uses of SCADA in power system.  
  
  
**Part-B**  
(5\*16=80)  
  
11.(a) Explain the following : (16)  
(i) Hot reserve and cold reserve  
(ii) Load curve and load duration curve  
(iii) Governor control  
(iv) Security control  
Or  
11.(b) A generating station has the following daily load cycle: (16)  
Time (hours): 0-6 6-8 8-12 12-14 14-18 18-20 20-24  
Load (MW): 45 35 75 20 80 25 50  
(i) Draw the daily load curve  
(ii) Draw the load duration curve  
(iii) Calculate load factor  
(iv) Calculate plant capacity factor if the capacity of the plant is 120MW.  
  
12.(a) Develop the model of single control area and obtain its block diagram representation. Explain the salient features under static and dynamic conditions. (16)  
Or  
12.(b) Two synchronous generators operating in parallel. Their capacities are 700MW and 600MW. The droop characteristics of their governor are 4% and 5% from no load to full load. Assuming that the generators are operating at 60 Hz at no load, how would be a load of 800MW shared between them. What will be the system frequency at this load? Assume free governor action. (16)  
  
13.(a)(i) Discuss generation and absorption of reactive power. (8)  
(ii) Explain how voltage control can be affected by injection of reactive power. (8)  
Or  
13.(b)(i) Explain the operation of on-load tap changing transformer. (8)  
(ii) A 414 KV line is fed through 132/415 KV transformer from a constant 132 KV supply. At the load end of the line, the voltage is reduced by another transformer of 415/132 KV. The total impedance of line is (20+j40) ohms. Both transformers are equipped with tap-changing. The product of the two off-nominal setting is unity. The load on the system is 250 MW at 0.8 p.f. lagging. Calculate the settings of the tap changer required to maintain the voltage at 132KV. (8)  
  
14.(a) State the unit commitment problem. Explain priority list method of unit commitment problem in detail. (16)  
Or  
14.(b) With a neat flow chart explain the iterative algorithm for solving the economic dispatch equation of N-bus power system taking into account the effects of system losses. (16)  
  
15.(a) Discuss the various functions of energy control centre. (16)  
Or  
15. (b) Explain the operating states of a power system in the security perspective with an example. (16)