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**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_\_

**End Semester Examination – Nov/Dec - 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **EE275** | **Duration :** | **3 hrs** |
| **Sub. Name:** | **Power System Control** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | | **Marks** |
| **PART-A(10X1=10 MARKS)** | | | |
| 1. | Mention the important characteristics of a power grid. | | (1) |
| 2. | State the reasons for interconnecting power systems. | | (1) |
| 3. | Mention the range of frequency variation in Indian grids. | | (1) |
| 4. | How the ALFC loop is affected by AVR loop? | | (1) |
| 5. | Write the basic function of an excitation system. | | (1) |
| 6. | What is “synchronous condenser?” Mention its application. | | (1) |
| 7. | Draw the hierarchical control structure of Indian Grid. | | (1) |
| 8. | Define load shedding. | | (1) |
| 9. | Write the condition for economical operation of power system consists of thermal power generators. | | (1) |
| 10. | How priority list is prepared for solving unit-commitment? | | (1) |
| **PART B(5 X 3= 15 MARKS)** | | | |
| 11. | Write the model equations for electrical loads under steady state. | | (3) |
| 12. | Justify the need for speed governor and its droop setting. | | (3) |
| 13. | Draw a transmission line with tap-changing transformers. Write the specific condition on the off-nominal tap settings of the transformers. | | (3) |
| 14. | List the functions of energy control center. | | (3) |
| 15. | List the constraints in unit-commitment. | | (3) |
| **PART C(5 X 15= 75 MARKS)** | | | |
| 16. | Write the characteristics of a properly designed power system. Also, discuss the need for frequency and voltage regulation. | | (15) |
| (OR) | | | |
| 17. | Draw the schematics of ALFC and AVR loops. Mention functions of each loop. | | (15) |
| 18. | a. | Find the static frequency drop for a 2000MW system following a load increase of 1% of system rating. Assume the frequency dependency of the load as 0.01 pu MW/Hz and regulation setting as 2 Hz/ pu MW. | (5) |
| b. | Draw the block diagram of a single area ALFC with Integral Controller. Prove that, following a step load change, the static frequency drop will become zero with the help of the controller. | (10) |
| (OR) | | | |
| 19. | a. | How will you model the tie-line between two areas? | (8) |
| b. | Justify the need for tie-line bias control for a two area system. Write the expressions for the reference signals for the two areas with integral controller. | (7) |
| 20. | Draw the block diagram representation of AVR loop. With the help of root loci, explain the need for stability compensation. | | (15) |
| (OR) | | | |
| 21. | Explain the function of static VAR compensator. | | (15) |
| 22. | Draw the layout of a typical SCADA system and list all its components. Write the main functions of a SCADA system. | | (15) |
| (OR) | | | |
| 23. | With the help of state transition diagram, explain different states of a power system. Mention various control strategies to be adopted. | | (15) |
| 24. | The fuel cost function of two generators are given as  Find the optimum load allocation between the two generators if the load in the system is 162.5 MW. Calculate the daily loss in economy if the units share the load equally. | | (15) |
| (OR) | | | |
| 25. | Derive the coordination equations for economic dispatch of power plants. Include transmission losses. | | (15) |

ALL THE BEST