Hall Ticket Number:

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**Code No. : 21712**

# VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

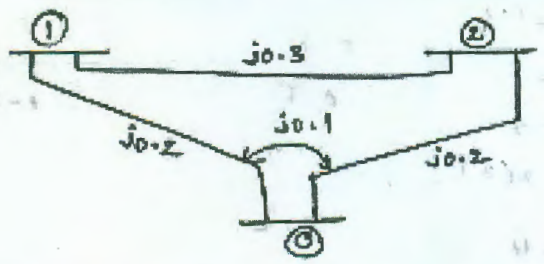
## M.E. (EEE: CBCS) I-Semester Main Examinations, January-2018

(Power Systems & Power Electronics)

## Advanced Computer Methods in Power Systems

Time: **3** hours Max. Marks: **60**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

| Q. No | Stem of the Question | M | L | CO | PO |
|---|---|---|---|---|---|
| | ***Part-A (10 × 2 = 20 Marks)*** | | | | |
| 1. | Define the following terms i) Link ii) Basic loop | 2 | 1 | 1,2 | 1 |
| 2. | Show that $A_b K^t = U$ | 2 | 2 | 1,2 | 1,2 |
| 3. | What do you mean by triangularization? | 2 | 1 | 1,2 | 1,2 |
| 4. | Write expressions for $Z_{qi}$ and $Z_{qq}$ when added element is a branch. Assume P is reference node? | 2 | 2 | 1,2 | 1,2 |
| 5. | What is the importance of load flow studies in power systems? | 2 | 2 | 3 | 1,3 |
| 6. | What is acceleration factor? In which method of load flow this factor is recommended? | 2 | 2 | 3 | 1,3 |
| 7. | Write the importance of Clark's transformation matrix? | 2 | 2 | 1,2 | 1,2 |
| 8. | Write the equations for $Z_{ll}^{abc}$ and $Z_{ll}^{abc}$ | 2 | 3 | 1,2 | 1,2 |
| 9. | What are the different types of faults and write the effect of each fault on the power system? | 2 | 2 | 2 | 1,2 |
| 10. | Estimate the fault level when a fault takes place in power system? | 2 | 3 | 1,2 | 1,2 |
| | ***Part-B (5 × 8 = 40 Marks)*** | | | | |
| 11. a) | The transpose of the matrix A is given by $A^t$ $= \begin{bmatrix} -1 & 1 & 0 & 1 & 0 & 0 \\ 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & -1 & -1 & 1 & 0 \\ 0 & 0 & 0 & -1 & 1 & 1 \end{bmatrix}$ Draw its oriented graph and obtain B, $\bar{B}$, C, $\bar{C}$ and K matrices of the network? | 6 | 4 | 1,2 | 1,2 |
| b) | Write the equation for Zloop by singular transformation? | 2 | 2 | 1,2 | 1,2 |
| 12. a) | Find Zbus for the system shown in fig.   | 4 | 5 | 2 | 1,2 |
| b) | Explain the algorithm for formation of Zbus matrix | 4 | 2 | 3 | 1,2 |

*Contd...2*

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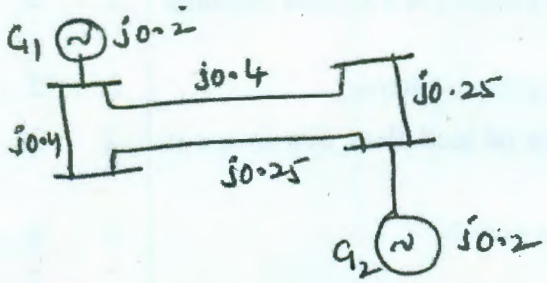
|---|---|---|---|---|---|
| 13. a) | With the help of flowchart, explain how to obtain load flow solution using Fast decoupled load flow method? | 5 | 2 | 3 | 1,3, 4 |
| b) | Explain the classification of buses in load flow studies. | 3 | 2 | 3 | 1,2 |
| 14. a) | Explain an algorithm for formation of three-phase bus impedance matrix for addition of branch? | 5 | 4 | 3 | 1,3, 4 |
| b) | What are transformation matrices and write their significance. | 3 | 2 | 2 | 1,2 |
| 15. a) | Derive the expressions for fault currents, voltages when 3-phase to ground fault occurs at bus P. Also write flowchart? | 5 | 4 | 1,2 | 1,2 |
| b) | What are the basic assumptions made in short circuit studies. | 3 | 2 | 2 | 1,2 |
| 16. a) | For the network shown in fig., obtain the bus admittance matrix by singular transformation?   | 5 | 5 | 1,2 | 1,2 |
| b) | What are the advantages of Zbus building algorithm? | 3 | 2 | 1,2 | 1,3 |
| 17. | Answer any ***two*** of the following: | | | | |
| a) | Compare the various methods of load flow study? | 4 | 1 | 1,2 | 1,3 |
| b) | Show that impedance matrix is same both in symmetrical components and Clark's components for a balanced three-phase stationary elements? | 4 | 2 | 1,2 | 1,2 |
| c) | Derive $Z_F^{abc}$ for LLG fault on phases b and c? | 4 | 3 | 1,2 | 1,2 |

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

| S. No. | Criteria for questions | Percentage |
|---|---|---|
| 1 | Fundamental knowledge (Level-1 & 2) | 58.75 |
| 2 | Knowledge on application and analysis (Level-3 & 4) | 30.0 |
| 3 | *Critical thinking and ability to design (Level-5 & 6) (*wherever applicable) | 11.25 |

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