

Hall Ticket Number:

| | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

Code No. : 18531 (B) N/O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD
Accredited by NAAC with A++ Grade

B.E. (Mech. Engg.) VIII-Semester Main & Backlog Examinations, May-2023
Power Plant Engineering (PE-V)

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from *Part-A* and any *FIVE* from *Part-B*
Part-A (10 × 2 = 20 Marks)

| Q. No. | Stem of the question | M | L | CO | PO |
|----------------------------------|---|---|---|----|----|
| 1. | Distinguish between conventional and non-conventional energy sources. | 2 | 2 | 1 | 1 |
| 2. | What are the requirements of a good coal handling plant? | 2 | 1 | 1 | 1 |
| 3. | What are the advantages of pulverized coal? | 2 | 1 | 2 | 1 |
| 4. | Classify draught system used in thermal power plants. | 2 | 2 | 2 | 1 |
| 5. | List essential components of a typical hydroelectric power plant. | 2 | 1 | 3 | 1 |
| 6. | Draw the hydrological cycle. | 2 | 1 | 3 | 1 |
| 7. | List different nuclear fuels. | 2 | 1 | 4 | 1 |
| 8. | Write the function of moderator and reflector of a nuclear reactor. | 2 | 1 | 4 | 1 |
| 9. | Define load factor and delivery factor. | 2 | 1 | 5 | 1 |
| 10. | List different pollutants from a thermal power plant. | 2 | 1 | 5 | 7 |
| Part-B (5 × 8 = 40 Marks) | | | | | |
| 11. a) | Discuss the prospects of non- conventional energy sources for Indian scenario. | 4 | 3 | 1 | 1 |
| b) | Draw the complete layout of modern steam power plant and explain the working of steam circuit. | 4 | 2 | 1 | 1 |
| 12. a) | Distinguish between under feed and over feed stocker. | 4 | 2 | 2 | 1 |
| b) | Explain with a neat sketch the working principle of a cyclone furnace. | 4 | 4 | 2 | 1 |
| 13. a) | Discuss the criteria to be considered while selecting a site for a hydropower plant. | 4 | 2 | 3 | 1 |
| b) | The following data relate to a hydroelectric power plant: Available head=40m, Catchment area=500km ² , Rain fall=155cm/year, Percentage of total rainfall utilized=78%, Penstock efficiency=92%, Turbine efficiency=90%, Generator efficiency=94%, Calculate the power developed by the turbine. | 4 | 4 | 3 | 2 |

Contd... 2

| | | | | | | | | | | | | | | | | | |
|---|---|------------|-------|-------|-------|-------|-------|-----------|----|----|----|-----|----|--|--|--|--|
| 14. a) | Explain the constructional details and working of a nuclear reactor with a line diagram. | 4 | 4 | 4 | 1 | | | | | | | | | | | | |
| b) | Describe the working of Boiling water reactor with a neat diagram and mention its advantages. | 4 | 4 | 4 | 1 | | | | | | | | | | | | |
| 15. a) | A Power station has to supply load as follows | 4 | 4 | 5 | 2 | | | | | | | | | | | | |
| <table border="1"> <tr> <td>Time (Hrs)</td> <td>0-6</td> <td>6-12</td> <td>12-14</td> <td>14-18</td> <td>18-24</td> </tr> <tr> <td>Load (MW)</td> <td>30</td> <td>90</td> <td>60</td> <td>100</td> <td>50</td> </tr> </table> | | Time (Hrs) | 0-6 | 6-12 | 12-14 | 14-18 | 18-24 | Load (MW) | 30 | 90 | 60 | 100 | 50 | | | | |
| Time (Hrs) | 0-6 | 6-12 | 12-14 | 14-18 | 18-24 | | | | | | | | | | | | |
| Load (MW) | 30 | 90 | 60 | 100 | 50 | | | | | | | | | | | | |
| i) Draw the load curve | | | | | | | | | | | | | | | | | |
| ii) Load factor. | | | | | | | | | | | | | | | | | |
| b) | Discuss different methods adopted in controlling pollutants of a thermal power plant. | 4 | 2 | 5 | 7 | | | | | | | | | | | | |
| 16. a) | List different ash handling systems used in steam power plant and explain working of any one with a neat diagram. | 4 | 2 | 1 | 1 | | | | | | | | | | | | |
| b) | Draw the line diagram of a Spreader stoker and discuss its working. | 4 | 4 | 2 | 1 | | | | | | | | | | | | |
| 17. | Answer any <i>two</i> of the following: | | | | | | | | | | | | | | | | |
| a) | Discuss the classification of dams and spillways. | 4 | 4 | 3 | 1 | | | | | | | | | | | | |
| b) | Explain various techniques used in disposal of nuclear waste. | 4 | 4 | 4 | 7 | | | | | | | | | | | | |
| c) | Explain different costs associated while generating and distributing electricity from a power plant. | 4 | 4 | 5 | 1 | | | | | | | | | | | | |

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

| | | |
|------|-------------------------------|-----|
| i) | Blooms Taxonomy Level - 1 | 20% |
| ii) | Blooms Taxonomy Level - 2 | 30% |
| iii) | Blooms Taxonomy Level - 3 & 4 | 50% |
