**18MED23**

**Hall Ticket Number:**

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| **III/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | | | | | | | | | | |
| **June, 2022** | | | | **Mechanical Engineering** | | | | | | | | |
| **Sixth Semester** | | | | **Power Plant Engineering** | | | | | | | | |
| **Time:** Three Hours | | | | | **Maximum:** 50 Marks | | | | | | | |
| *Answer Question No.1 compulsorily.* | | | | | | (1X10 = 10 Marks) | | | | | | |
| *Answer ONE question from each unit.* | | | | | | (4X10=40 Marks) | | | | | | |
| 1. | a) | Define hydrology | | | | | CO1 | |  | |
|  | b) | What is the main advantage of pulverized fuel firing? | | | | | CO2 | |  | |
|  | c) | List out the factors affecting runoff | | | | | CO1 | |  | |
|  | d) | Classify draught | | | | | CO2 | |  | |
|  | e) | Name the different methods of out plant handling of coal | | | | | CO2 | |  | |
|  | f) | Define nuclear fission | | | | | CO3 | |  | |
|  | g) | Name the various components of fixed cost | | | | | CO3 | |  | |
|  | h) | Define diversity factor | | | | | CO3 | |  | |
|  | i) | Classify fuel cells | | | | | CO4 | |  | |
|  | j) | Name various applications of solar energy? | | | | | CO4 | |  | |
| **UNIT –I** | | | | | | | | | | |
| 2. | a) | The runoff data of a river at a particular site is tabulated below   |  |  |  |  | | --- | --- | --- | --- | | Month | Mean discharge in millions of m3/month | Month | Mean discharge in millions of m3/month | | Jan | 80 | July | 150 | | Feb | 50 | Aug | 200 | | Mar | 40 | Sep | 250 | | Apr | 20 | Oct | 120 | | May | 0 | Nov | 100 | | Jun | 100 | Dec | 80 |   i) Draw hydrograph, Flow duration curve and find the mean flow  ii) Find the power in MW available at mean flow if the head available is 100m and overall efficiency of generation is 80% | | | | CO1 | | L2 | | 5M |
|  | b) | Draw a layout of hydroelectric power plant and explain the functions of different components | | | | CO1 | | L2 | | 5M |
| **(OR)** | | | | | | | | | | |
| 3. | a) | Write the classification of hydroelectric power plants and explain in detail | | | | CO1 | | L3 | | 5M |
|  | b) | With a neat sketch explain the diesel power plant. List out its merits and demerits | | | | CO1 | | L2 | | 5M |
| **UNIT –II** | | | | | | | | | | |
| 4. | a) | Draw the general layout of thermal power plant and explain various circuits | | | | CO2 | | L2 | | 5M |
|  | b) | Enumerate and explain the different material handling equipments used in inplant handling of coal | | | | CO2 | | L3 | | 5M |
| **(OR)** | | | | | | | | | | |
| 5. | a) | Describe the spreader stoker with a neat sketch | | | | CO2 | | L2 | | 5M |
|  | b) | Explain lamont boiler with a neat sketch and list out the merits and demerits | | | | CO2 | | L2 | | 5M |
| **UNIT –III** | | | | | | | | | | |
| 6. | a) | Draw a neat diagram of nuclear reactor and explain the functions of different components | | | | CO3 | | L2 | | 5M |
|  | b) | Describe liquid metal fast breeder reactor (LMFBR) with a neat sketch | | | | CO3 | | L3 | | 5M |
| **(OR)** | | | | | | | | | | |
| 7. | a) | The peak load on a power station is 30 MW. The loads having maximum demands of 25 MW, 10 MW, 5MW and 7MW are connected to the power station. The capacity of the power station is 40 MW and annual load factor is 50%. Find i) Average load on the station ii) energy supplied per year iii) Demand factor iv) Diversity factor | | | | CO3 | | L2 | | 5M |
|  | b) | A power station has to supply load as follows   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Time (hour) | 0-6 | 6-10 | 10-12 | 12-16 | 16-20 | 20-22 | 22-24 | | Load (MW) | 20 | 50 | 60 | 40 | 80 | 70 | 40 |   i) Load curve ii) draw load duration curve ii) Calculate the load factor | | | | CO3 | | L2 | | 5M |
| **UNIT –IV** | | | | | | | | | | |
| 8. | a) | With a neat sketch explain solar pond electric power plant | | | | CO4 | | L3 | | 5M |
|  | b) | Classify wind turbines and explain about horizontal axis wind turbine with a sketch | | | | CO4 | | L2 | | 5M |
| **(OR)** | | | | | | | | | | |
| 9. | a) | Explain open cycle OTEC power plant with a neat sketch | | | | CO4 | | L2 | | 5M |
|  | b) | Describe closed cycle MHD Generator power plant with a neat sketch | | | | CO4 | | L2 | | 5M |

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