**1.** A generating station has a connected load of 40 MW and a maximum demand of 20 MW: the units generated being $60\times10^6$. Calculate (*i*) the demand factor (*ii*) the load factor. **[(*i*) 0·5 (*ii*) 34·25%]**

**2.** A 100 MW powers stations delivers 100 MW for 2 hours, 50 MW for 8 hours and is shut down for the rest of each day. It is also shut down for maintenance for 60 days each year. Calculate its annual load factor. **[21%]**

**3.** A power station is to supply four regions of loads whose peak values are 10,000 kW, 5000 kW, 8000 kW and 7000 kW. The diversity factor of the load at the station is 1.5 and the average annual load factor is 60%. Calculate the maximum demand on the station and annual energy supplied from the station. **[20,000 kW; 105·12 × $10^6$ kWh]**

**4.** A generating station supplies the following loads: 15000 kW, 12000 kW, 8500 kW, 6000 kW and 450 kW. The station has a maximum demand of 22000 kW. The annual load factor of the station is 48%. Calculate (*i*) the number of units supplied annually (*ii*) the diversity factor and (*iii*) the demand factor. **[(*i*) 925 × $10^5$ kWh (*ii*) 1·9 (*iii*) 52·4%]**

**5.** A generating station has a maximum demand of 20 MW, a load factor of 60%, a plant capacity factor of 48% and a plant use factor of 80%. Find:

(*i*) The daily energy produced
(*ii*) The reserve capacity of the plant
(iii) The maximum energy that could be produced daily if the plant was running all the time
(iv) The maximum energy that could be produced daily if the plant was running fully loaded and operating as per schedule.

**[(*i*) 288 × $10^3$ kWh (*ii*) 5 (*iii*) 600 × $10^3$ kWh (*iv*) 360 × $10^3$ kWh]**

**6.** A generating station has the following daily load cycle:

| Time (hours) | 0—6 | 6—10 | 10—12 | 12—16 | 16—20 | 20—24 |
|---|---|---|---|---|---|---|
| Load (MW) | 20 | 25 | 30 | 25 | 35 | 20 |

Draw the load curve and find

(*i*) Maximum demand, (*ii*) Units generated per day,

(*iii*) Average load per day, (*iv*) Load factor,

**[(*i*) 35 MW (*ii*) 600 × $10^3$ kWh (*iii*) 25 MW (*iv*) 71·43%]**

**7.** A power station has to meet the following load demand: Load *A* 50 kW between 10 A.M. and 6 P.M., Load *B* 30 kW between 6 P.M. and 10 P.M., Load *C* 20 kW between 4 P.M. and 10 A.M. Plot the daily load curve and determine (*i*) diversity factor (*ii*) units generated per day (*iii*) load factor.

**[(*i*) 1·43 (*ii*) 880 kWh (*iii*) 52·38%]**

**8.** The yearly load duration curve of a certain power station can be approximated as a straight line; the maximum and minimum loads being 40 MW and 8 MW respectively. To meet this load, three turbine generator units, two rated at 20 MW each and one at 10 MW are installed. Determine (*i*) installed capacity (*ii*) plant factor (*iii*) kWh output per year (*iv*) load factor.

**[(*i*) 50MW (*ii*) 48% (*iii*) 210 × $10^6$ kWh(*iv*) 60%]**

9. A generating station has a daily load cycle, while it is operating at no load in intervals from a time of 0 to 4, and from a time of 12 to 16. This station is operating at a load increased linearly from 0 to 8 MW at intervals from a time of 4 to 8, and from a time of 16 to 20 and it is operating at a load decreased linearly from 8 MW to 0 at intervals from a time of 8 to 12, and from a time of 20 to 24. (Time in hours)

Draw the daily load curve and find

(i) The maximum demand, (ii) The units generated per day,

(iii) The average load and (iv) Load factor.

**[(i) 8MW (ii) 64 MWh (iii) 2.7 MW (iv) 33.33%]**

10. A generating station has the following daily load cycle:

| Time in hours | 6—8 | 8—11 | 11—16 | 16—19 | 19—22 | 22—24 | 24—6 |
|---|---|---|---|---|---|---|---|
| Load in MW | 20 | 40 | 50 | 35 | 70 | 40 | 20 |

Draw the load curve and select suitable generator units from the 10,000, 20,000, 25,000, 30,000 kVA. Prepare the operation schedule for the machines selected and determine the load factor from the curve. **[55·06%]**