

B.E. Mechanical Engineering (Model Curriculum) Semester-VI
PECMEL321 - Power Plant Engineering

P. Pages : 2

Time : Three Hours



GUG/W/23/14077

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Diagrams and Chemical equation should be given wherever necessary.
 5. Illustrate your answers wherever necessary with the help of neat sketches.
 6. Use of slide rule, Logarithmic Tables, Steam Tables, Mollier's Chart, Drawing Instruments, Thermodynamic tables for moist air, Psychometric charts and Refrigeration charts is permitted.
 7. Attempt Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6, Q. 7 or Q. 8, Q. 9 or Q10.

1. a) Discuss the layout of modern steam power plant. Discuss its circuits. 8
- b) Enlist types and role of pulverizing mills. Discuss any pulverizing mill with neat sketch. 8

OR

2. a) Explain unit system of pulverized fuel handling. 8
- b) What are the advantages of quenching of ash while it's handling? Explain mechanical system of ash handling. 8
3. a) Explain the construction and working of BWR. 8
- b) Explain the construction and working of CANDU reactor with neat sketch. Discuss its various advantages and disadvantages. 8

OR

4. a) With neat sketch, discuss general components of nuclear reactor. 8
- b) Compare the working of PWR with the BWR. 8
5. a) The runoff data of a river at a particular site is tabulated below: 16

Mean discharge millions of m ³ /month	500	200	1500	2500	3000	2400	2000	1500	1500	1000	800	600
Month	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MARCH

- a) Draw the hydrograph and find mean flow
- b) Also draw flow duration curve
- c) Find the power available at mean flow if the head available is 80 m and overall efficiency of generation is 80%. Take 30 days in month.

OR

6. a) Explain classification of hydroelectric power plants in details. **8**
- b) Discuss advantages and disadvantages of hydroelectric plant over thermal plant. **8**
7. a) Discuss open cycle gas turbine plant in detail. **8**
- b) Explain methods to improve thermal efficiency of simple open cycle constant pressure gas turbine plant. **8**

OR

8. Write short notes on **any two** **16**
- a) Bio gas power b) Fuel cell c) Brayton cycle
9. a) A power station supplies the following load to consumers **8**

Time (Hr)	0-6	6-10	10-12	12-16	16-20	20-22	22-24
Load (MW)	20	50	60	40	80	70	40

Find

- i) The load factor of the plant
- ii) What is the load factor of a standby equipment of 20 MW capacity if it takes up all load above 60 MW?
- b) Explain use factor, demand factor, diversity factor and capacity factor in detail. **8**

OR

10. Find the cost of generation per kW hr from the following data: Capacity of the plant – 120 MW, Capital cost – Rs 1200000/ kW installed, Interest and depreciation – 10% on capital, Fuel consumption – 1.2 kg/kW hr, Fuel cost – Rs 40000/ tonne, Salaries, wages, repairs and maintenance – Rs 60000000/ year. The maximum demand is 80 MW and load factor is 80%. **16**
