

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

P. Pages : 2

Time : Three Hours



GUG/W/24/14077

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 Steam tables, Drawing instruments is permitted.
 7. Discuss the reaction, mechanism wherever necessary.

1. a) Discuss layout of a modern steam plant. Explain factors to be considered for site selection of thermal plant. 8
- b) What is principle of combustion in overfeed stoker? Explain chain grate stoker with neat sketch. 8

OR

2. a) What are the advantages of pulverized fuel handling? Explain elements of pulverized coal system with neat sketch. 8
- b) Explain high pressure hydraulic ash handling system. What are its advantages? 8
3. a) Describe Pressurized water reactor with neat sketch. Also explain its advantages. 8
- b) Write short notes on : 8
- i) Moderator ii) Reflector in nuclear reactor

OR

4. a) Discuss CANDU reactor in detail. 8
- b) Explain main components of a nuclear power plant with neat sketch. 8

5. The runoff data of a river at a particular site is tabulated below: 16

Mean discharge m^3/s	100	225	300	600	750	800	1000
Month	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY

1200	900	000	400	200
AUG	SEPT	OCT	NOV	DEC

- a) Draw the hydrograph and find mean flow.
- b) Also draw flow duration curve.

OR

6. a) Explain and discuss essential elements of a hydroelectric power plant. 8
- b) Discuss the various factors which govern the site selection of hydro plant. 8
7. a) Discuss open cycle gas turbine plant in detail. 8
- b) Derive the expression for efficiency of constant pressure open cycle gas turbine. 8

OR

8. Write short notes on any two with neat sketch. 16
- a) Geothermal power generation
- b) Wind power
- c) Solar power.
9. a) Write short notes on: 8
- i) Plant capacity factor
- ii) Utilization factor
- iii) Diversity factor
- iv) Reserved capacity.
- b) A 60MW power station has an annual peak load of 50MW. The power station supplies load having maximum demands of 20MW, 17MW, 10MW and 9MW. The annual load factor is 0.45. Find (i) Average load (ii) Energy supplied per year (iii) Diversity factor (iv) Demand factor. 8

OR

10. It is proposed to supply a load with a maximum demand of 100MW and a load factor of 0.4. Choice is to be made from nuclear, hydro and steam power plants. Calculate the overall cost/kwh in each scheme. 16

Cost	Nuclear power plant	Hydro power plant	Steam power plant
Capital/kw installed	Rs. 5000/-	Rs. 4320/-	Rs. 2160/-
Interest	10%	10%	12%
Depreciation	10%	8%	12%
Operating cost/kwh	12 paise	6 paise	18 paise
Transmission cost/kwh	0.24 paise	0.96 paise	0.24 paise
