B.E. Mechanical Engineering (Model Curriculum) Sem-VI

PECMEL321 : Power Plant Engineering

P. Pages : 2 **GUG/W/22/14077**

Time : Three Hours * 3 3 0 6 * 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. Retain the construction lines.
6. Illustrate your answers wherever necessary with the help of neat sketches.
7. Use of slide rule, Logarithmic tables, Steam tables, Mollier's chart, Drawing instruments, Thermodynamic tables for moist air, Psychrometric charts and Refrigeration charts is permitted.
8. Discuss the reaction, mechanism wherever necessary.
9. Solve: Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6, Q. 7 or Q. 8, Q. 9 or Q. 10

1. a) Describe general layout of ash handling system with neat diagram. **8**

b) Explain factors to be considered for site selection of thermal power plant. **8**

OR

2. a) Explain Velox boiler in detail. **10**

b) Explain advantages offered by thermal power plant over hydroelectric power plant. **6**

3. Explain general components of nuclear reactor in detail. **16**

OR

4. Write short notes on **any two**. **16**
a) General problems of reactor operation.
b) Boiling water reactor
c) CANDU type reactor.

5. a) Explain working of pumped storage plant in detail. **8**

b) Describe general arrangement of storage type hydroelectric project and its operation. **8**

OR

6. The run off data of a river at a particular site is tabulated below. **16**

Moth	Mean discharge (Millions of m^3/month)	Month	Mean discharge (Millions of m^3/month)
J	80	J	150
F	50	A	200
M	40	S	220
A	20	O	120
M	0	N	100
J	100	D	80

a) Draw a hydrograph and find mean flow
b) Also draw flow duration curve
c) Find the power in MW available at mean flow if the head available is 100 m and overall efficiency of generation is 80%

Take each month of 30 days.

7. Describe methods to improve thermal efficiency of a simple open cycle constant pressure gas turbine power plant in detail. **16**

OR

8. Write short notes on **any two**. **16**

a) Geothermal power plant
b) Tidal power plant.
c) Wind power plant.

9. The following data pertains to power plant of 120 MW capacity: **16**
The capital cost = Rs. 15000 / kW
Interest and depreciation = 10% on capital
Annual running charges = Rs. 20×10^6
Profit to be gained = 10% of capital
The energy consumed by the power plant auxiliaries = 5% of generated
The annual load factor = 0.6, Annual capacity factor = 0.5. Calculate
a) Reserve capacity
b) Cost of generation / kWhr

OR

10. a) Explain tariff methods for electrical energy. **8**

b) Write short notes on **any two**. **8**

i) Load duration curve
ii) Load factor.
iii) Plant capacity factor.

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