

Faculty of Engineering & Technology  
 Seventh Semester B.E. (Mechanical Engg.)/Seventh  
 Semester B.E.P.T. (Mech.) Examination  
**POWER PLANT ENGG.**

**Elective—I****Sections—A & B**

Time : Three Hours] [Maximum Marks : 80  
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**INSTRUCTIONS TO CANDIDATES**

- (1) All questions carry marks as indicated.
- (2) Answer **THREE** questions from Section A and **THREE** questions from Section B.
- (3) Assume suitable data wherever necessary.
- (4) Illustrate your answers wherever necessary with the help of neat sketches.
- (5) Use of Steam tables, Mollier's chart, Drawing instruments are permitted.
- (6) Use of Non-programmable Calculator is permitted.

**SECTION—A**

1. (a) With the help of a neat sketch, explain the working of the pressurized water reactor. 5
- (b) What do you understand by the term Binding Energy? State its significance. 4

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- (c) What are the various factors to be considered for the selection of a nuclear power plant? Write in brief. 4
2. (a) Explain the various controls which are provided in the hydroelectric power plant. 7
  - (b) What do you understand by steam jet draught? Where it is generally employed? 6
3. The run off data of a river at a particular site is given below :

Month	Mean Discharge (Millions of m <sup>3</sup> /month)
Jan	90
Feb	60
March	30
April	20
May	00
June	90
July	160
Aug	210
Sep	240
Oct	150
Nov	110
Dec	80

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- (i) Draw hydrograph and find the mean flow.
- (ii) Draw the flow duration curve.
- (iii) Find the power in MW available at mean flow if the head available is 120 m and overall efficiency of generation is 78%. 13

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4. (a) Explain the unit system and central system of pulverised fuel firing. Mention advantages and disadvantages of each of them. 6

(b) Draw a neat diagram of electrostatic precipitator. Explain its working. 7

5. Write short notes on (any **THREE**) :

(i) Types of Nuclear Waste

(ii) Boiler Accessories

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(iii) Compounding of steam turbine

(iv) Water Hammer.

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### SECTION—B

6. (a) Derive the conditions for maximum work output of a simple gas turbine. 6

(b) What do you understand by the term MHD generator? What are the types of MHD generator? Explain any one. 7

7. (a) The following data refers to a power plant of 210 MW capacity :—

(i) The capital cost : Rs. 4000 per kW of installed capacity.

(ii) Interest and Depreciation : 15% on Capital cost, rtmnuonline.com

(iii) Annual running cost : Rs.  $30 \times 10^6$

(iv) Profit gained : 10% on the capital

(v) The energy consumed by the power plant is 5% of the generated

(vi) The annual load factor : 0.7

(vii) Annual capacity : 0.6

Calculate the selling cost of energy/kWh. 10

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(b) Explain any one thermal storage device. 3

8. (a) What are the advantages and limitations of Solar energy? rtmnuonline.com 6

(b) Explain the working of tidal power plant. Draw neat sketch showing various components. 7

9. (a) A residential load of a locality is given below :

<u>Time (Hrs)</u>	<u>Load (kW)</u>
0-5	02
5-6	06
6-9	20
9-18	00
18-21	12
21-24	08

Draw the load curve and find out the load factor and energy consumed during 24 hrs. 10

(b) Enumerate efforts of fluctuating load. 3

10. Write short notes on (any **FOUR**) :—

(a) Geothermal Power Plant rtmnuonline.com

(b) Wind Power Plant

(c) Tariffs for Electrical Energy

(d) Measurement of smoke and dust

(e) Pumped Storage Plants. 14

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