ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END-SEMESTER EXAMINATION : MAY 2021** (Academic Session: 2020 – 21)		
Name of the Program:	B. Tech.	**Semester:**	VI
Paper Title :	Elective – II (Power Generation Economics)	**Paper Code:**	EEE43114
Maximum Marks :	**40**	**Time duration:**	2 Hours
Total No of questions:	8	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	Read complete question paper before starting the examination.		

Answer all the Groups

Group A

Answer all the questions of the following $5 \times 1 = 5$

1. a) What are the need of economic dispatch?

b) When generating units are loaded to equal incremental costs, it results in
(i) minimum fuel cost (ii) fuel costs at a maximum
(iii) fuel costs are not affected (iv) maximum loading of generating units.

c) State the assumptions made in transmission loss formula.

d) Unit of penalty factor is: (i) Rs (ii) MW^{-1} (iii) Rs/MWh (iv) No units.

e) Transmission loss is:
(i) a function of real power generation (ii) independent of real power generation
(iii) a function of reactive power generation
(iv) a function of bus voltage and its angle.

GROUP –B

Answer *any three* of the following $3 \times 5 = 15$

2. Why should the system frequency be maintained constant?

3. Draw a neat sketch of a typical turbine speed-governor system and explain its operation in detail.

4. An industrial consumer has a maximum demand of 120 kW and maintains a load factor of 80%. The tariff in force is Rs. 60 per kVA of maximum demand plus Re. 1 per unit. If the average power factor is 0.8 (lagging), calculate the total energy consumed per annum and the annual bill.

5. A generating plant has a maximum capacity of 100 kW and costs Rs. 1,60,000. The annual fixed charges are 12% consisting of 5% interest, 5% depreciation and 2% taxes. Find the fixed charges per kWh if the load factor is (i) 100% and (ii) 50%.

GROUP –C

Answer *any two* of the following $2 \times 10 = 20$

6. Three plants have a total capacity of 500 MW are scheduled for operation to supply a total system load of 310 MW. Evaluate the optimum load scheduling if the plants have the following cost characteristics and the limitations:

$C_1 = 0.06P_{G1}^2 + 30P_{G1} + 10, \quad 30 \le P_{G1} \le 150$

$C_2 = 0.10P_{G2}^2 + 40P_{G2} + 15, \quad 20 \le P_{G2} \le 100$

$C_3 = 0.075P_{G3}^2 + 10P_{G3} + 20, \quad 50 \le P_{G3} \le 250$

7. (a) Explain the advantages of high load factor.
(b) In a particular area both steam and hydro stations are equally possible. It has been estimated that capital costs and running costs of these two types will be as under:

Plant Type	Capital Cost/ kW	Running Cost/ kWh	Interest
Hydro	Rs. 3000	Rs. 3	5%
Steam	Rs. 2000	Rs. 5	5%

8. Determine the load factor at which the cost of supplying a unit of electricity from a Diesel and from a Steam station is same if the annual fixed and running charges are as follows:

Station Type	Fixed charges	Running charges
Diesel	Rs. 300 per kW	Rs. 3 per kWh
Steam	Rs. 1200 per kW	Rs. 4 per kWh

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