Printed Pages : 2 **NAU-022**

(Following Paper ID and Roll No. to be filled in your Answer Books)										
PAPER ID :	**Roll No.**									

B.TECH.

Theory Examination (Semester-VI) 2015-16

POWER PLANT ENGINEERING

Time : 3 Hours ***Max. Marks : 100***

Note: Attempt all questions as directed & assume missing **data suitably**, if any.

SECTION – A

1 Attempt all questions **10 *2 = 20**

a. What do you mean by term depreciation. Name different methods to calculate depreciation rate.
b. What is pulverization?
c. What is the use of load curves in power plants?
d. What are the applications of diesel engine power plant?
e. Define Fuel handling and lubricating systems of a diesel power plant.
f. Draw block diagram of closed forced circulation cooling system.
g. How the nuclear reactors are classified?
h. What are the three main factors for power output of hydroelectric plant?
i. Why is the maximum cycle temperature of gas turbine plant much lower than that of diesel power plant?
j. Why is there a need of generator cooling?

SECTION – B

2. Attempt any FIVE Questions **5*10 = 50**

a) A rated capacity of a power plant is 400 MW. The peak load on the plant is 350 MW. The various consumer groups having maximum demands of 120 MW, 100 MW, 80MW and 90 MW are connected to the plant. The annual load factor is 0.8 calculate (i) Capacity factor (ii) The energy supplied per year (iii) Reverse factor (iv) Demand factor (v) Diversity factor.
b) Explain the essential characteristics of a ash handling plant. Explain with neat sketch hydraulic ash handling system used in the steam power plant with its merits and demerits.
c) Explain the Gas turbine power plant with neat sketch. Discuss the advantages of gas turbine power plant
d) With the help of a neat diagram, explain and describe the complete diesel cyle power plant.
e) Explain the working principle of cogeneration plant and combined steam and gas turbine power plant.
f) Draw a neat diagram of nuclear reactor and level different components. Discuss the function of moderator. Why lighter materials are used as moderator?
g) Discuss the various factors while selecting a site for a hydro – electric plant. In what way a forebay differ from a surge tank.
h) Explain the concept of Reheat and regenerating in context gas turbine .

SECTION – C

Attempt any two questions. **15*2 = 30**

3 (a) In a boiler trial, the analysis of coal gives : C = 81%, H_2 = 4.5%, O_2 = 8% and remainder incombustible. The analysis of dry flue gas gives: CO_2 = 8.3%, O_2 = 10%, N_2 = 80.3% and CO = 1.4%. Calculate mass of air supplied per kg of fuel and the percentage of excess air.

(b) The following data relate to a hydroelectric power plant: Available head = 30 m, catchment area = 450 km^2, rain fall = 150 cm/year, percentage of total rainfall Utilized = 70%, penstock efficiency = 90%, turbine efficiency = 85%, generator efficiency = 90%,Load factor = 45%. Calculate the power developed by the turbine and suggest suitable turbine for the Plant.

4 (a) Explain with diagram, the working principle :

(i) Geothermal power plant

(ii) Tidal power plant

(b) With the help of a sketch discuss the ring and bridging bus-bar arrangement of electrical equipments and cooling system of transformer.

5 (a) Explain with diagram pulverized fuel combustion. State advantages of FBC system over conventional system.

(b) Discuss the construction and working of gas turbine combustion chamber. Why too lean air-fuel ratio is used for combustion in gas turbine plants