Code No: 154BW

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year II Semester Examinations, April/May - 2023
POWER SYSTEM - I
(Electrical and Electronics Engineering)

Time: 3 Hours   Max. Marks: 75

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	Which system carry water from intake to the turbines in power system?	[2]
b)	How to raise the temperature in boiler?	[3]
c)	What is a peak load station?	[2]
d)	What is the relationship between load, utilization and capacity factors?	[3]
e)	Why underground cables are used?	[2]
f)	What are the types of cables?	[3]
g)	What is a bundled conductor?	[2]
h)	What is symmetrical spacing? Explain its advantages.	[3]
i)	What is the purpose of substation?	[2]
j)	What are the objectives of distribution of power?	[3]

PART – B

(50 Marks)

2.a) Draw the block diagram of hydro power plant and describe in detail.
  b) How power is extracted from tidal energy? Explain. [5+5]
OR
3.a) Draw the block diagram of steam power plant and describe in detail.
  b) What are the advantages and disadvantages of fuel cell? Explain. [5+5]

4.a) How the cost of electrical energy is decided? Explain.
  b) Installed capacities of generating station is 25MW and generated 200×10^6 units/annum. Calculate the cost per unit generated, if the annual fixed charges are Rs. 150/kW installed and running charges are 5 paise/kWh. [5+5]
OR
5.a) What are the different types of loads? Explain.
  b) A power station has a maximum demand of 40 MW with annual load factor is 60%. Determine the cost per kWh generated from the following data. Capital cost=Rs.80×10^5, annual cost of fuel and oil = Rs. 8×10^5, taxes, wages, and salaries = Rs. 5×10^5, and the rate of interest and depreciation is 12%. [5+5]

6.a) What are the differences between over head and underground cables? Explain.
 b) Which power lines are used for extra high voltages? Explain.   [5+5]

OR

7.a) Discuss in detail about the grading of cables.
  b) Give the detailed classification of insulators.   [5+5]

8.a) Which factors influence corona loss? Explain.
  b) A single phase, two-wire transmission line, 10 km long, is made up of round conductors, each 0.5 cm in diameter, separated from each other by 30 cm. Calculate the equivalent diameter of a fictitious hollow, thin walled conductor having the same inductance as the original one. What is the value of this inductance?   [5+5]

OR

9.a) Why there is interference between power and communication lines? Explain.
  b) A single circuit, three phase, 60-Hz transmission line consists of three conductors arranged as shown below. If the conductors are 5-km long solid cylindrical aluminum conductor with a diameter of 20 m, find the capacitive reactance of the line per kilometer per phase.   [4+6]
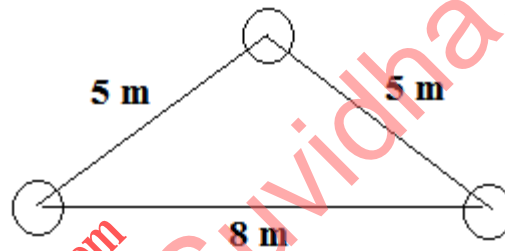
10.a) How DC distribution is done? Explain with neat sketch.
   b) Explain the major differences and similarities of radial and ring main distributors in detail.   [5+5]

OR

11.a) How bus bars are arranged in substations? Explain in detail.
   b) What are the types of distribution systems? Explain each in detail.   [5+5]

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