

BACHELOR OF TECHNOLOGY (C.B.C.S.) (2020 COURSE)

B.Tech.Sem - III ELECTRICAL : : SUMMER - 2022

SUBJECT : POWER SYSTEM ENGINEERING

Day : Tuesday
Date : 31-05-2022

S-24541-2022

Time : 02:30 PM-05:30 PM
Max. Marks : 60

N.B.:

- 1) All questions are **COMPULSORY**.
 - 2) Figures to the right indicate **FULL** marks.
 - 3) Draw neat labelled diagrams **WHEREVER** necessary.
 - 4) Use of non- programmable **CALCULATOR** is allowed.
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- Q.1** a) With neat diagram explain the working of nuclear reactor. (05)
- b) What are the various factors to be considered while selecting the site for hydro power station? (05)

OR

- Q.1** a) What is mean by water hammering? How this problem is resolved in case of hydro power station. (05)
- b) With neat block diagram explain the functioning of thermal power plant. (05)

- Q.2** a) What are the various parameters to be considered for selecting the site for wind power plant? (05)
- b) With neat block diagram explain the working of solar PV power plant. (05)

OR

- Q.2** a) What is mean by carbon credit? What is its significance? (05)
- b) With neat block diagram explain the working of solar thermal power plant. (05)
- Q.3** a) A thermal power plant consists of two 80MW units each running for 8000 hours and 40MW unit running for 2000 hours per year. The energy produced by the plant is 876×10^6 kWh per year. Determine plant load factors and plant use factor. Consider maximum demand is equal to plant capacity. (05)
- b) Determine the following terms: (05)
- i) Diversity factor ii) Plant Capacity Factor iii) Load factor

OR

- Q.3** a) A diesel generating station supply following loads to various consumers. (05)
- i) Industrial consumers = 1500kW
ii) Commercial consumers = 750kW
iii) Domestic consumers = 100kW
iv) Domestic light = 450 kW
If the M.D. on station is 2500 kW and number of units generated per year are 45×10^5 kWh, calculate load factor, diversity factor, demand factor.
- b) Compare between load curve and load duration curve. (05)

P. T. O.

Q.4 a) A 3 phase single circuit transmits the power at 132kV. It has following data (05)
Weight of conductor = 670 kg/ km.
Length of span = 200 meter
Ultimate tensile strength = 3500kg.
Safety factor = 2
Calculate the height of conductor above ground at which the conductor should be supported. Ground clearance required is 10 meter.

b) What is corona effect? What are the advantages and disadvantages of corona effect? (05)

OR

Q.4 a) A 3 phase overhead transmission line is being supported by 3 disc insulators. (05)
The potentials across top unit and middle units are 8kV and 11kV respectively.
Calculate: Line voltage and String efficiency.

b) What are the different types of conductors used in case of overhead line? (05)
Explain with their property.

Q.5 a) A 3 phase transmission line delivers 5000 kW power at 22kV at 0.8 p.f. (05)
lagging. The resistance and reactance of line is 4 Ω and 6 Ω respectively.
Determine transmission efficiency.

b) Represent the medium transmission line considering nominal pi method. (05)

OR

Q.5 a) What is the maximum length in km for a 1 phase transmission line having (05)
copper conductor of 0.8cm² cross section over 200kW at unity power factor
and at 3300 V are to be delivered? The efficiency of transmission is 90%. Take
specific resistance as 1.725 $\mu\Omega$ cm.

b) Represent the medium transmission line considering nominal T method. (05)

Q.6 a) Draw the cross section of cable and explain its construction. Also mention the (05)
material used for each part of the underground cable.

b) A single phase two wire distributor AC has loaded as follows: (05)
i) 110 Amp. at 0.8 p.f. lag at point C
ii) 80 Amp at 0.8 p.f. lag at point B
The impedance AB is (0.04+ j 0.08) Ω . If the voltage at the far end C is to be
maintained at 500 V, determine the voltage at A and B.

OR

Q.6 a) A single core cable is used on a 3 phase 66 kV system at 50Hz frequency. The (05)
length of the cable is 1.5km and core diameter of 10cm and an impregnated
paper insulation of thickness 8cm. The relative permittivity of the insulation
may be taken as 4. Calculate the charging current of cable.

b) Explain the capacitance grading in case of underground cables. (05)

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