| U.S.N. | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

# B.M.S. College of Engineering, Bengaluru-560019

**Autonomous Institute Affiliated to VTU**

## September / October 2023 Semester End Main Examinations

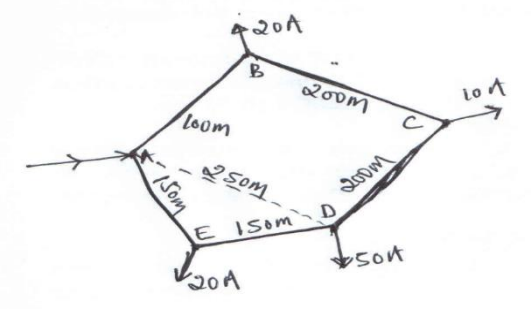
**Programme: B.E.** **Semester: IV**
**Branch: Electrical and Electronics Engineering** **Duration: 3 hrs.**
**Course Code: 22EE4PCGTD** **Max Marks: 100**
**Course: Generation, Transmission and Distribution**

**Instructions**: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

**Important Note:** Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

| | | | UNIT - I | *CO* | *PO* | Marks |
|---|---|---|---|---|---|---|
| 1 | a) | | Draw the typical block schematic diagram for hydroelectric power plant and explain in brief. | *CO1* | *PO1* | **07** |
| | b) | | Explain the following terms: Demand Factor; Load Factor; Diversity Factor. | *CO1* | *PO1* | **06** |
| | c) | | A transmission line has a span of 200 meters between level supports. The conductor has a cross-sectional area of 1.29 $cm^2$, weighs 1170 kg/km and has a breaking stress of 4218 $kg/cm^2$. Find the sag for a safety factor of 5, allowing a wind pressure of 122 $kg/m^2$of projected surface. Calculate the vertical sag. | *CO2* | *PO1* | **07** |
| | | | **OR** | | | |
| 2 | a) | | What are the methods of power factor improvement?. A 500 volts 60 cycles/seconds single phase motor takes a full load current of 50 amps at P.F 0.86 lagging. The motor power factor has to be improved to 0.94 by connecting capacitor bank across it. Calculate the required capacity of capacitor in both kVAR and μ-Farads? | *CO1* | *PO2* | **05** |
| | b) | | Derive & analyses the equation for sag when the conductor is supported between two poles at the unequal level. | *CO2* | *PO1* | **07** |
| | c) | | A transmission line has a span of 275 m between level supports. The conductor has an effective diameter of 1.96 cm and weighs 0.865 kg/m. Its overall strength is 8060 kg. If the conductor has ice coating of radial thickness 1.27 cm and is exposed to a wind pressure of 3.9 $gm/cm^2$ of projected surface, compute sag for a safety factor of 2. Weight of 1 c.c. of ice is 0.91 gm. | *CO2* | *PO1* | **08** |
| | | | **UNIT - II** | | | |
| 3 | a) | | Discuss on methods of enhancing string efficiency and explain in brief | *CO2* | *PO2* | **05** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | b) | Develop an expression for inductance (internal flux & external flux) of a single phase two wire system. | *CO2* | *PO2* | **07** |
| | | c) | Develop an expression for capacitance of three phase overhead line with unsymmetrical spaced line. | *CO2* | *PO2* | **08** |
| | | | **UNIT - III** | | | |
| | 4 | a) | Analyses and develop an expression for ABCD constants of medium transmission line using Nominal-Pi (Π) method. Also draw the phasor diagram. | *CO4* | *PO2* | **10** |
| | | b) | A three phase, 50 Hz overhead transmission line has the following constants: Resistance =28 Ω; Inductive reactance =63 Ω and capacitive susceptance =4x10-4 ℧. If the load at receiving end is 75 MVA at 0.8 p.f. lagging with 132 kV between lines, Evaluate (i). Voltage, (ii). Current, (iii). Power factor at sending end, (iv). regulation and (v). Efficiency of transmission for this load using nominal T-method. | *CO4* | *PO2* | **10** |
| | | | **UNIT - IV** | | | |
| | 5 | a) | Discuss on methods of decreasing Corona effect and Corona benefits and disadvantages | *CO2* | *PO1* | **06** |
| | | b) | Define Grading of cables and Show that the ratio of gradient with & without inter sheath is $\frac{3}{1+a+a^2}$ , when there is only TWO layers. | *CO2* | *PO1* | **08** |
| | | c) | A single core cable has a conductor diameter of 2.5 cm and a sheath of inside diameter 6 cm. Evaluate the maximum stress. It is desire to reduce the maximum stress by two inter sheaths and also evaluate their best position of, man stress & voltage on each system. Voltage is 66 kV three phase. | *CO2* | *PO2* | **06** |
| | | | **UNIT - V** | | | |
| | 6 | a) | Explain with neat diagram for DC distribution systems of according to scheme of connection | *CO3* | *PO1* | **06** |
| | | b) | Derive the expression for A.C distributors with concentrated loads of referring power factor: Power Factors referred to respective load voltages. | *CO3* | *PO1* | **06** |
| | | c) | A DC two-line Distributor 'AB, is fed at both ends at same voltage of 220 V & 225 V respectively. the length of distributor is 225 m and loads tapped off from the end F1 are:<br>Distance in meter \| 50 \| 75 \| 100 \| 125<br>Load in amps \| 20 \| 40 \| 25 \| 35<br>The resistance per kilometer of both distributors is 0.3 ohm. Evaluate: (i).The current in each section and (ii).The voltage at the point of minimum potential. | *CO3* | *PO2* | **08** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | **OR** | | | |
| | 7 | a) | For the same voltage drop between the supply point 'A' and load point 'D' in the network shown below, compare the weights of copper required with & without an interconnector between 'A' & 'D'. Conductor has the cross-sectional in each scheme.   | *CO3* | *PO2* | **08** |
| | | b) | What are the factors considered for site selection of sub-station and also comparison of outdoor sub-station & indoor sub-station? | *CO3* | *PO1* | **06** |
| | | c) | Discuss on methods of neutral earthing and importance of neutral grounding | *CO3* | *PO1* | **06** |

**********