**NAVRACHANA UNIVERSITY**
a UGC recognized University

**School:** School of Engineering and Technology

**Program/s:** Electrical Engineering

**Year:** 3rd    **Semester:** 5th

**Examination:** End Semester Examination

**Examination year:** December - 2021

**Course Code:** EE321    **Course Name:** **Elements of power system**

**Date:** 06/12/2021    **Total Marks:** 40

**Time:** 11:30 am to 01:30 pm    **Total Pages:** 2

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*Instructions:*

➔ *Write each answer on a new page.*
➔ *Use of a calculator is permitted/not permitted.*
➔ *\* COs=Course Outcome mapping. # BTL=Bloom's Taxonomy Level mapping*

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| Que. A | **Attempt any Four.** | Marks | COs* | BTL# |
|---|---|---|---|---|
| **Q.1** | Define substation. Give broad classification of substation. Also give comparison between indoor & outdoor substation. | 5 | CO1, CO2 | BT1, BT2, BT3, |
| **Q.2** | List down equipment of transformer sub-station. Describe function of each equipment along with its symbolical presentation. | 5 | CO1, CO2 | BT1 ,BT2, BT4, BT5 |
| **Q.3** | What is corona? What are the factors which affect corona? Also discuss the advantages and disadvantages of corona. | 5 | CO6, CO7 | BT1 ,BT2, BT3, BT4 |
| **Q.4** | Discuss the methods used to calculate value of earth capacitance & core capacitance in 3-core cable. | 5 | CO6, CO7 | BT1 ,BT2, BT3, BT4 |
| **Q.5** | Give the comparison for volume of conducting material required between D.C. 2-wire system with midpoint earth & 2-phase 2-wire A.C. system with one conductor earthed. Also list out assumption required for this comparision. | 5 | CO3, CO4, CO5 | BT2 ,BT3, BT4, BT5 |

**Que. B**    **Attempt any Four.**

**Q.1**    A 3-phase, 4-wire system supplies power at 440 V and lighting at 200 V.    5
If the lamps are use require 75 A, 80 A & 30 A in each of the three lines,
what should be the current in the neutral wire? If a 3-phase motor is now
started , taking 115 A from the lines at a p.f. of 0.5 lagging, what should
be the total current in each line and the neutral wire?

CO3,    BT1
CO4,    ,BT2,
CO5     BT4,
        BT5

**Q.2**    A two wire D.C. distributor AB is 225 m long. The across section area of    5
each conductor is 0.27 cm². The end A is supplied at 220 V. Resistivity
of the wire is 1.78 μ Ω-cm. The load distribution is given in the table.
Calculate (i) current in each section of the conductor (ii) the two-core
resistance of each section (iii) the voltage tapping point C & D.

CO3,    BT1
CO4,    ,BT2,
CO5     BT4,
        BT5

| At point | Distance from A in meters | Concentrated load in Amp. |
|----------|---------------------------|---------------------------|
| C | 75 | 15 |
| D | 175 | 12 |
| B | 225 | 20 |

**Q.3**    A 800 meters 2-wire D.C. distributor AB fed from both ends is uniformly    5
loaded at the rate of 1.2A/m run. Calculate the voltage at the feeding
points A & B if the minimum potential of 200 V occurs at point C at a
distance 450 m from the end A. Resistance of each conductor is 0.03
Ω/km.

CO3,    BT1
CO4,    ,BT2,
CO5     BT4,
        BT5

**Q.4**    A single core lead sheathed cable has a conductor diameter of 3cm; the    5
diameter of the cable being 9 cm. The cable is graded by using two
dielectrics of relative permittivity 4 & 3 respectively with corresponding
safe working stresses of 33KV/cm & 22 KV/cm. Calculate the radial
thickness of each insulation and safe working voltage of cable.

CO6,    BT1
CO7     ,BT2,
        BT3,
        BT4

**Q.5**    An overhead transmission line conductor having a parabolic configuration    5
weighs 1.925 kg/m length. The c.s.a. of the conductor is 2 cm² and the
ultimate strength is 8050 kg/cm². The supports are 550 m apart having 20
m difference of levels. Calculate the sag from the taller of the two supports
which must be allowed so that the factor of safety shall be 4.

CO3,    BT2
CO4,    ,BT3,
CO5     BT4,
        BT5

***********End of Question Paper***********