	Utech
Name:	(4)
Roll No.:	O American Cy Consider and College
Invigilator's Signature :	

POWER SYSTEM - I

Time Allotted: 3 Hours Full Marks: 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP - A

(Multiple Choice Type Questions)

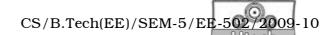
1. Choose the correct alternatives for any *ten* of the following :

 $10 \times 1 = 10$

- i) Corona loss can be reduced by using
 - a) solid conductor of diameter 'd'
 - b) hollow conductor of diameter ' $d + \delta d$ '
 - c) bundle conductor
 - d) both (a) and (b)
 - e) both (b) and (c).

55406 [Turn over

- ii) Tower footing resistance of a transmission tower should be
 - a) as high as possible b) as low as possible
 - c) moderately high d) moderately low.
- iii) By increasing the transmission voltage double of its original value, the same power can be despatched keeping the line loss
 - a) equal to its original value
 - b) half of original value
 - c) double the original value
 - d) one-fourth of original value.
- iv) Characteristics of an overhead line is usually in the range of
 - a) 100 ohms 200 ohms
 - b) 200 ohms 300 ohms
 - c) 400 ohms 500 ohms
 - d) 0 ohm 100 ohms.

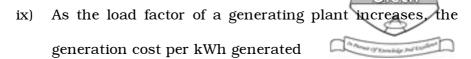


- The dielectric strength of air under normal condition is v) about
 - a)
- $100 \ kV_p$ / cm b) $21 \cdot 1 \ kV_p$ / cm
 - $30 kV_n / cm$ c)
- d) $200 kV_p / cm$.
- A synchronous compensator absorbs inductive reactive vi) power. It is
 - over excited a)
 - b) normally excited
 - c) under excited
 - none of these. d)
- vii) To obtain the maximum value of stress in cables, the ratio (R/r) should be
 - $2 \cdot 13$ a)

b) 2.718

c) 1.96

- d) 1.5
- viii) Poll mounted substations are used in
 - a) primary transmission system
 - b) secondary transmission system
 - primary distribution system c)
 - d) secondary distribution system.



- a) decreases
- b) increases
- c) remains same
- d) none of these.
- x) In a transmission line having negligible resistance, the surge impedance is
 - a) $\sqrt{L+C}$

b) $\sqrt{C/L}$

- c) $\sqrt{\frac{1}{LC}}$
- d) $\sqrt{L/C}$.
- xi) Transposition of transmission line is done to
 - a) reduce line loss
 - b) reduce skin effect
 - c) balance line voltage drop
 - d) reduce corona.

GROUP - B

(Short Answer Type Questions)

Answer any three of the following.

- $3 \times 5 = 15$
- 2. Discuss the effect of wind and ice on sag.
- 3. What is arcing ground? How it can be minimized?
- 4. Explain the method of capacitance grading of an underground cable.
- 5. Describe the following briefly:
 - a) Pin type insulator
 - b) Suspension type insulator
 - c) Post type insulator.
- 6. What is a stringing chart? What is its utility?

GROUP - C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

- 7. a) What is corona? Explain briefly the factors which affect corona.
 - b) Find the disruptive critical and visual corona voltages of a grid line operating at 132 kV. The following data is given:

Conductor dia = 1.9 cm, conductor spacing = 3.81 m, temperature = 44° C, barometric pressure = 73.7 cm, conductor surface factor : fine weather = 0.8, rough weather = 0.66

- 8. a) Write down the general aspects of power distribution system.
 - b) A 2-wire D.C. distributor, 800 metre long, is fed from both ends. It is uniformly loaded at the rate of $1\cdot 1$ A/m run. Calculate the voltage at the feeding points A and B if the minimum potential of 230 V occurs at point C at a distance of 500 metres from the end A. Resistance of the distributor is $0\cdot 1$ Ω/km (go and return)
- 9. What is sag? What factors affects sag? An overhead line erected across a span of 250 metres on level supports. The conductors has a diameter of 1·42 cm and has a dead weight of 1·09 kg/m. The line is subjected to wind pressure of 37·8 kg/square metre of projected area. The radial thickness of ice is 1·25 cm line is carried by insulator string 1·43 km long. Calculate: (i) sag in inclined direction (ii) sag in vertical direction (iii) height of lowest cross arm to give minimum ground clearance of 7·62 m under bad weather condition. Assume one cubic metre of ice weight 913·5 kg and maximum stress of 1050 kg/square cm.

55406 6

10. The daily load of an industrial corner is as follows

100 kW for 9 hours

125 kW for 6 hours

50 kW for 7 hours

5 kW for 2 hours

The tariff rate is Rs. 800 per kW of maximum demand per year plus Rs. 2.50 per kWh. Determine the energy consumption per year (365 days) and yearly bill.

- 11. Write short notes on any three of the following:
 - a) Earthing of substation
 - b) Choice of voltage for transmission line
 - c) Ferranti effect
 - d) Power circle diagram
 - e) Two part tariff.

55406 7 [Turn over