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INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

Higher National Diploma in Engineering

3rd Year, First Semester Examination – 2016

EE 3109 - Electrical Power Distribution

Instructions for Candidates:

Answer (5) five questions

All questions carry equal marks

No. of questions : 06

No. of pages : 04

Time : 3 hrs

- 01. (a).** (i). What are the Main characteristics of distribution systems? (3 Marks)
(ii). Explain above characteristics. (3 Marks)
- (b).** Draw suitable single line diagram of low tension distribution system. (4 Marks)
- (c).** Discussed the Connection Types of Distribution System (3 Marks)
- (d).** (i). What are the two types classified in a.c. distribution systems? (2 Marks)
(ii). Explain the above two types. (5 Marks)

02.

(a). Power generated in power stations and passed through large & complex networks like transformers, overhead lines, cables & other equipments and reaches the end users. It is a fact that the Unit of electric energy generated by Power Station does not match with the units distributed to the consumers.

Some percentage of the units is lost in the Distribution network. This difference in the generated & distributed units is known as Transmission and Distribution loss.

- (i).** What are the main types of Transmission and Distribution Losses ? (2 marks)
(ii). Briefly explain above losses in distribution system . (5 marks)
(Discussed minimum 5 of each types using examples)
- (b).** Draw and name the construction of Underground cable. (5 marks)

(c). A single core cable 5 km long has an insulation resistance of $0.7 \text{ M}\Omega$. The core diameter is 22 mm and the diameter of the cable over the insulation is 55 mm.

(i). Calculate the resistivity of the insulating material. (4 marks)

(d). What are the types of Transformer faults? (4 marks)

03. (a). Describe the principle of operation of:

(i) Isolators

(ii) Air-break switch

(iii) Load break switch

(iv) Auto recloser

(10 marks)

(b). Write Comparison between underground and overhead distribution systems. (5 marks)

(c). What is over voltage? What are the methods of protection of over voltage? (5 marks)

04. (a). Define tariff. (4 marks)

(b). List different types of tariffs, their advantages & disadvantages (6 marks)

(c). An electric supply company having a maximum load of 50 MW generates 18×10^7 units per annum and the supply consumers have an aggregate demand of 75 MW. The annual expenses including capital charges are :

For fuel = Rs 90 lakhs

Fixed charges concerning generation=Rs 28 lakhs

Fixed charges concerning transmission=Rs 32 lakhs

distribution Assuming 90% of the fuel cost is essential to running charges and the loss in transmission and distribution as 15% of kWh generated,

By using a two part tariff find the actual cost of supply to the consumers. (10 marks)

05.

(a).

A two-wire d.c. distributor AB, 600 metres long is loaded as under:

Distance from A (metres)	150	300	350	450
Loads in Amperes	100	200	250	300

The feeding point A is maintained at 400 V and that of B at 450 V. If each conductor has a resistance of 0.01Ω per 100 metres, calculate:

(i) The currents supplied from A to B

(ii) The power dissipated in the distributor.

(10 marks)

(b). A single phase distributor one km long has resistance and reactance per conductor of 0.1Ω and 0.15Ω respectively. At the far end, the voltage $V_B = 200$ V and the current is 100 A at a p.f. of 0.8 lagging. At the mid-point M of the distributor, a current of 100 A is tapped at a p.f. of 0.6 lagging with reference to the voltage V_M at the mid-point.

Calculate :

(i) voltage at mid-point

(ii) sending end voltage V_A

(iii) phase angle between V_A and V_B

(10 Marks)

06.

(a). (i). What is meant by power quality ? (3 Marks)

(ii). Explain four parameters of Power quality (4 Marks)

(b). Electrical installations in industry are complex installation systems connecting demanding electrical devices and equipment. Specially adapted products and solutions ensure modern designing, implementation and maintenance of electrical installations which surmount international and national directives

(i). List and Explain the five technical defects list that you need to check before hand overing the industrial installations (5 Marks)

(ii). Name five safety precautions and the need for five wiring regulations in Electrical installations in industry (5 Marks)

(c). Name five most common internal faults in transformer (3 Marks)