UGANDA INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

END OF SEMESTER II EXAMINATIONS

DEPARTMENT	:	**ICT**
YEAR	:	**TWO**
SEMESTER	:	**TWO**
PROGRAM	:	**DIPLOMA IN ELECTRICAL & ELECTRONICS ENGINEERING**
COURSE	:	**ELECTRICAL POWER TRANSMISSION & DISTRIBUTION**
COURSE CODE	:	**ELT 2201**
DATE	:	**SATURDAY, JULY 6, 2024**
TIME	:	**02:00 PM – 05:00 PM**
DURATION	:	**3 Hours**

INSTRUCTIONS

- The paper consists of two Sections A and B
- Answer **ALL** questions in Section A and **ANY THREE** questions in Section B
- Credit will be given to relevant examples and illustrations
- Don Not Write anything on this question paper

SECTION A:(40 Marks)

1. Transmission efficiency increases as
   A) voltage decreases but power factor increases. B) voltage increases but power factor decreases.
   C) voltage and power factor both decrease. D) voltage and power factor both increase.
2. Strain type insulator are used where the conductor are
   A) dead ended. B) at intermediate anchor towers.
   C) any of the above. D) none of the above.
3. The disadvantage of constant voltage transmission is
   A) Short circuit current of the system is increased. B) Load power factor in heavy loads.
   C) Large conductor area is required for same power transmission. D) all of the above.
4. In overhead transmission lines, the effect of capacitance can be neglected when the length of line is less than
   A) 80 km. B) 100 km C) 160 km D) 200 km.
5. The effective resistance of a conductor will be the same as 'ohmic resistance' when
   A) Current is uniformly distributed in the conductor cross-section. B) Current is in true sine wave from.
   C) Voltage is low. D) Power factor is unity.
6. The voltage of single phase supply to residential consumers is
   A) 110V B) 210V C) 230V D) 400V
7. The distributors for residential areas are.
   A)Single phase. B) Three phase three C)Three phase four wire. D) None of the above.
8. When a conductor carries more current on the surface as compared to the core, its due to
   A) Corona. B) Skin effect. C) Unsymmetrical fault. D) All of the above.
9. The following system is not generally used electrical power transmission and distribution.
   A) 1-Phase 3 wire B)1-Phase 4 wire C)3-Phase 3 wire D)3-Phase 4 wire
10. For transmission of power over a distance of 200km,the transmission voltage should be
    A) 11kV B)66kV C)33kV D)132kV
11. Expanded ACSR conductors are used
    A)to increase the tensile strength of the line B) to reduce corona loss C) to reduce I^2R loss
    D) to reduce the voltage drop
12. As the temperature increases, the temperature of coefficient of resistance
    A) increases B) decreases C) does not change D) doubles
13. The skin effect does not depend on
    A) nature of material B)size of wire C) supply frequency D) ambient temperature
14. The following are regarded as line parameters
    A) shunt reactance and conductance . D) series reactance and resistance. C) A or B. D) A and B
15. A conductor carries more current on the surface as compared to its core, this phenomenon is known as
    A)permeability B) corona C) skin effect D) unsymmetrical faults
16. The failure of insulators is due to
    A) flash over B)puncture C)either A or B D)none of these
17. The most commonly used material for insulators of overhead lines is ……
    A) porcelain B)glass C) mica D) PVC
18. When an insulator breaks down because of a puncture, it is…….damaged.
    A)partially B)permanently C)temporarily D)none of these

19. The insulator provides necessary…….between line conductors and prevents any leakage current from conductors to earth.
A) insulation B) conduction C) dielectric D)semiconductor
20. Types of insulators are……
A)pin and suspension B) strain C)shackle and stay D)all of these
21. Low-tension cables are generally used up to
A)0.2 kV B) 0.5 kV C) 0.7 kV D) 1 kV
22. Underground cables are laid at sufficient depth
A)to minimize temperature stresses B)to avoid being unearthed easily due to removal of soil
C)to minimize the effect of shocks and vibrations due to passing vehicles. D)all of the above
23. In cables, sheaths are used to
A)prevent the moisture from entering the cable B) provide enough strength
C)provide proper insulation D)to enter the moisture into the cable
24. High-tension cables are generally used up to
(A)11 kV (B)33 kV (C)66 kV (D)132 kV
25. Which of the following insulation is used in cables?
(A)Varnished cambric (B) rubber (C) paper (D)any of the above
26. The most commonly used insulation in high voltage cables is …….
(A)impregnated paper (B)rubber (C)VIR (D)cloth
27. If a cable is to be designed for use on 1000 kV, the insulation preferred is
(A)poly vinyl chloride (B)vulcanized (C)impregnated paper (D)compressed SF_6 gas
28. Which of the following regulation is considered best?
A)50% B)20% C) 10% D)2%
29. Overhead lines generally use
A)Copper conductors B)All Aluminum Conductors C) ACSR Conductors D)None of these
30. By which of the following system electric power may be transmitted?
A)Overhead System B)Underground System C)A and B D)None of the above
31. In which of the following supply system, is skin effect ignored
A) AC B)DC C)both D)none
32. AC resistance of a conductor is more than DC resistance due to
A) proximity effect B)skin effect C) corona effect D)sagging effect
33. Crowding of current towards the surface of conductor is known as
A)skin effect B)proximity effect C) spirality effect D)Ferranti effect
34. Which one of the following statements is not true?
A. The GMD method of finding inductance does not apply to ACSR conductors.
B. Current density in ACSR conductors is uniform.
C. The GMD between two circular areas, each of different diameters, is equal to the distance between their centres.
D. None of these.
35. ACSR conductors have
A) all conductors made of aluminium. B) outer conductors made of aluminium.
C) inner conductors made of aluminium. D) no conductors made of aluminium.
36. The inductance of a power transmission line increases with
A) decrease in line length C)increase in diameter of conductor
B) increased spacing between conductor D)increase in load current carried by the conductors

37. Stranded conductors are easier to

A) handle B) transport C)handle and transport D)none of these

38. ACSR conductor consists of a central core of

A)copper B)steel C)stainless steel D)cadmium

39. Inductance is equal to

A)Flux/current B)Flux linkages/current C) EMF/flux D)EMF/current

40. Which of the following is not a standard transmission voltage

A)400 kV B) 11 kV C)190 kV D)750 kV

Section B:

Question One:

(a) Define a grid system as applied to electricity supply. (2marks)

(b) Draw a typical diagram of the grid supply system from the generating plant to the consumer. (8marks)

(c) Give the advantages and disadvantages of ac transmission system. (10 marks)

Question Two:

a) Explain the following terms as applied to transmission lines.

(i) Ferranti effect (3Marks)

(ii) Skin effect (3Marks)

(iii) Corona (3Marks)

b) Mention Five factors that affect corona. (5 Marks)

c) Discuss any three ways of minimizing Corona on Transmission lines? (6 Marks)

Question Three:

a) Name four parameters that govern transmission line. (4 Marks)

b) Give any two advantages and disadvantages of overhead transmission over underground transmission; (4 Marks)

c) Mention four types of commonly used insulators in transmission lines (4 Marks)

d) Give five importances of insulators and state clearly any three desirable properties that insulators must poses. (8 Marks)

Question Four:

a) Discuss the following elements of a transmission line.

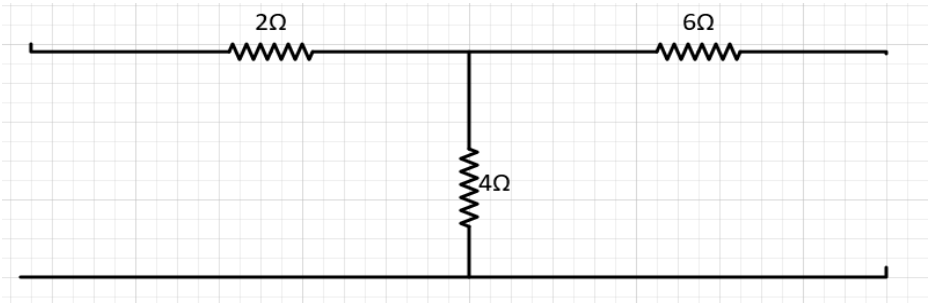
i. Conductors. (3 Marks)

ii. Protective devices. (3 Marks)

iii. Voltage regulators. (2 Marks)

b) Differentiate between Transmission lines and Distribution lines. (6 Marks)

c) Find the ABCD Parameters for the following two port network (6Marks)



Question Five:

Consider a three-phase, **400-kV,** 50-Hz transmission line that has a series inductive reactance of 0.30 Ω/km and a shunt admittance of 3.75 x10^{-6} S/km. If the line is 300 km long, determine the following.

i. Surge impedance Zc. (6 Marks)
ii. Propagation constant, γ (2 Marks)
iii. ABCD constants. (8 Marks)
iv. Wavelength. (2 Marks)
v. SIL. (2 Marks)

END