



FNU FIJI NATIONAL UNIVERSITY

COLLEGE: COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY (CEST)

SCHOOL: SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING

PROGRAMME: TRADE DIPLOMA IN ELECTRICAL ENGINEERING (STAGE 5)

UNIT CODE: EEE573

TITLE: ELECTRICAL POWER TRANSMISSION AND DISTRIBUTION

FINAL EXAMINATION – TRIMESTER 2, 2016

ROOM: AS PER TIMETABLE

TIME: 3 HOURS 10 MINUTES

INSTRUCTIONS TO STUDENTS

1. You are allowed **10 minutes** extra reading time during which you are **NOT** to write.
2. Begin each **SECTION** on a fresh page and use both sides of the sheet.
3. Write your candidate number at the top of each attached sheet.
4. Insert all written foolscaps, graph paper, drawing paper, etc. in their correct sequence and secure with a string.
5. For all sheets of paper on which rough/draft work has been done, cross it through and **ATTACH** these to your answer scripts.
6. Write clearly the number(s) of the question(s) attempted on the top of each sheet.
7. Use of programmable calculator(s) is prohibited.
8. **ANSWER ALL QUESTIONS**
9. Show all working where necessary.
10. **ALWAYS CHECK YOUR WORK BEFORE YOU LEAVE THE EXAM ROOM.**

Section A

[20 Marks]

Multiple Choice

1. By which of the following systems electric power may be transmitted?
 - a) Overhead system
 - b) Underground system
 - c) Both (a) and (b)
 - d) None of the above
2. are the conductors, which connect the consumer's terminals to the distribution.
 - a) Distributors
 - b) Service mains
 - c) Feeders
 - d) None of the above
3. Which of the following materials is not used for transmission and distribution of electrical power?
 - a) Copper
 - b) Aluminium
 - c) Steel
 - d) Tungsten
4. The corona is considerably affected by which of the following?
 - a) Size of the conductor
 - b) Shape of the conductor
 - c) Surface condition of the conductor
 - d) All of the above
5. Which of the following are the constants of the transmission lines?
 - a) Resistance
 - b) Inductance
 - c) Capacitance
 - d) All of the above
6. The distributors for residential areas are
 - a) Single phase
 - b) Three phase three wire
 - c) Three phase four wire
 - d) None of the above

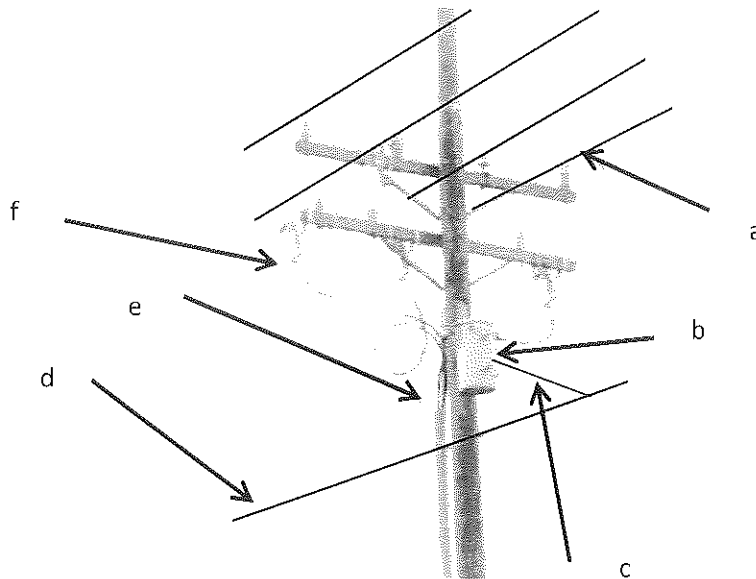
7. Overhead lines generally use
 - a) Copper conductors
 - b) All aluminium conductors
 - c) A.C.S.R conductors
 - d) None of these
8. The minimum clearance between high voltage line and low voltage line is
 - a) 2.2 meters
 - b) 2.1 meters
 - c) 1.1 meters
 - d) 1.0 meter
9. A feeder, in a transmission system, feeds power to
 - a) Distributors
 - b) Generating stations
 - c) Service mains
 - d) All of the above
10. Which of the following distribution systems is more reliable?
 - a) Radial system
 - b) Tree system
 - c) Ring main system
 - d) All are equally reliable
11. A conductor, due to sag between two supports, takes the form of
 - a) Semi-circle
 - b) Triangle
 - c) Ellipse
 - d) Catenary
12. A circuit is disconnected by isolators when
 - a) Line is energized
 - b) There is no current in the line
 - c) Line is on full load
 - d) Circuit breaker is open
13. When a live conductor of public electric supply breaks down and touches the earth which of the following will happen?
 - a) Current will flow to earth
 - b) Supply voltage will drop
 - c) Supply voltage will increase
 - d) No current will flow in the conductor

14. Series capacitors on transmission lines are of little use when the load VAR requirement is
- Large
 - Small
 - Fluctuating
 - Any of the above
15. Electro-mechanical voltage regulators are generally used in
- Reactors
 - Generators
 - Transformers
 - All of the above
16. For transmission of power over a distance of 200 km, the transmission voltage should be
- 132 kV
 - 66 kV
 - 33 kV
 - 11 kV
17. There is a great possibility of occurrence of corona during
- Dry weather
 - Winter
 - Summer heat
 - Humid weather
18. The power factor of industrial loads is generally
- Unity
 - Lagging
 - Leading
 - Zero
19. The loads on distribution systems are generally unbalanced.
- Balanced
 - Unbalanced
 - Both (a) and (b)
 - None of the above
20. High voltage transmission lines use
- Suspension insulators
 - Pin insulators
 - Both (a) and (b)
 - None of the above

Section B

[80 Marks]

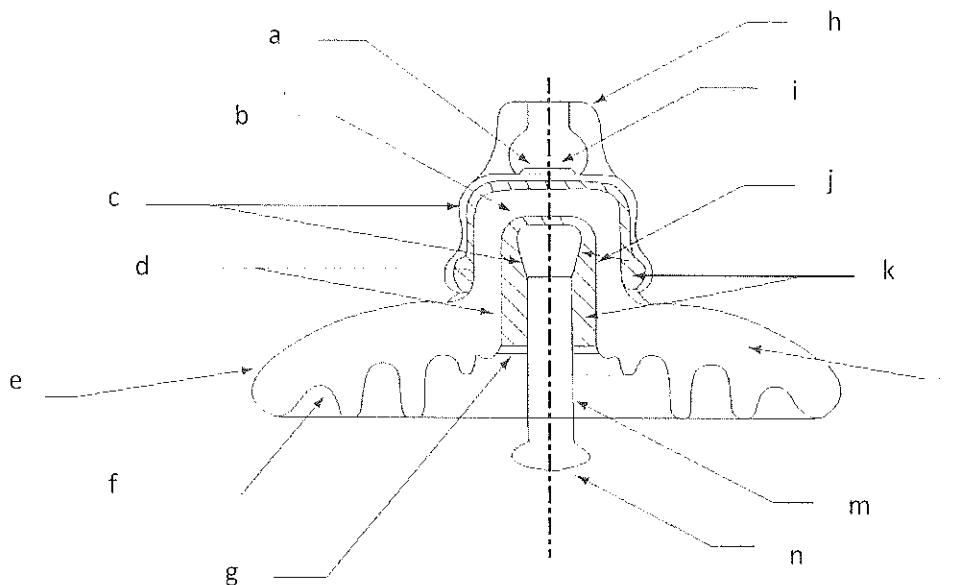
1. Draw the distribution line arrangement of a pole top, two arms and a single arm. (3 marks)
2. Figure below shows the transmission and distribution line arrangement. Give your answers on what the arrow is pointing.



(7 marks)

3. List down the transmission structure types in use for transmitting power from one station to another. (4 marks)
4. What are some of the factors affecting the structure type selection in overhead transmission line? (4 marks)
5. The insulation of an electric system is divided into two broad categories. What are they and explain the importance of each. (4 marks)
6. What factors leads to cause electrical stresses on insulation and elaborate on them. (8 marks)
7. List down four environmental stresses which affects both mechanical and electrical performance of the line. (4 marks)

8. Figure below shows the cross-section of a standard ball-and-socket insulator. Write down on what the arrow is pointing. (7 marks)

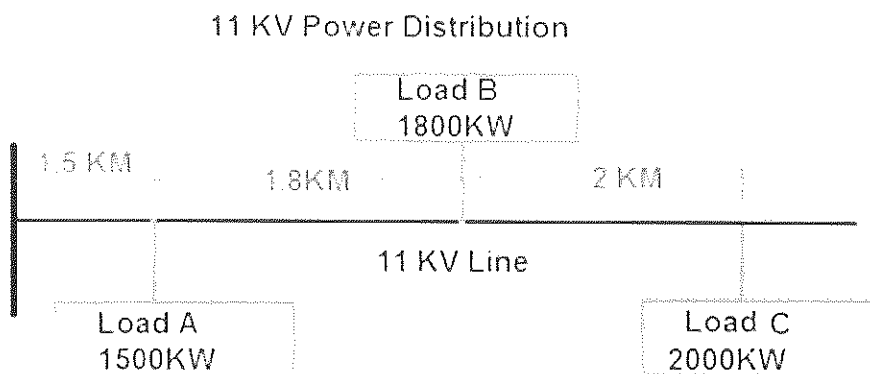


9. What are the seven methods of improving insulator performance on transmission lines? (7 marks)
10. There are two types of underground systems. What are they and draw their diagrams to support your answers. (8 marks)
11. Draw the equivalent circuit of a short-length transmission line. (4 marks)
12. The primary winding of a delta-star connected 50VA transformer is supplied with a 100 volt, 50Hz three-phase supply. If the transformer has 500 turns on the primary and 100 turns on the secondary winding, calculate the secondary side voltages and currents. (8 marks)

13. Calculate Voltage drop and % Voltage Regulation at Trail end of following 11 KV Distribution system:

- System have ACSR DOG Conductor (AI 6/4.72, GI7/1.57)
- Current Capacity of ACSR Conductor = 205Amp,
- Resistance = 0.2792Ω and Reactance = 0Ω ,

Permissible limit of % Voltage Regulation at Trail end is 5%.



(10 marks)

THE END