TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

Department of Electrical and Electronic engineering

UNIVERSITY EXAMINATION:

Diploma in Electrical Power Engineering

Electrical Power systems II

EEP 2302

END OF SEMESTER EXAMINATION

SERIES: SEPT.

TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **five** Questions;. Attempt any THREE Questions.

Do not write on the question paper.

Question ONE

(a) Explain the following with reference to underground cables:

(i) Void formation
(ii) Effect of voids
(iii) How void formation can be prevented

(11marks)

(b) With the aid of a labeled diagram for a single core cable derive the expression for:

(i) Capacitance
(ii) Maximum and minimum dielectric stress

(9 marks)

Question TWO

(a) With reference to power systems explain:

(i) Stability
(ii) Steady state stability
(iii) Dynamic stability
(iv) Transient stability
(v) Hunting

(10 marks)

(b) Explain the following electrical power transmission terms:

(i) Feranti effect
(ii) Regulation
(iii) Transmission efficiency

(10 mark)

Question THREE

(a) State FOU R factors that affect the temperature rise of a cable. (4 marks)

(b) (I) Explain the meaning of graded insulation.
(ii) State the practical difficulties experienced when using grade insulation.

(4 marks)

(c) The cross-section of an 11KV single core lead sheathed cable with graded insulation is as in Figure 1 below. The relative permitivities of dielectrics E_{r1} are 4.8 and 3.2 respectively. Determine the minimum and maximum values of:

(i) Dielectric stress for each dielectric

(ii) Dielectric stress for cable having the same dimensions and homogeneous insulation

(12 marks)

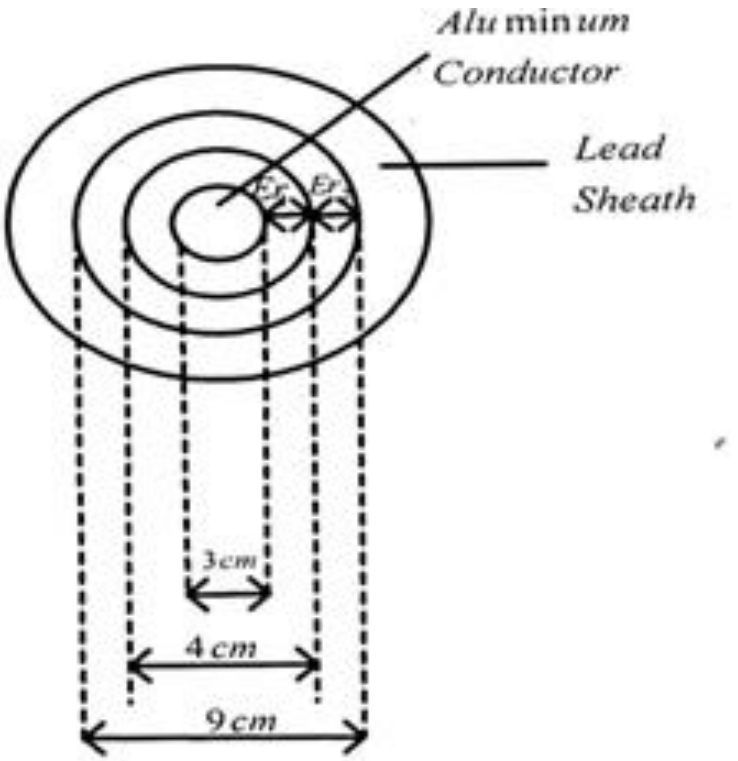


Fig. 1

Question FOUR

(a) Explain why the neutral point of a power system is earthed. (4 marks)

(b) Explain the relative merits of the following:

(i*) Solid earthing*
(ii) Resistance earthing
(iii) Reactance earthing

(6 marks)

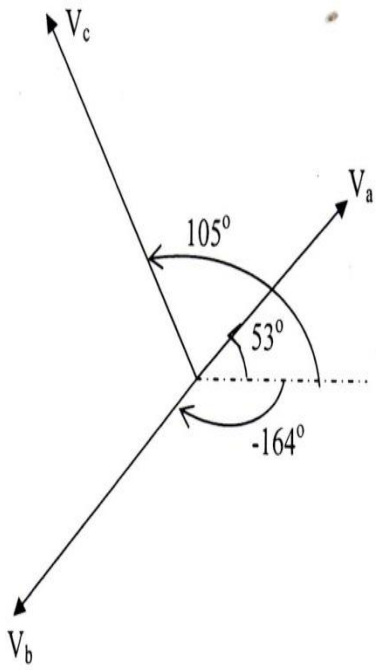
(e) With the aid of a diagram explain the method of earthing through a voltage transformer and state its advantages and application. (10 marks)

Question FIVE

(a) State the theory of symmetrical components in an unbalanced system. (6 marks),

(b) For Figure2:

If $V_a = 5\angle 53°$, $V_b = 7\angle -164$, $V_c = 7\angle 105°$ Determine the symmetrical components



14 marks