



**THE OPEN UNIVERSITY OF SRI LANKA  
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING  
DIPLOMA IN TECHNOLOGY**

**ECX3234/ECD1212/ECE3212 –Electrical Technology  
Final Examination 2005/2006**

*Date: 23 March*

*Time: 0930 -1230*

*This paper consists of two parts: Part A and Part B.*

*Part A contains three questions and Part B contains four questions.*

*Answer any two (2) questions from Part A and any three (3) questions from part B.*

**PART A.**

- Q1.** (i). How you can divide resistors into three different categories? Write down the resistor values for each category.  
 (ii). Draw the resistor measuring equipment “Megger” and explain the function of its components.  
 (iii). Why in Ohmmeters scale starts from “infinite ( $\infty$ )” and end at zero (0) Ohms, whereas the scale of other electrical measuring equipment start from zero and end at the maximum range?
- Q2.** (i). Describe the term of an insulator.  
 (ii). Generally what are the materials used for electrical insulators.  
 (iii). Why porcelain is the most commonly used materials for electrical insulators.
- Q3.** (i). What is a transistor? With help of suitable sketches explain the operation of a “NPN” and “PNP” transistors.  
 (ii). Draw the common base NPN transistor and with help of suitable current characteristics of it explain the term “current gain”.  
 (iii). Draw the circuit diagram of a full wave rectifier using PN junction diode. Explain the term “ripple” with respect to rectifier circuit. Explain how to minimise the ripple.

**PART B**

- Q4.** (i). Paralleling of two or more three-phase transformers is very common in power distribution places. What are the requirements that should be satisfied in order to connect three phase transformers in parallel?  
 (ii). Explain the meaning of term 21-Yy-6 with respect to three-phase transformer.  
 (iii). A three phase 230 V, 27 kVA, 0.9 power factor load is fed by a three phase 2300 V/230 V transformer. The transformer is supplied from a three phase source through a three phase feeder whose impedance is  $0.8+j 5 \Omega$  per phase.

The equivalent per phase impedance of transformer referred to the low voltage is  $0.12+j0.25 \Omega$ . Determine the required supply voltage if the load voltage is 230 V.

- Q5.** A balanced star connected three phase load of  $300+j100 \Omega$  is supplied by a three phase 40 km long 11 kV distribution line with an impedance of  $0.6+j0.7 \Omega$  per km per phase. Line voltage at load is maintained at 11 kV.
- Find the sending end voltage.
  - What is the phase displacement between sending end and receiving end voltages.
  - Calculate the transmission efficiency and voltage regulation.
- Q6.** (i). Briefly explain different types of three phase squirrel cage induction motors.  
(ii). How do you categorise these motors with starting torque and starting current?  
(iii). How do you can change the direction of rotation of three phase induction motor.  
(iv). What are the starting methods of an induction motor?
- Q7.** (i). What is the different between instrument transformer an power transformer?  
(ii). What are the advantages and disadvantages of an autotransformer when compare with transformer.  
(iii). The primary and secondary voltages of an auto transformer are 500V and 400V respectively. Show with aid of a suitable diagram the current distribution in windings when the secondary current is 100 A . Calculate the copper saving in this case.