



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

Faculty of Engineering and Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

CERTIFICATE IN COMPUTER MAINTENANCE & INFORMATION COMMUNICATION
TECHNOLOGY-CMNT 2K11M

APS 1103: FUNDAMENTALS OF PHYSICS

END OF SEMESTER EXAMINATIONS

SERIES: AUGUST/SEPTEMBER 2011

TIME: 2 HOURS

Instructions to Candidates:

This paper consist of **TWO** sections **A** and **B**

Answer question **ONE (COMPULSORY)** and any other **TWO** questions from the list of questions below

This paper consists of **THREE** printed pages

SECTION A COMPULSORY (30 MARKS)

Question 1

- a) Explain the OHMS law using graphical illustrations (4 marks)
- b) Three resistors of $20\text{K}\ \Omega$, $10\text{K}\ \Omega$ and $80\text{K}\ \Omega$ are connected in parallel. They are then connected in series to $50\text{K}\ \Omega$ and $70\text{K}\ \Omega$ resistors. The network is then supplied with 24V d.c. Calculate:
- (i) Total resistance in the circuit
 - (ii) Voltage drop in the parallel circuit
 - (iii) Total current in the circuit
 - (iv) Current through $20\text{K}\ \Omega$, $10\text{K}\ \Omega$ and $80\text{K}\ \Omega$ resistors
 - (v) Total power in the circuit (9 marks)
- c) Determine the colour codes for the following resistors
- (i) $1.9\text{M}\ \Omega \pm 20\%$
 - (ii) $330\text{K}\ \Omega \pm 10\%$
 - (iii) $470\ \Omega \pm 5\%$
 - (iv) $4.7\text{M}\ \Omega \pm 2\%$ (8 marks)
- d) With the aid of a circuit diagram, explain the operation of a full wave bridge rectifier (9 marks)

SECTION B (ANSWER ANY TWO QUESTIONS)

*This section consists of **FOUR** questions 20 marks each.
Choose any two questions*

Question 2 (20 marks)

- a) Calculate the maximum and the minimum values of the following resistors given the colour codes. (All answers in $\text{K}\ \Omega$) (10 marks)
- (i) Violet, green, yellow
 - (ii) Blue, black, purple, silver
 - (iii) Green, red, yellow, gold
- b) Differentiate between step-up and step-down transformers (4 marks)
- c) Briefly explain the following (6 marks)
- (i) Intrinsic semiconductor
 - (ii) Extrinsic semiconductor
 - (iii) Doping

Question 3 (20 marks)

- a) Define the following terms:
- (i) Capacitance
 - (ii) Time constant
 - (iii) Transmission ratio
 - (iv) Self inductance
 - (v) Mutual inductance
- (10 marks)
- b) With the aid of circuit diagrams, explain the following with regard to diodes
- (i) Forward biasing
 - (ii) Reverse biasing
- (6 marks)
- c) Differentiate between rectification and voltage regulation
- (4 marks)

Question 4 (20 marks)

- a) Three capacitors of $300\ \mu\text{F}$, $200\ \mu\text{F}$ and $400\ \mu\text{F}$ are connected in series and then connected to $3600\ \mu\text{F}$ capacitor in parallel. The network is then supplied with 12V D.C.
- (i) Draw the circuit diagram
 - (ii) Calculate the capacitance in the circuit
 - (iii) Charge across the $3600\ \mu\text{F}$ capacitor
 - (iv) Energy in the circuit
- (10 marks)
- b) Describe TWO applications of P-N junction diodes
- (4 marks)
- c) Explain the kirchoffs law on:
- (i) Current
 - (ii) Voltage
- (6 marks)

Question 5 (20 marks)

- a) Using circuit diagram, show the following transistors configurations
- (i) Common base
 - (ii) Common collector
 - (iii) Common emitter
- (9 marks)
- b) Explain the following
- (i) Resistance
 - (ii) Reactance
 - (iii) Impedance
- (6 marks)
- c) With the aid of diagrams, differentiate between N-P-N and P-N-P transistors
- (5 marks)