THE UNITED REPUBLIC OF CANZANIA. NATIONAL EXAMINATIONS COUNCIL. CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

082 FEEC PRICAL ENGINEERING SCIENCE
(For Both School and Private Candidate)

TIME: 3 Hours

Wednesday 8 October, 2008 p. id.

Instructions

This offper consists of sections A, B and F)

Answer all questions in sections A and Board three (Higgs dons from section Cara

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Plectronic calculators are not allowed in the examination from.

Write your Examination Number on overy page of your answer booklows).

This paper consists of 5 printed pages.

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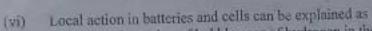
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SECTION A (10 marks)

Answer all questions in this section.

- From each of the items (i) (x) choose the correct answer among given alternatives and write its letter beside the item number.
 - (i) Neutron is a particle of an atom with
 - A negative charge
 - B positive charge
 - C no charge
 - D negative and positive charges
 - E positive ion.
 - (ii) Which one of the following is a correct conversion?
 - A $15 \mu\Omega = 150 \text{ m}\Omega$
 - B 3.2 mA = 0.0032 A
 - C 40 kW = 400 W
 - D 250 mV = 25 V
 - E $15 k\Omega = 150 \Omega$
 - (iii) The lowest resistance in an electric circuit is obtained when the resistors are connected in
 - A series-parallel circuit
 - B series
 - C compound
 - D parallel
 - E parallel series to the load.
 - (iv) The measuring instrument that is used to measure both a.c. and d.c. electrical quantities is the
 - A moving iron type
 - B moving coil type
 - C galvanometer type
 - D metal rectifier type
 - E dynamometer type.
 - (v) Which of the following is the correct formula applied in the calculation of turn ratio of a transformer?
 - $A = \frac{N_2}{N} = \frac{V_1}{V}$
- В
- $\frac{V_2}{V_1} = \frac{I_2}{I_1}$
- $C = \frac{N_i}{N} = \frac{1}{i}$

- $D = \frac{V_1}{V_2} = \frac{I_1}{I_2}$
- E
- $\frac{N_1}{N_2} = \frac{I_2}{I_1}$



- the formation of bubbles gas of hydrogen in the carbon electrode (electrode)
- the situation whereby electrolyte attacks the carbon electrode B
- the process of sal-ammonia solution attacking the glass container C
- the process of electrolyte attacking the impurities in the zinc D (-ve electrode)
- charging of zinc plate using carbon plate. E

What will happen to a carbon material when it is exposed to high temperature?

- Its resistance will decrease
- Its resistance will increase B
- Its resistance will remain constant C
- It will soften D
- It will harden E

Which of the following will affect the capacitance of a capacitor?

- Permeativity, number of turns and maximum flux
- Area, number of parallel plates, insulation material and distance B between the plates
- Cross-sectional area, resistivity, length and temperature
- Permeability, length and cross-sectional area D
- Resistivity, dielectric material, number of plates and cross-E sectional area

The effective value in an a.c. circuit is called (ix)

- peak value
- average value B
- minimum value C
- form factor value D
- root mean square value.

Which of the following motors is not recommended to be started without a (x) load?

- A
- Accumulative compound B
- Differential compound C
- Series D
- Squirrel cage E

SECTION B (30 marks) Answer all questions in this section.

- 2. Why is series wound motor known as a universal motor?
- Give three (3) advantages of three phase system over a single phase system.
- 4. An area 10 m × 2.5 m is to be illuminated to a level of 150 lux. How many lumen must reach the area?
- Explain the meaning of the word AMPACITY as applied in conductors and cables.
- A power transformer has 415 V at no load and 405 V at full load. Calculate the voltage regulation.
- Give two (2) differences between moving coil instrument and moving iron instrument.
- A force on a conductor carrying current of 25 A is 12 N and lies at right angle to a
 magnetic field density of 1.6 T. Calculate the length of a conductor.
- Give three (3) practical applications of chemical effect of electric current.
- Deduce the behaviour of current in series and parallel connected loads.
- Find the internal resistance of a cell having an e.m.f. of 1.8 V, potential difference of 1.2 V and circuit current of 0.6 A.

SECTION C (60 marks) Answer three (3) questions from this section.

- Three coils are connected in delta to a 3-phase 3-wire 415 V, 50 Hz supply.
 They take line current of 5 A at 0.8 power factor lagging.
 Calculate the
 - (a) resistance of a coils
 - (b) inductance of a coils
- 13. (a) What is the difference between motor and generator?
 - (b) A d.c. shunt generator has an induced c.m.f. of 300 V when the armature current is 80 A and terminal voltage is 274 V. Assuming a brush voltage frop of 2 V, calculate the
 - (i) annature resistance
 - (ii) terminal voltage for armature current of 60 A.

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