



ZIMBABWE

**MINISTRY OF HIGHER AND TERTIARY EDUCATION,
INNOVATION, SCIENCE AND TECHNOLOGY
DEVELOPMENT**

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL CERTIFICATE

IN

ELECTRICAL POWER ENGINEERING

**MODULE: Power Generation Transmission
Distribution and Utilisation**

PAPER NO: 321/22/M02

DURATION: 3 Hours

NOVEMBER / DECEMBER 2025 EXAMINATION

REQUIREMENTS

1. Answer booklet.
2. Non – programmable calculator.

INSTRUCTIONS TO CANDIDATE

1. Answer all ten (10) questions.
2. Each question carries ten (10) marks.

PAPER NO: 321/22/M02 – POWER GENERATION, TRANSMISSION
DISTRIBUTION AND UTILISATION

QUESTION 1

- a) Explain what makes up Grid system. (2 marks)
- b) Give benefits realised by Grid system in Zimbabwe. (6 marks)
- c) Name any two (2) power stations found in Zimbabwe. (2 marks)

QUESTION 2

Draw a line diagram to show the how electrical energy is generated, transmitted and distributed and clearly label it. (10 marks)

QUESTION 3

- a) Explain four (4) factors which affect the location of a substation in Zimbabwe. (4 marks)
- b) State two (2) advantages and one disadvantage of indoor and outdoor substations. (6 marks)

QUESTION 4

- a) Give reasons for dividing the whole installation into individual circuits with their own means of protection and switch gear. (4 marks)
- b) Name four (4) applicable HV switch gear arc quenching mediums. (4 marks)
- c) What does MCB stands for? (2 marks)

QUESTION 5

- a) Define the following terms:
 - i) Tarriff (2 marks)
 - ii) Maximum demand (2 marks)
 - iii) Power factor (2 marks)
- b) State any two methods used for power factor correction. (4 marks)

PAPER NO: 321/22/M02 – POWER GENERATION, TRANSMISSION
DISTRIBUTION AND UTILISATION

QUESTION 6

- a) State the five (5) classification of tariff according to consumers. (5 marks)
- b) A consumer consumes 350 000 units per annum with an MD of 800KVA at a power factor of 0,8.
- Calculate:
- i) The load factor.
- ii) Bill under a two part tarriff of \$5-00 per kW of MD plus 20 cents per unit consumed.
- iii) The saving if load factor is improved to 0,9. (5 marks)

QUESTION 7

- a) Explain what the letters T, N and C in TN-C stands for in earthing. (6 marks)
- b) Sketch a typical diagram showing the IT system. (4 marks)

QUESTION 8

A room $10\text{m} \times 50\text{m} \times 3\text{m}$ is to be illuminated to 200 lux on the working plane.

Calculate the number of 2700lm

LED lamps to be installed of

$C_n = 0,6$ $M_f = 0,8$

Make a scale drawing of the plan showing the distribution of the lamps.

(10 marks)

PAPER NO: 321/22/M02 – POWER GENERATION, TRANSMISSION
DISTRIBUTION AND UTILISATION

QUESTION 9

- a) Name two (2) types of emergency lighting systems. (2 marks)
- b) Write the full name of UPS. (1 mark)
- c) Give three (3) application of a static inverter special installation UPS. (3 marks)
- d) Draw a well labelled diagram to illustrate how a buried metal pipe is protected from corrosion using cathodic protection. (4 marks)

QUESTION 10

- a) State three (3) types of PV systems that are applicable in typical Zimbabwe. (3 marks)
- b) State three (3) types of batteries that are used for named PV systems. (3 marks)
- c) Draw a block diagram to show major components of a PV system and how it is connected. (4 marks)

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