



Complete, fold and seal
(see note 2 below)

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Examination Answer Books

12 Pages

Instructions to Candidates

1. Please give the information requested in the boxes below.
2. Enter your name in the space provided to the right, fold over and seal down (using the label provided) to hide your name.
3. The answers must be legibly written. The Examiners can either ignore illegible script or have it typed and the expense of typing charged to the candidate.
4. Write your answers in ink.
5. Begin each answer on a fresh page. Do all rough work in the answer book and cross it through.
6. No part of this book is to be torn out; it must be handed in complete.
7. If more books than one are used, fasten them together using the tags available from the invigilator(s).
8. Every book must be handed in. In no circumstances may answer books, used or unused, be taken out of the examination venue.

1	Student Number	CAS18839616
2	Title of Examination Paper	Design of electrical installations
3	Module Code	GDEE 4001 (M4x00920)
4	Date and Time of Examination	12/01/2022
5	Examination Venue	Gower college
6	Seat Number	11

7	Number of Answer Books handed in	1
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List the numbers of the questions you have attempted	Office Use
1	0
2	9
3	10
4	3
5	5
6	4
Total	31/10

=52% ✓ KF

Q1

A

8m

$$9 \times 1.5 \text{ mm} = 13.5$$

$$6 \times 2.5 \text{ mm} = 15$$

$$9 \times 6 \text{ mm} = 54$$

$$3 \times 10 \text{ mm} = 30$$

$$150 \times 38 \text{ mm}$$

$$2999$$

$$112$$

Q1

B

$$150 \times 38$$

/

$$10 \text{ mm}^2$$

15 cables

$$\frac{150}{10} = 15$$

✓ 0/5

Q2

A

$$\sqrt{(a^2 + b^2 + c^2) - (a \times b) - (a \times c) - (b \times c)}$$

$$\sqrt{(120^2 + 230^2 + 90^2) - (120 \times 230) - (120 \times 90) - (230 \times 90)}$$

$$\sqrt{|14400 + 52900 + 8100| - |27600| - |10800| - |20700|}$$

$$\sqrt{75400 - 27600 - 10800 - 20700}$$

$$\sqrt{16300}$$

$$= 127.7 \checkmark$$

(6)

Q2
B

The calculation wouldn't be accurate
the neutral current would change.

(2)

Q2
C

Only allow one phase to supply room
~~even if~~ correct load balance.

(1)

✓ 9/10

Q3

A

$$\frac{E \times a}{F \times u_f \times m_f}$$

$$E = 370$$

$$F = 16000$$

$$u_f = 0.8$$

$$m_f = 0.7$$

$$a = 16 \times 45$$

$$= \frac{370 \times 16 \times 45}{16000 \times 0.8 \times 0.7}$$

$$= \frac{266400}{8960}$$

$$= 29.73$$

$$= 30 \text{ Lamps}$$

(3)

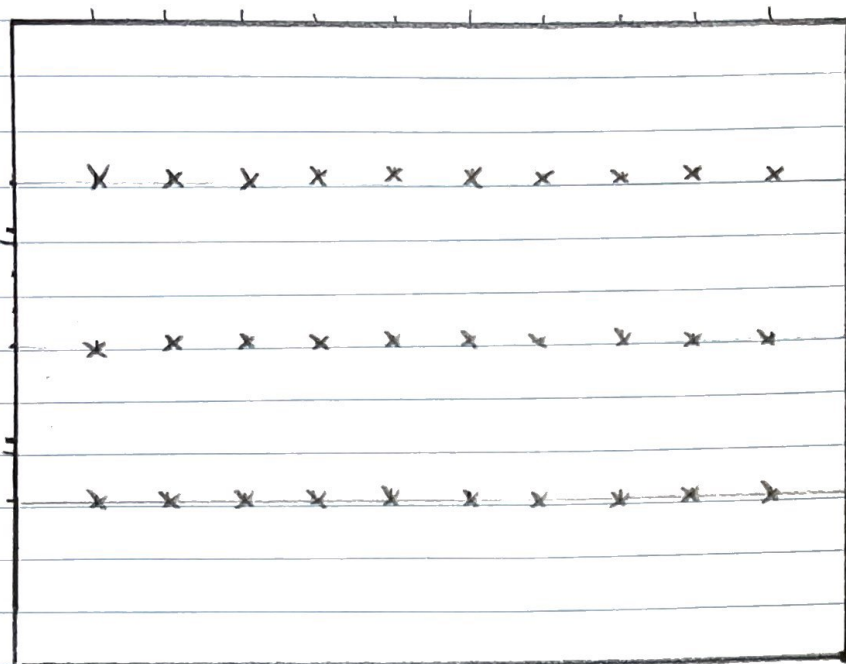
Q3

B

$$\frac{I}{d^2} = \frac{8000}{8^2} = 125 \text{ lux}$$

(3)

Q3
C



(2)

✓ 10/10

Q4) CPC size

$$S = \frac{\sqrt{I^2 t}}{K}$$

$$\frac{\sqrt{400^2 \times 0.1}}{115}$$

$$= \frac{\sqrt{160000 \times 0.1}}{115}$$

$$\frac{\sqrt{16000}}{115} = 1.1 \text{ mm} \checkmark$$

$$Z_s = Z_e + \frac{R_1 + R_2 \times L \times 1.2}{1000}$$

$$Z_s = 0.58 + \frac{36.2 \times 32 \times 1.2}{1000}$$

$$Z_s = 0.58 + \frac{1390.08}{1000}$$

Q4 $Z_s = 0.58 + 1.39$

$Z_s = 1.97$

3/15

Q5) $I_p = \frac{V}{Z_s}$ $I_p = \frac{V}{Z_e + (R_1 + R_2)}$
A

$\frac{(R_1 + R_2) \times \text{multiplier} \times \text{length}}{1000}$

length = 75

multiplier = 1.2

$(R_1 + R_2) = 6.16$

$Z_e = 0.35$

$V = 230V$

$I_p = \frac{230}{0.35 + (R_1 + R_2)}$

$\frac{6.16 \times 1.2 \times 75}{1000} = 0.5544$

$\frac{V}{0.35 + 0.55}$

$\frac{230}{0.9} = 255.5 \checkmark$

5

✓ 5/10

Q5
B

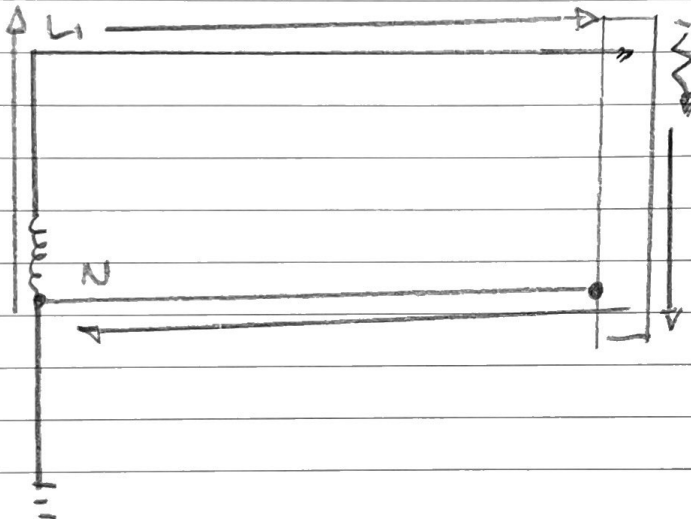
17Sec

Q6 An exposed conductive part would be anything connected to the circuit that can conduct electricity. For example a steel backed rod or steel conduit.

(4)

b To decrease the fault time

C.



D. TN-C-S earth system Advantages

- Earthing is on supplier's side and not outside house.
- Earthing is connected and doesn't require a whole other line.

✓ 6/10