



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	2205436
2	Title of Examination Paper	Power Electronics and Drives
3	Module Code	ACDA6004
4	Date and Time of Examination	22/05/2026 9:30am
5	Examination Venue	1Q310
6	Seat Number	9
7	Number of Answer Books handed in	1

List the numbers of the questions you have attempted	Office Use
1	2 ✓
2	0 ✓
3	0 ✓
4	1 ✓
5	1 ✓
6	0
7	2 ✓
8	0 ✓
Total	6%

6%
12/1
8/6/26

1.

Synchronous

Requires slip to become
Synchronous ✗

Induction

No slip. ✗

- Both work through electromagnetic induction ✓
- Rotating coil ^{in the rotor} has a current applied, Squirrel cage completes the circuit which induces the voltage.
- ~~causing~~ an ~~induced~~ electromagnetic field between two poles of a magnet causes the coil to rotate. ✓

2

Delta motor :

- 250 kVA
- 6 kV
- 12 pole pairs (24 poles)
- 1000 rpm ~~1000~~ (5.21 Hz)

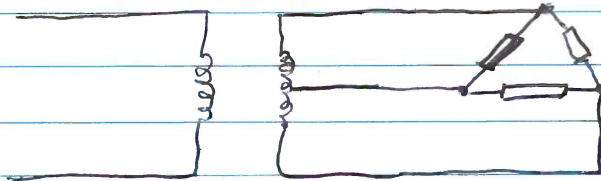


Types of transistor technology :

- IGBT

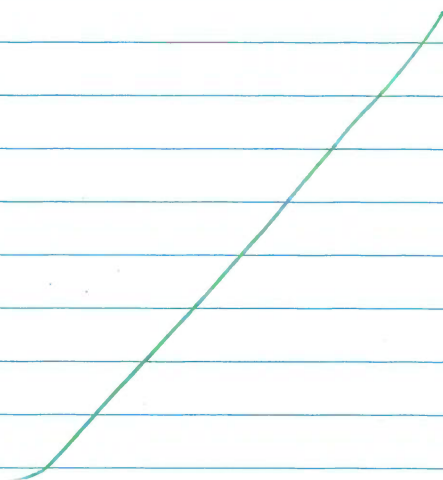
-

-



3.

0





4. -Dynamo operates through electromagnetic induction

- Rotor has a rotating coil, current is applied.
- electromagnetic field formed between the two poles of a magnet and when the circuit is complete a voltage is induced. ✓

1



5. a)

- b) Frequency in a ~~motor~~ synchronous AC motor determines speed of coil rotation which in turn determines torque. A variable frequency drive adjusts the frequency in a circuit.

In a synchronous AC motor, speed and torque are ~~also~~ synchronous. So as one is ~~may~~ increased, so is the other.



6. 6 poles $\rightarrow$ 3 pole pairs

$$3 \times 50 \times 16 = 2400 \text{ rpm.}$$

2.

0

7. a) $emf = NAB2\pi f$

$$f = \left(\frac{3000}{16} \right) \div 1 = 187.5 \text{ Hz} \quad \text{K-}$$

$$emf = 1600 \times (150 \times 10^{-3} \times 250 \times 10^{-3}) \times 0.75 \times 2\pi (187.5)$$

$$= 53014.37608 \quad \checkmark$$

b) $\phi = NAB$ (2)

$$= 1600 \times (150 \times 10^{-3} \times 250 \times 10^{-3}) \times 0.75$$

$$= 45 \quad \alpha.$$



Question No.

Examiner Only

8. a)

0

b)

Rhif y Cwestiwn

Arholwr yn unig



Question No.

Examiner Only