

Total No. of printed pages = 8

**RETEST EXAMINATION - 2019**

Semester : 4th

Subject Code : CAI-402

**ELECTRICAL MACHINES AND CONTROL**

Full Marks - 70

Time - Three hours

The figures in the margin indicate full marks for the questions.

**Instructions :**

1. All questions of PART-A are compulsory.
2. Answer any five questions from PART-B.

**PART - A**

Marks - 25

1. Fill in the blanks :  $1 \times 10 = 10$

(a) Transformer action requires \_\_\_\_\_ magnetic flux.

(b) \_\_\_\_\_ is determined from open circuit test.

[Turn over



(c) Two windings of a transformer are designated as primary winding and \_\_\_\_\_ winding.

(d) The power factor of an AC circuit is given by \_\_\_\_\_ power divided by \_\_\_\_\_ power.

(e) The emf induced in the armature of a DC machine is \_\_\_\_\_ to the flux and \_\_\_\_\_ to the speed.

(f) The commutator segments of a DC machine are made up of \_\_\_\_\_.

(g) The stator of a 3-phase induction motor produces \_\_\_\_\_ magnetic field.

(h) The single-phase series motor can operate on both \_\_\_\_\_ and \_\_\_\_\_.

(i) An over excited synchronous motor running on no-load is known as \_\_\_\_\_.

(j) A single-phase induction motor employs \_\_\_\_\_ rotor.



2. Write true or false :

$1 \times 10 = 10$

(a) An ideal transformer is one which has no losses and leakage reactance.

(b) A transformer transfers electrical energy from primary to secondary usually with a change in frequency.

(c) The core of a transformer is made of aluminium.

(d) The emf induced in the windings of a transformer will be in-phase with the core flux.

(e) The armature of a DC machine is made up of laminated sheets to reduce hysteresis loss.

(f) Armature reaction is increased when the armature current increases.

(g) In a clockwise rotating loaded DC generator, brushes have to be shifted anticlockwise.

(h) The value of back emf ( $E_b$ ) in a DC motor is maximum at no-load.





(i) In a three phase induction motor, three-phase supply is to be given to stator winding and DC supply to the rotor winding.

(j) The rotor winding of a 3-phase wound rotor is generally delta connected.

3. Choose the correct answer :  $1 \times 5 = 5$

(a) A two winding transformer operates at maximum efficiency when its

- (i) hysteresis loss equals to eddy current loss
- (ii) copper loss equals to iron loss
- (iii) primary resistance equals to secondary resistance
- (iv) voltage regulation is minimum

(b) The core of a transformer is assembled with laminated sheets to reduce

- (i) Hysteresis loss
- (ii) Eddy-current loss
- (iii) Magnetic noise
- (iv) Magnetising current



(c) In the three phase induction motors, the rotor current frequency is

- (i)  $f/s$
- (ii)  $sf$
- (iii)  $\sqrt{sf}$
- (iv)  $s^2f$

(d) The speed at which a 4 pole alternator should be driven to generate 50 cycles per sec. is

- (i) 1500 rpm
- (ii) 1000 rpm
- (iii) 500 rpm
- (iv) None of the above

(e) A stepper motor is a

- (i) DC motor
- (ii) single-phase AC motor
- (iii) two-phase motor
- (iv) multi-phase motor







(c) Calculate the stepping angle for

(i) a 3-phase, 16 tooth rotor VR motor

(ii) a 3-phase, 24-pole PM motor. 3

9. Write short notes on any *three* : 3×3=9

(a) Interpoles

(b) Open circuit test of transformer

(c) Capacitor start capacitor run single-phase induction motor

(d) Power measurement by two wattmeter method in 3-phase circuits.

