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Total No. of Questions : 6 ] [Total No. of Printed Pages : 9

**EH-165**

**B.E. II<sup>nd</sup> Semester (CGPA) Elect. &**

**Commun. Engg.**

**Examination, 2019**

**Basic Electrical Engg.**

**Paper - EL - 201**

**Time : 3 Hours]**

**[Maximum Marks : 60**

**Note :-** Attempt all the questions. Scientific calculator is required

**1. Choose any one :**

- (i) If the full-load core loss of a transformer is 100W, its core loss at half load will be -

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**(1)**

**P.T.O.**

(a) 200 W

(b) 100 W

(c) 50 W

(d) 25 W

(ii) Which type of winding is used in 3-phase shell-type transformer?

(a) Circular type

(b) Sandwich type

(c) Cylindrical type

(d) Rectangular type

(iii) Which dc motor is used for machine tools?

(a) Series motor

(b) Shunt motor

(c) Differentiaially compound motor

(d) Cumulatively compound motor

(iv) Relative permeability of vaccum is -

(a) 1

(b) 1 H/m

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**(2)**

- (c)  $\frac{1}{4} \pi$
- (d)  $4\pi \times 10^{-7} \text{ H/m}$

(v) Which of the following will oppose the change in circuit current ?

- (a) Capacitance
- (b) Inductance
- (c) Resistance
- (d) All of the above

(vi) Which of the following is a 4 - wire system ?

- (a) Delta
- (b) Star
- (c) both a & b
- (d) Neither a nor b

(vii) Eddy current losses are proportional to

- (a)  $f, B, t$
- (b)  $f, B, t^2$
- (c)  $f, B^2, t^2$
- (d)  $f^2, B^2, t^2$

(viii) The armature reaction mmf in a dc machine has a shape -

- (a) Sinusoidal
- (b) Trapezoidal
- (c) Rectangular
- (d) Triangular

(ix) The power drawn by a dc shunt motor on no-load comprises -

- (a) Iron loss
- (b) Mechanical loss
- (c) Cross loss & mechanical loss
- (d) Copper loss

(x) If 110 v is applied across a 220v, 100w bulb, the power consumption by it will be -

- (a) 100W
- (b) 50 W
- (c) 25 W
- (d) 12.5 W

2. (a) Find current in  $8\Omega$  resistor in circuit shown in Fig 1 using maxwell's loop analysis.

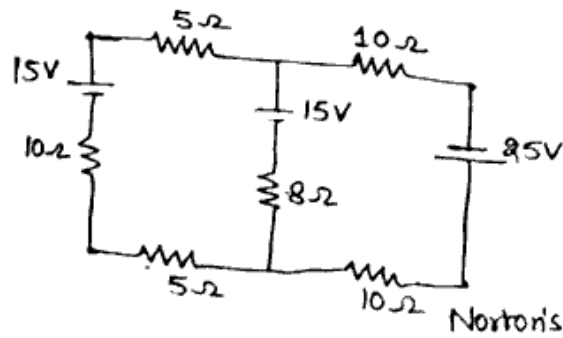


Fig. 1

(b) State and explain Norton's theorem. 05

OR

(a) Find the resistance between terminals xy of fig.2 using star-delta transformation. 05

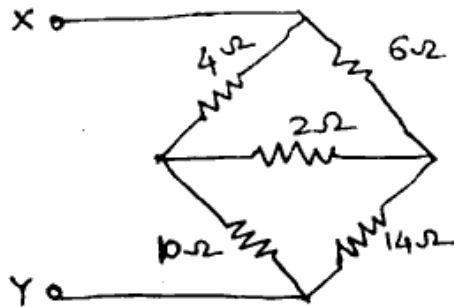


Fig. 2

(b) In the circuit shown in fig 3, determine currents in various resistors using super position theorem. 05

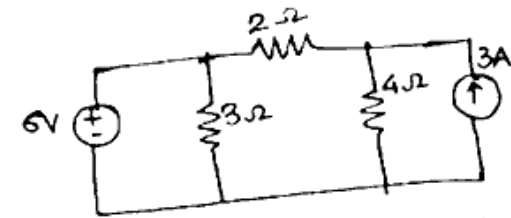


Fig. 3

3. (a) Derive the expression for coefficient of coupling in terms of mutual and self inductance of coil. 05
- (b) A coil of 300 turns, wound on a core of nonmagnetic material has an inductance of 10mH. Calculate. 05
  - (i) The flux produced by a current of 5A.
  - (ii) The average value of emf induced when a current of 5A is reversed in 8 milli seconds.

OR

- (a) Derive an expression for electrodynamic force on a current carrying conductor lying in a magnetic field. 05
  - (b) State and explain faradays laws of electromagnetic induction and Lenz's law. 05
4. (a) A voltage of 200v is applied to a series circuit consisting of a resistor, an inductor and capacitor. The respective

voltage across them are 170v, 150v, 100v and current is

4A. Find 05

- (i) Power factor
- (ii) Resistance
- (iii) Inductive reactance
- (iv) capacitive reactance

(b) In a 2-wattmeter method, power measured was 30KW at 0.7 pf lagging. Find reading of each wattmeter. 05

**OR**

- (a) An inductive coil of inductance 1.045H and resistance  $40\Omega$  is connected in series with a capacitor of 20 MF. calculate the resonance frequency. If a voltage of 100v is given, calculate current drawn from the supply. 05
- (b) A capacitance of  $100\Omega$  reactance is connected in paralld with a coil of  $70.7\Omega$  resistance and  $70.7\Omega$  inductive re-actance to a 250V ac supply. Calculate 05

- (i) Supply current
- (ii) Power factor of circuit.

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(7)

P.T.O.

5. (a) Derive an equation for emf induced in the windings of a transformer. 05
- (b) Draw the equipment circuit of a single phase transformer, mention magnetising reactance and iron loss component on the same. 05

**OR**

- (a) A 25 KVA, 2000v/200v single phase transformer has, the iron and full-load copper losses are 350w and 400w respectively calculate the efficiency at unity power factor on. <http://www.onlinebu.com> 05
- (i) Full load
  - (ii) Half full load
- (b) Explain the principle of operation of single phase transformer. 05
6. (a) With the help of a neat diagram, explain various parts and their function, of a dc machine. 05
- (b) A 230V series motor is taking 50A resistance of armature and series field winding is  $0.2\Omega$ , and  $0.1\Omega$  respectively, calculate - 05

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(8)

- (i) Terminal voltage
- (ii) Back emf,
- (iii) Power wasted in armature
- (iv) Mechanical power developed.

**OR**

- (a) Explain the operation of a three point starter with the help of heat diagram. 05
- (b) Derive an expression for emf generated in a dc generators. 05

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