Printed pages: 02 **Sub Code: NEE101**

Paper Id: 120105 **Roll No.** | | | | | | | | | | |

B TECH
(SEM I) THEORY EXAMINATION 2018-19
BASIC ELECTRICAL ENGINEERING

Time: 3 Hours **Total Marks: 100**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

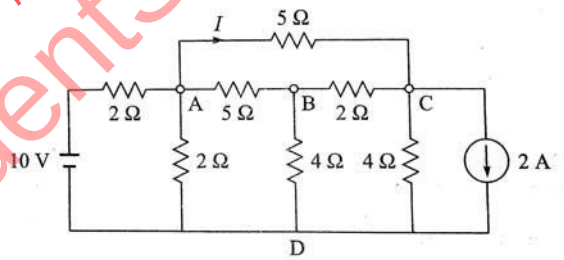
1. Attempt all questions in brief. **2 x 10 = 20**

a. What do you mean by unilateral and bilateral elements?
b. Can we apply KVL in a loop containing a current source? Give answer with reason.
c. What do you mean by average value of an alternating quantity?
d. Calculate the R.M.S. value of a half wave rectified current.
e. Explain phase sequence in a three phase circuit.
f. Explain eddy current damping in the measuring instruments.
g. What is the necessity of earthling?
h. Explain losses in magnetic circuit.
i. Explain the principle of Electromechanical energy conversion.
j. What is the role of commutator in dc machine?

SECTION B

2. Attempt any three of the following: **10 x 3 = 30**

a. Using nodal analysis find current I in the circuit given below.



b. A capacitor of 35 µF is connected in series with a variable resistor. The circuit is connected across a 50 Hz main. Find the value of the resistor for a particular condition when the voltage across the capacitor is half the supply voltage.

c. Explain two wattmeter methods for the measurement of three phase power. Derive the relation for three phase power with the help of phasor diagram.

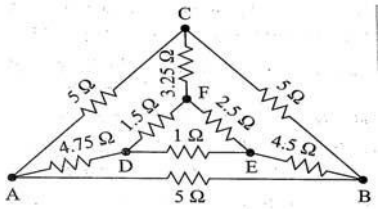
d. Draw and explain equivalent circuit of a single phase transformer.

e. A short shunt compound generator supplies 200 A at 100 V. The resistance of armature, series field and shunt field is respectively 0.04, 0.03 and 60 ohm. Find the emf generated.

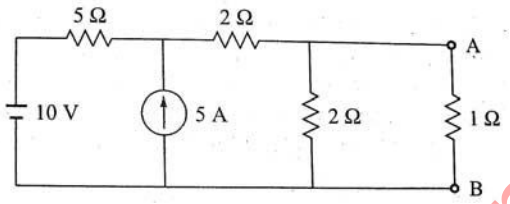
SECTION C

3. Attempt any one part of the following: 10 x 1 = 10

(a) Find the equivalent resistance between point A and B using star delta conversion



(b) Determine power loss in the 1 ohm resistance across terminal A and B of circuit given in figure using Norton's theorem.



4. Attempt any one part of the following: 10 x 1 = 10

(a) Explain power factor. What are the causes of low power factor? Explain methods of power factor improvement.

(b) Find the capacitance which must be connected in series with a 100W, 110V lamp in order that the lamp may draw its normal current when the combination is connected to a 230V, 50 Hz supply.

5. Attempt any one part of the following: 10 x 1 = 10

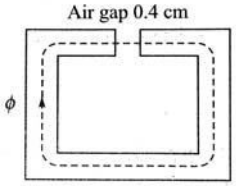
(a) Three inductive coils, each with a resistance of 15 ohm and an inductance of 0.03 H are connected (i) in star (ii) in delta, to 3 phase, 400V 50 Hz supply. Calculate for each of the above case (i) Phase current and line current (ii) total power absorbed.

(b) Explain construction and working of PMMC type instruments also gives it's and disadvantages.

6. Attempt any one part of the following: 10 x 1 = 10

(a) What do mean by earthling? Explain any methods of earthling.

(b) An electromagnet is shown in figure whose area of cross section is 12cm^2. Mean length of iron path is 50cm. It is excited by two coils each having 400 turns. When the current in the coil is 1.0 A, the resulting flux density gives a relative permeability of 1300. Calculate (i) reluctance of iron part, air gap and total reluctance.(ii) total flux(iii) flux density in air gap.



7. Attempt any one part of the following: 10 x 1 = 10

(a) Explain double field revolving theory for single phase induction motor.

(b) An 8 pole alternator runs at 750 rpm. It supplies power to a 6 pole, 3 phase induction motor, which has a full load slip of 3 %. Find the full load speed of the induction motor and the frequency of its rotor emf.