

Paper Id: **120102**

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B.TECH
(SEM I) THEORY EXAMINATION 2019-20
BASIC ELECTRICAL ENGINEERING

Time: 3 Hours

Total Marks: 70

Note 1. Attempt all sections if you are unable to attempt any part of a question, you may omit it suitably.

S E C T I O N

1. Attempt all questions brief.

2 x 7 = 14

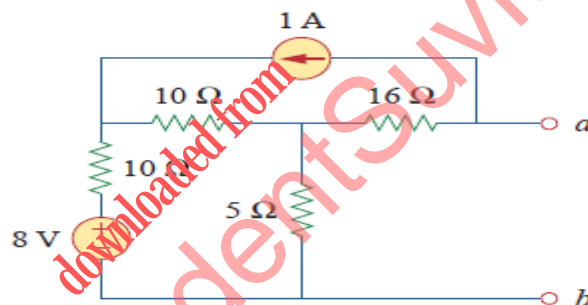
- Three resistors 2Ω , 4Ω , 5Ω are connected in delta. Determine its equivalent Star connection.
- Define Form Factor and Peak Factor.
- $V_1 = 50 \sin 50 t$ and $V_2 = 30 \sin (50 t - \pi/4)$. Illustrate by phasor diagram.
- What is the major difference between PMMC type and dynamometer type of instruments?
- Compare star connection with delta in 3 phase system.
- Why dc series motor is never started on No load?
- Write different methods of starting single phase induction motor.

SECTION B

2. Attempt any three of the following:

7 x 3 = 21

- Obtain the Thevenin equivalent at terminals of the circuit given below-



- Explain with neat diagram, working principle of Moving Iron type electrical measuring instruments also write advantages and disadvantages.
- A sinusoidally varying alternating current of frequency 50 Hz has a maximum value of 10 amperes:
 - Write down the equation for instantaneous value.
 - Find the value of current after $1/100$ second.
 - Find the time to reach 7 amp for the first time and
 - Find its average value
- Explain the two-wattmeter method for determination of power and power factor of three-phase load with suitable diagram.
- Explain principle of operation of three phase induction motor. Draw the torque-slip characteristics of a three phase induction motor.

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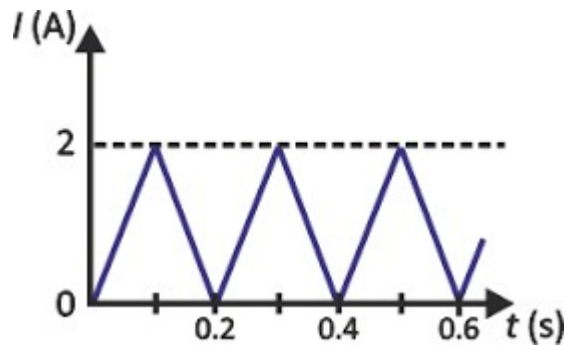
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SECTION C

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

- (a) Find the Average value and RMS value of the following wave.



- (b) A circuit consists of three parallel branches. The branch currents are represented by
- $i_1 = 10 \sin \omega t$
- ,
- $i_2 = 20 \sin (\omega t + 40^\circ)$
- ,
- $i_3 = 7.5 \sin (\omega t - 45^\circ)$
- . Find the resultant current and express it in the form
- $i = i_m \sin (\omega t + \phi)$
- .

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

- (a) Give the relationship between quality factor, resonant frequency and bandwidth for a series R-L-C Circuit.
- (b) Why power factor improvement is required, explain any method to improve power factor.

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

- (a) Explain the principle of operation of attraction type of moving iron instruments. A moving coil instrument gives a full scale deflection of 30 mA when a potential difference of 70 mV is applied. Calculate the series resistance to measure 750V at Full scale.
- (b) A 3-phase star connected balanced load is supplied 400 V, 50 Hz. The load takes a leading current of 1.732 A and power 20 KW. Calculate power factor of the load, resistance and inductance per phase.

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

- (a) List the various losses that occur in transformer. Derive the condition of maximum efficiency.
- (b) Write analogy between Magnetic circuit and electric circuit.

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

- (a) Derive EMF equation of DC Machine; explain with the help of neat diagram the different types of DC motors.
- (b) Explain working principle of synchronous motor and write its specific applications.