Roll No. | | | | | | | |

TEE–101

B. Tech. (First Semester)

Mid Semester EXAMINATION, 2017

(All Branche)

BASIC ELECTRICAL ENGINEERING

Time : 1:30 Hours] [*Maximum Marks : 50*

Note : (i) This question paper contains two Sections.

(ii) Both Sections are compulsory.

Section—A

1. Fill in the blanks/True-False : (1×5=5 Marks)

(a) The value of resistance in open circuit condition any two-terminal circuit is ..... .

(b) KCL is valid only for D.C. circuit. (True/False)

(c) Average power of a purely inductive a. c. circuit is equal to ..... .

(d) Internal resistance of ideal voltage source is infinite. (True/False)

(e) 3 resistances of R Ω each are connected in delta. Its equivalent star will comprise resistances of value ..... .

2. Attempt any *five* parts : (3×5=15 Marks)

(Define/Short Numerical/Short Programming/Draw)

(a) Define bilateral and unilateral elements.

(b) Draw phasor diagram for series RL a. c. circuit and waveform for voltage and current.

(c) Define active, reactive and apparent power for a. c. circuits.

(d) Define Thevenin's theorem.

(e) Define ideal and practical current sources.

(f) Define the following terms :

(i) frequency

(ii) time period

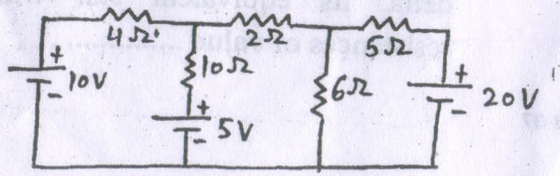
(iii) cycle, for a sinusoidal waveform

Section—B

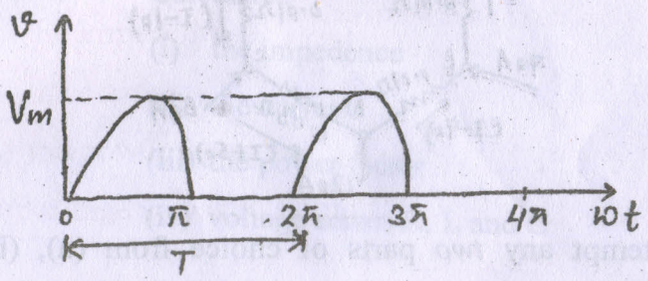
3. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)

(a) State Maximum Power Transfer theorem for D.C. circuits. Derive the relationship for maximum power transfer condition and efficiency.

(b) Use Mesh analysis to find current in the 10 Ω resistance and voltage across 5 Ω resistance of the network shown below.



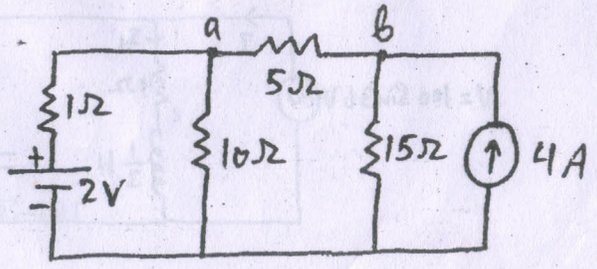
(c) Define RMS value for an a. c circuit. Calculate the average value, r. m. s. value and form factor of output voltage wave of a half-wave rectifier, shown below.



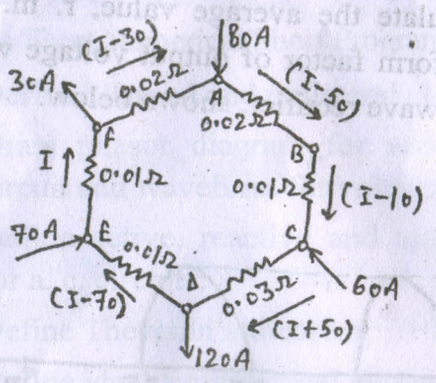
4. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)

(a) How star to delta transformation takes place for any two-terminal network. Derive the expression.

(b) Use Thevenin's theorem to find the current through 5 Ω resistor in the circuit shown below.



(c) Give the statement of KCL. Find the currents in all branches of the network shown below :



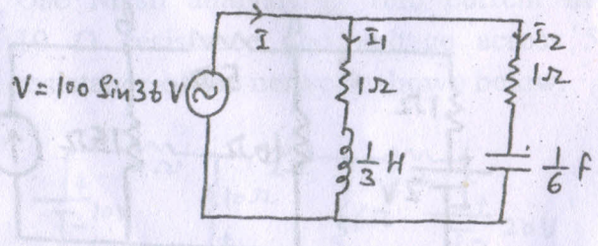
5. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)

(a) Explain a purely capacitive a. c. circuit with proper diagram and waveforms. Also derive the expression for average power of purely capacitive a. c. circuit.

(b) In the circuit shown below, a voltage $v = 100 \sin 3t$ is applied. Determine :

(i) Branch currents I_1 and I_2 with their phase angles.

(ii) Total current supplied by the source and its phase angle.



(c) A resistance of 15 Ω, an inductance of 200 mH and a capacitance of 100 μF are connected in series A 200 V, 50 Hz, a. c. supply is connected across this series circuit. Calculate :

(i) the impedence

(ii) the current

(iii) the power factor

(iv) voltage across R, L and C