Roll No. | | | | | | | |

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TEE–201

B. Tech. (Second Semester)
End Semester EXAMINATION, 2017
(All Branches)
BASIC ELECTRICAL ENGINEERING

Time : Three Hours] [*Maximum Marks : 100*

Note : (i) This question paper contains *five* questions.

(ii) All questions are compulsory.

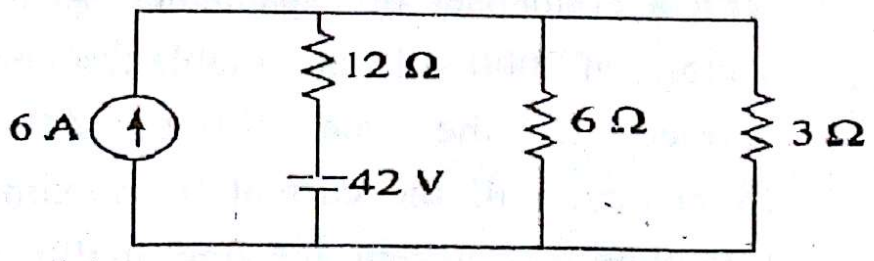
(iii) Instructions on how to attempt a question are mention against it.

(iv) Total marks assigned to each question are **twenty.**

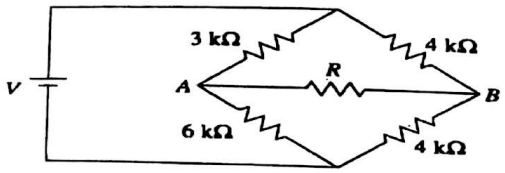
1. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

   (a) State Norton's Theorem and explain this theorem with steps from any example.

   (b) Find the current through the 3 Ω.



(c) The value of the resistance R connected across the terminals A and B, which will absorb the maximum power is :



2. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Define the following :

(i) Linear and non-linear element

(ii) Quality factor

(iii) r. m. s. and average value

(iv) Time period and frequency

(b) A coil having resistance of 10 ohm and an inductance of 0.4 H is connected in series with a condenser of capacitance 40 mF. A voltage of 2000 volts at variable frequency is applied to the combination. At what frequency, will the current be maximum ? Calculate this current and find quality factor and bandwidth of this circuit.

(c) Derive the condition of response in series RLC circuit and also derive expression for quality in series RLC circuit.

3. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) (i) What is the principle of single phase transformer ?

(ii) What is the analogy between electrical and magnetic circuit ?

(iii) Draw a complete equivalent circuit of transformer with secondary referred to primary side.

(b) The power into a balanced 3-phase inductive load measured by two wattmeter's are 2000 W and 1000 W. The line voltages are 400 V, 50 Hz. Determine the active power, reactive power, kVA and power factor of the load.

(c) Explain all type of losses in the transformer during its operation at full load.

4. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Prove that active and reactive power in three phase balanced star circuit can be measured by two Wattmeter method.

(b) A 40 kVA transformer has iron loss of 450 W and full-load copper loss of 850 W. If power factor of the load is 0.8 lagging. Calculate :

(i) full-load efficiency

(ii) the load at which maximum efficiency occurs

(iii) the maximum efficiency

(c) Define Maximum power transfer theorem for d. c. circuit and derive the condition of maximum efficiency.

5. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) (i) What is the principle of DC machine with its construction diagram ?

(ii) Write the different classification of d. c. motor.

(b) The armature of a four-pole, lap-wound shunt generator has 120 slots with 4 conductors per slot. The flux per pole is 0.05 Wb. The armature resistance is 0.05 Ω and the shunt-field resistance is 50 Ω. Find the speed of the machine when supplying 450 A at a terminal voltage of 250 V.

(c) The power input to the rotor of a 440-V, 50 Hz, 6-pole, 3-phase induction motor is

100 kW. The rotor electromotive force is observed to make at 1000 r. p. m. Calculate :

(i) The slip

(ii) The rotor speed

(iii) Speed of stator field with respect to rotor

(iv) Frequency of rotor currents at standstill

(v) Speed of rotor magnetic field with respect to stator magnetic field.