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TEE–101

B. TECH. (FIRST SEMESTER)
END SEMESTER EXAMINATION, 2018
(ALL BRANCHES)
BASIC ELECTRICAL ENGINEERING

Time : Three Hours

Maximum Marks : 100

Note : (i) This question paper contains five questions with alternative choice.

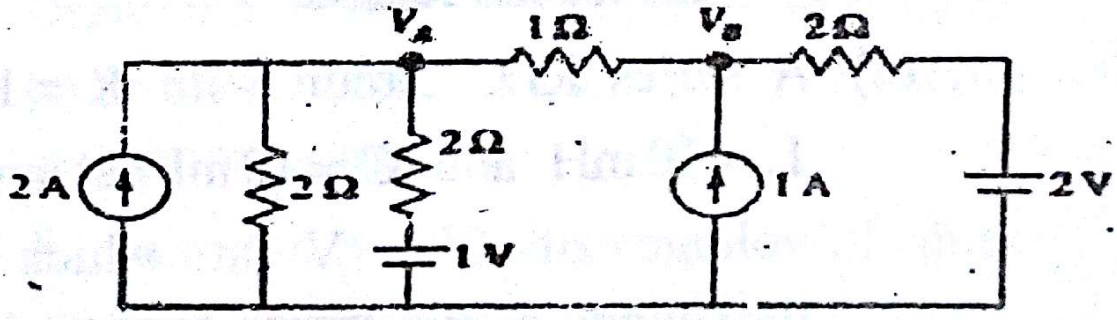
(ii) All questions are compulsory.

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

(iv) Each part carries **ten** marks. 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) Use Nodal Analysis to find out current in 1 ohm resistor.



(b) State and explain Norton's theorem with suitable example.

(c) Write short notes on :

(i) Dependent and Independent energy sources.

(ii) Current division rule and voltage division rule.

(iii) Unilateral and bilateral elements.

(iv) Active and passive elements.

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

(a) Why is ac more advantageous than dc and explain with circuit diagram current behavior in R, L, C, R-L and R-C circuits.

(b) An inductance of 0.5 H in series with resistor 10Ω. The circuit connected across $220\,V, 50\,Hz$ single phase AC supply. Find the following in circuit :

(i) Current

(ii) Voltage across resistor and voltage across inductance

(c) A series RLC circuit with $R = 10$ ohms, $L = 10\,mH$ and $C = 10\,mF$ has an applied voltage of 200 V at which current maximum in the series circuit. Calculate

the resonating frequency, current in the circuit and quality factor and bandwidth of the circuit.

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

(a) Explain in detail construction and working of single phase transformer.

(b) What are the different types of losses that occur in single phase transformer ? How can we minimize them ?

(c) A 2200/220 V, 100 kVA, 50 Hz single phase transformer gave the following test results :

OC Test : 2000 V, 4.5 A, 2 kW

SC Test : 22 V, 9.09 A, 3 kW

Determine the efficiency of transformer at full load for 0.9 pf lagging.

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

(a) Draw and explain with applications based on speed-torque characteristic of DC series and shunt motor.

(b) Explain the working principle of three phase induction motor in detail.

(c) A 250 V dc shunt motor takes 30 A current while running at full load. The resistance of motor armature and field windings are 0.1 Ω and 200 Ω respectively. Determine :

(i) Shunt field current

(ii) Armature current

(iii) Back e.m.f. generated in the motor, when it runs on full load.

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

(a) Write short notes on the following :

MCB, ELCB and MCCB

(b) Explain the following :

(i) Power factor

(ii) Methods of Power factor correction with circuit diagram

(c) A balanced star-connected load of $(8 + j6)\Omega$ per phase is connected to a balanced 3-phase, 440 V supply :

Find the :

(i) Line current

(ii) Power factor

(iii) Active power