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TEE–201

B. TECH. (SECOND 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.

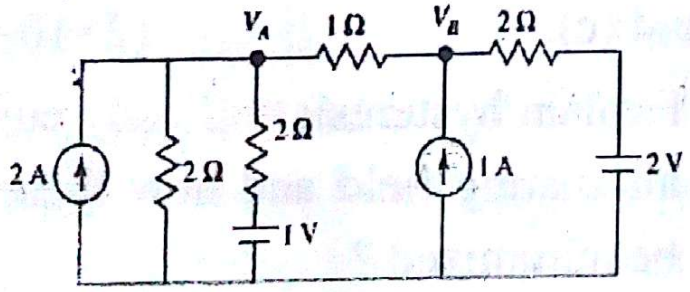
(iii) Instructions on how to attempt a question are mentioned against it.

(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) State KCL, Node, Mesh and Ohm's law.

(b) Calculate nodal voltage at A and B in the circuit shown in Fig. by using nodal analysis.



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(c) A particular load is to be driven at about 900 r.p.m. What should be the number of poles for a 3-ϕ induction motor when (i) $f = 50$ Hz, (ii) $f = 60$ Hz ? Calculate the actual speed in each case if the rated slip is 6%.

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

(a) Explain principle and construction of D. C. motor with suitable diagram. Derive an expression for back EMF.

(b) A series RLC circuit with R = 12 ohms, L = 1 mH and C = 10 mF has an applied voltage of 220 V at which current maximum in the series circuit. Calculate the resonating frequency, current in the circuit and quality factor of the circuit.

(c) Draw magnetic circuit with expression for m.m.f. in the circuit. Also write analogy between electrical and magnetic circuit.

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

(a) Explain hysteresis and eddy current loss in alternating field and how these losses can be minimized ?

(b) The readings on two wattmeter's connected to measure three-phases power in star connected load are 12.0 kW and 6.0 kW respectively with phase current 10 A in each phases. Calculate the power factor, active power, line voltage and phase voltage.

(c) Derive an expression for three-phase total power on balanced load measured by two wattmeter method.

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

(a) Define the following :

(i) Frequency

(ii) Form Factor

(iii) Quality Factor

(iv) Time period

(v) Phase

(b) A 5 kVA, 250/500 V, 50 Hz, single-phase transformer gives the following test results :

No-load : 250 V 0.75 A 60 W
(LV side)

Short Circuit test : 9 V 6 A 21.6 W
(HV side)

Calculate :

(i) What are the values of core loss component Ic and magnetizing component Im across core of the transformer ?

(ii) Find the value of x (load factor) for which maximum efficiency obtained. Calculate the maximum efficiency at .8 lagging p. f.

(c) What is meant by O. C. and S. C. test in single-phase transformer ? Explain with the help of equivalent circuits and mathematical expression.

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

(a) Is three-phase induction motor is self start or not ? Explain the concept of three-phase rotating magnetic field.

(b) A d.c. shunt machine connected to 200 V supply has resistance of armature as 1 ohm and of field winding as 80 ohm. Find the value of e.m.f. (E) if it design as a generator and for as a motor.

(c) State Norton's theorem d.c. circuit with its equivalent diagram and determine $R_N = R_{Th}$ across the A and B terminal for given circuit.