Code No.: EE104ES | R20 | H.T.No. | | | 8 | R | | | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
I–B.TECH–I–Semester End Examinations (Supply) - March- 2023
BASIC ELECTRICAL ENGINEERING
(Common for CSC, CSD, CSE, IT)

[Time: 3 Hours] **[Max. Marks: 70]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(20 Marks)**

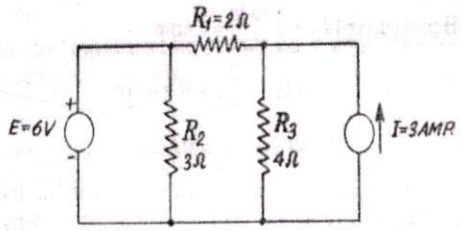
1. a) State Kirchhoff's current law. [2M]
   b) Draw the equivalent circuit of Thevenin's theorem. [2M]
   c) Define impedance of an a.c circuit. [2M]
   d) Give the expression for resonant frequency of series R-L-C circuit. [2M]
   e) Define the voltage regulation of a transformer. [2M]
   f) What are the applications of auto transformer? [2M]
   g) What are the losses in a d.c generator? [2M]
   h) Draw the characteristics of a d.c shunt motor. [2M]
   i) What is rotating magnetic field? [2M]
   j) What is synchronous speed? [2M]

PART-B **(50 Marks)**

2. a) State and explain Norton's theorem. [5M]
   b) Derive an expression for transient current in R-L series circuit suddenly excited by d.c source. [5M]

OR

3. a) Obtain the V-I relationship for passive elements. [5M]
   b) In the given figure below, find the current flowing through R_1 using superposition's theorem. [5M]



4. Derive the r.m.s value, average value and form factor of a sinusoidal quantity. [10M]

OR

5. Obtain the line to phase relation of voltage and current quantities in 3-phase balanced star connection. [10M]

6. a) Draw the equivalent circuit of a single phase transformer. [5M]
   b) Explain various 3-phase transformer connections. [5M]

OR

7. State and explain various losses of a transformer. How to reduce them. [10M]

8. Explain the principle of operation and the constructional details of a D.C. Generator with a neat sketch. [10M]

OR

9. Derive an expression for torque of a D.C motor. [10M]

10. Explain the constructional details and working principle of a 3-phase Induction motor. [10M]

OR

11.a) A 3- phase induction motor is wound for 6 poles and is supplied from 50 Hz system. Calculate (i) the synchronous speed (ii) the rotor speed when slip is 3% and (iii) rotor frequency when rotor runs at 750 rpm. [5M] [5M]

b) Give the constructional details of a synchronous generator.

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