Roll No. : .....

# MEERUT INSTITUTE OF ENGINEERING AND TECHNOLOGY

NH-58, Delhi-Roorkee Highway, Baghpat Road, Meerut – 250 005 U.P.

**First Sessional Examination: Odd Semester 2024-25**

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| **Course/Branch** | : B Tech (OP1--OP14) | **Semester** | : I |
| **Subject Name** | : Fundamental of Electrical Engineering | **Max. Marks** | : 60 |
| **Subject Code** | : BEE 101 | **Time** | : 120 min |

*CO-1* : Apply Kirchhoff's laws in solving DC Circuits.

*CO-2* : Understand the steady state behavior of single phase and three phase A.C circuits.

**Section – A (CO - 1 ) # Attempt both the questions # 30 Marks**

Q.1 : Attempt any **SIX** questions (Short Answer Type). Each question is of two marks. (2 x 6 = 12 Marks)

a) Explain the law in which energy should be conserve (BKL : K2 Level).

b) Define Linear and non linear Elements with examples. (BKL : K2 Level).

c) State KCL. (BKL : K2 Level).

d) Define Unilateral and Bilateral elements. (BKL : K2 Level).

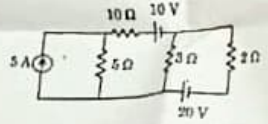
e) Define active and passive elements with examples. (BKL : K2 Level).

f) Define ideal and practical Current source with its V-I characteristics. (BKL : K2 Level).

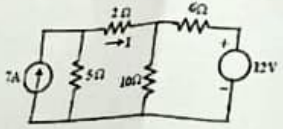
g) What are the application of KVL and KCL? (BKL : K2 Level).

Q.2 : Attempt any **THREE** questions (Medium Answer Type). Each question is of 6 marks. (3 x 6 = 18 Marks)

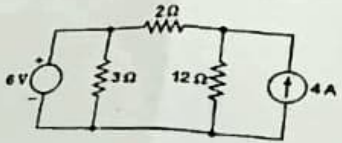
a) Find the current in 3 Ω shown in figure using mesh analysis. (BKL >= K3 Level).



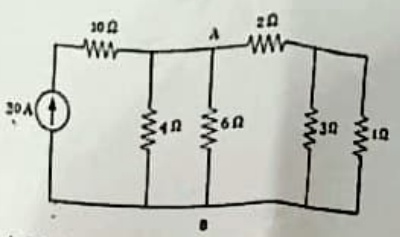

b) Find current through 2Ω resistance using mesh analysis.. (BKL >= K3 Level)



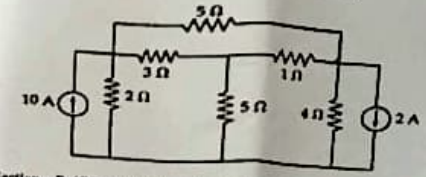

c) Find current through 2Ω resistance using Nodal Analysis.. (BKL >= K3 Level).




d) Determine the current Through A-B by using Nodal analysis (BKL >= K3 Level).




e) Using nodal analysis find the current in 4 Ω branches. (BKL >= K3 Level).




**Section – B (CO - 2 ) # Attempt both the questions # 30 Marks**

Q.3 : Attempt any **SIX** questions (Short Answer Type). Each question is of two marks. (2 x 6 = 12 Marks)

a) Define the quality factor of RLC series circuit at resonance? (BKL : K2 Level).

b) Define Form factor & Peak factor in A.C circuit. (BKL : K2 Level).

c) Define selectivity in RLC series circuit at resonance? (BKL : K2 Level).

d) Define Apparent power & reactive power in A.C Circuits. (BKL : K1 Level).

e) What is the average power in a pure capacitive circuit? (BKL : K2 Level)

f) Find the amplitude & frequency of the following voltage equation V= 200 sin (500 t + 45°) (BKL : -K3 Level)

g) A series circuit has R = 10 ohm, L = 0.05 H and C = 10μF Calculate Q-factor of the circuit (BKL : K3 Level).

Q.4 : Attempt any **THREE** questions (Medium Answer Type). Each question is of 6 marks. (3 x 6 = 18 Marks)

a) A 120V, 100W lamp is to be connected to 220 volt, 50Hz supply. In order that lamp should operate on correct voltage, calculate the value of a). Non inductive resistance b). Pure inductance (BKL >= K3 Level)

b) Find the r.m.s & average value, form factor and peak factor of the Half wave rectifier output.(BKL >= K3 Level).

d) Explain the phenomenon of resonance in series R-L-C circuit. Also derive the expressions for cut-off frequencies, band width and quality factor. (BKL >= K3 Level).

e) A resistance and inductance are connected in series with voltage v = 283 sin 314 t. The current expression is found to be i= 4 sin (314 t - 45°). Find the value of resistance, inductance and power factor. (BKL >= K3 Level).

f) Prove that the average power consumed in purely inductive circuit is zero? (BKL >= K3 Level).