Amrita Vishwa Vidyapeetham

Amrita School of Engineering, Amaravati

B. Tech End -term Examinations Jan 2025

1st Semester

Computer and Communication Engineering

23CCE102   Fundamentals of Electrical Engineering

Duration: Three hours   Maximum: 100 Marks

Course Outcomes (COs):

CO	Course Outcomes
CO01	understand fundamental electrical quantities
CO02	understand the principles of electrical measurements
CO03	analyse ac and dc circuits
CO04	understand the operation of electromagnetic machines

Answer all the questions

Q1. A 4,800-Vrms transmission line feeds a distribution transformer with 1,200 turns on the primary and 28 turns on the secondary. When a 10-Ω load is connected across the secondary, estimate the following parameters:

- the secondary voltage
- the primary and secondary currents,
- the power supplied to the load.   **[10] [CO04] [BTL5]**

Q2. A 8-pole 220V DC series motor has 200 slots in the armature and each slot has six conductors. The flux per pole is 20mWb when the motor takes 60A. The field resistance is 0.03Ω and the armature resistance is 0.15Ω. Analyze the number of parallel paths required to produce 523rpm from the motor. Also recommend the type of winding connection to connect the above identified parallel paths.   **[10] [CO04] [BTL5]**

Q3. A two-port cascaded attenuator circuit shown in figure is added to the input of a microwave system such that the gain of the system reduces and proper impedance matching is realized. In order to achieve gain reduction, compute the required impedance parameters (Z parameters) for the design of suitable matching circuit.   **[10] [CO04] [BTL4]**
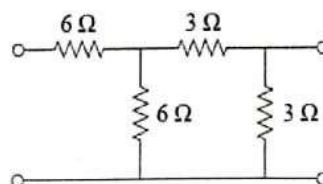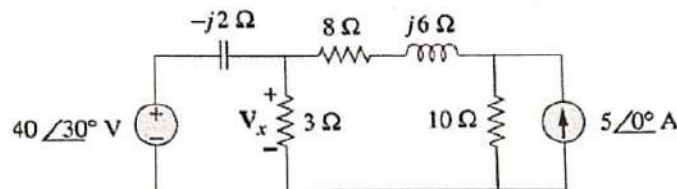
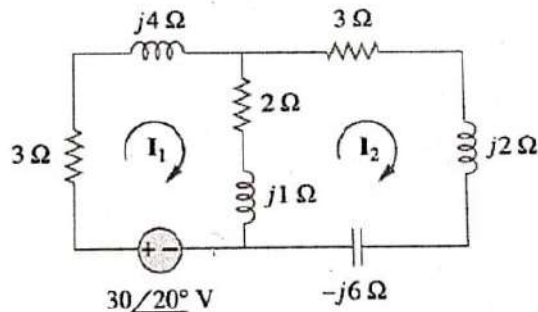**Q4.** Find current *Io* in the following circuit. [10] [CO03] [BTL4]
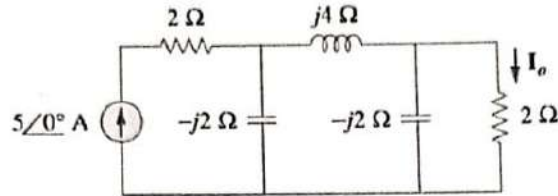
Q5. Determine V *x* in the following circuit using any method of your choice.
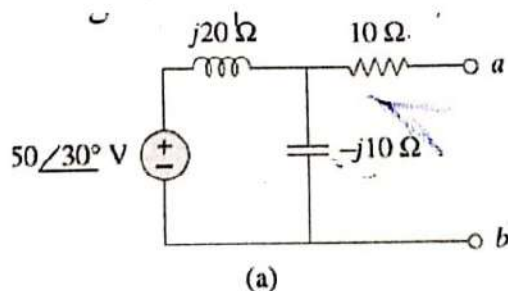
[10] [CO03] [BTL6]

Q6. By using mesh analysis, find I1 and I 2 in the circuit depicted in the following Fig.
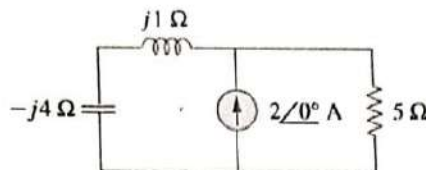
[10] [CO03] [BTL6]

Q7. Find the Thevenin and Norton equivalent circuits at terminals *a-b* for the following circuit shown in Fig. [10] [CO02] [BTL3]

(a)

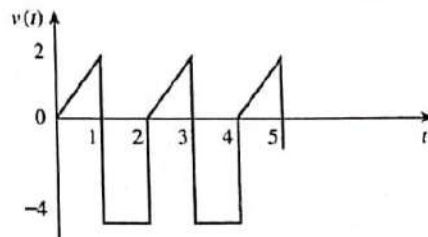**Q8.** Given the circuit in below Fig., find the average power supplied or absorbed by each element.   [10] [CO02] [BTL3]

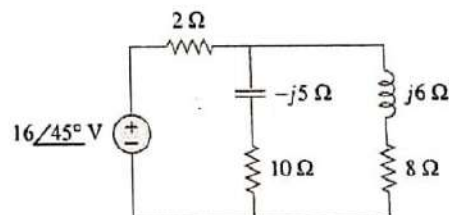**Q9.** Find the rms value of the signal shown in Fig.   [10] [CO01] [BTL2]

Q10. For the entire circuit in below Fig., calculate: [10] [CO03] [BTL2]
(a) the power factor
(b) the average power delivered by the source
(c) the reactive power
(d) the apparent power
(e) the complex power

Course Outcome /Bloom's Taxonomy Level (BTL) Mark Distribution Table

CO	Marks	BTL	Marks
CO01	10	BTL 1	
CO02	20	BTL 2	20
CO03	40	BTL 3	20
CO04	30	BTL 4	20
CO05		BTL 5	20
CO06		BTL 6	20