

3241
BOARD DIPLOMA EXAMINATION, (C-09)
MARCH/APRIL - 2019
DIPLOMA IN ELECTRICAL & ELECTRONICS ENGINEERING
ELECTRICAL CIRCUITS
THIRD SEMESTER EXAMINATION

Time: 3 Hours

Total Marks: 80

PART - A (10 x 3 = 30 Marks)

Note 1: Answer all questions and each question carries 3 marks

2: Answers should be brief and straight to the point and shall not exceed 5 simple sentences

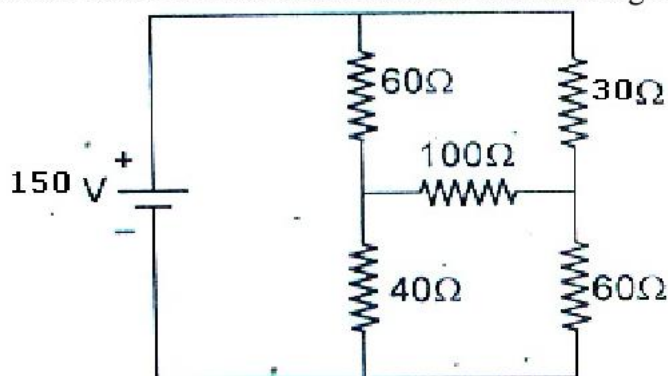
1. Find the equivalent star connected resistance of a given delta connected load with $R_{AB} = 10\Omega$, $R_{BC} = 20\Omega$, $R_{CA} = 30\Omega$.
2. Explain ideal voltage source and ideal current source.
3. convert the following vectors in to polar form
 - a) $(3-j3)$
 - b) $(-4-j8)$
 - c) $(-4+j6)$
4. An alternating current is represented by $i = 100 \sin 502.85t$, Determine
 - i) RMS values of current
 - ii) Frequency
 - iii) time period
5. Two currents are given by the expression $i_1 = 10\sin(314t+45^\circ)$ Amp, $i_2 = 8\sin(314t-60^\circ)$ Amps. Find i_1+i_2 and represent in the similar form
6. Define Q Factor of Series resonant circuit
7. Why a parallel resonant circuit is called as rejector circuit
8. What are the different methods by which a parallel AC circuit can be solved
9. A 3- ϕ delta connected a.c motor when connected to a 440V, 50Hz A.C supply develops 25kw at efficiency 90% and the power factor is 0.8 .Calculate the line current and phase current.
10. Derive an expression for power in a 3-phase circuit.

PART - B (5 x 10 = 50 Marks)

Note 1: Answer any five questions and each question carries 10 marks

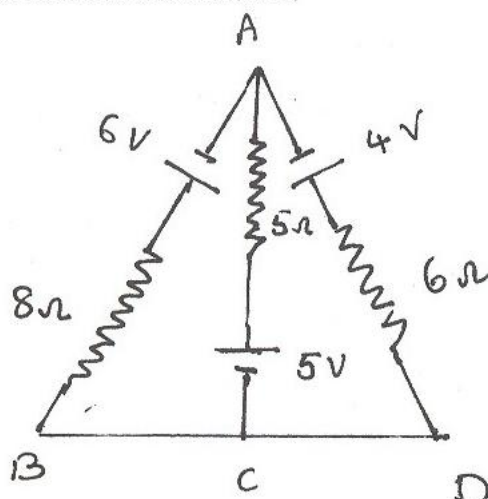
* 2: The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer

11. Find the current in the 100Ω resistor of the network shown in figure using Thevenin's theorem



12. a) Find the branch currents in the network.

5 marks



b) Two batteries A & B having emf of 20V & 24V respectively and internal resistances of 0.8Ω and 0.2Ω respectively are connected in parallel across 60Ω resistor calculate

i) The current through each battery. ii) The terminal voltage. 5 marks

13. An alternating current of frequency 60Hz has a maximum value of 120A

i) Write the equation for instantaneous value

ii) Reckoning time from the instant the current is zero and becoming positive, find the instantaneous value after $1/360$ sec

iii) Time taken to reach 96A for the first time

14. An R-L circuit takes a current of 3A at a p.f of 0.6 lag when connected to 115V, 50Hz supply. Another R-C circuit takes a current of 5A at a P.F of 0.77 lead when connected to the same supply. If the two circuits one connected in series across 230V, 50Hz supply. Calculate

a) Current

b) Power consumed

c) P.F. of the total circuit.

15. a) Derive an expression for Impedance of an AC circuit Consisting of resistance and a pure capacitor in series. Draw also the vector diagram. 5 marks

b) A Capacitor of $100\mu\text{F}$ is connected in series with a resistor of 50Ω . The combination is connected across a 230V, 50Hz AC supply, Calculate i) Impedance ii) Current iii) Power Factor iv) Active Power v) Reactive Power 5 marks

* 16. A lamp of rating 100W, 125V is connected in series with an element and the system is connected across a supply of 230V, 50Hz. Find the value of the series connected element if it is a) Resistor b) Inductor c) Capacitor.

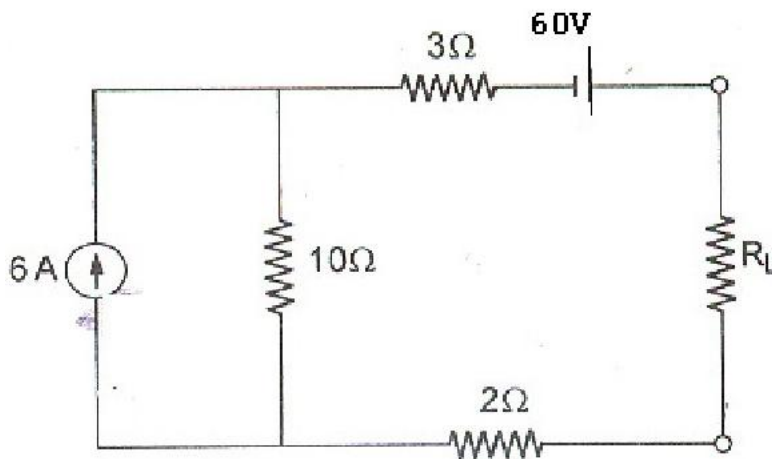
17. a) The load connected to a 3 ϕ supply comprises of 3 similar coils connected in star the Line current is 25 A and the KVA & KW outputs are 20 & 11 Respectively. Find the line voltage, phase voltages, the KVAR Input, the Resistance & reactance of the coil

5 marks

b) A Three Phase 440 V, 50 Hz, AC source supplies a 3 phase star connected balance load of 15 Kw. the current in the lines is 30 A. Determine the resistance & Reactive components of each phase impedance 5 Marks

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18A. Find the value of R_L in the figure given below for maximum power consumed by R_L and find maximum power.



B. A resistance of 10Ω and an inductance of 0.1H are connected in series across a supply of 220V , 50Hz determine.

a) The impedance

b) Current

c) Power Factor

d) Power.

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