



C09-EE-303

3241

BOARD DIPLOMA EXAMINATION, (C-09)

MARCH / APRIL - 2019

DEEE - III SEMESTER EXAMINATION

ELECTRICAL CIRCUITS

Time : 3 Hours]

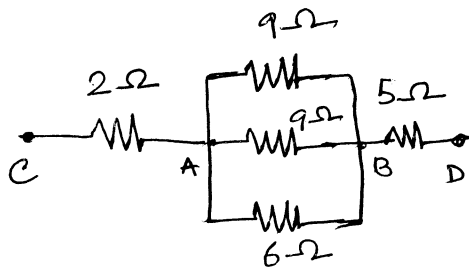
[Total Marks : 80

PART - A

3×10=30

- Instructions :**
- (1) Answer **ALL** questions.
 - (2) Each question carries **THREE** marks.
 - (3) Answer should be brief and straight to the point.

- 1 Find the equivalent resistance R_{CD} of the circuit as shown in the figure.



- 2 What are the limitations of Ohm's law ?
- 3 Convert the following vectors to rectangular form
(a) $15\angle -90^\circ$ (b) $30\angle -45^\circ$ (c) $100\angle 120^\circ$
- 4 An alternating current of frequency 50 Hz has a maximum value of 120 A. Calculate the time taken to reach 100A for the first time.
- 5 Two currents are given by the expression $i_1 = 15 \sin (314t + 60^\circ)$ Amp, $i_2 = 10 \sin(314t - 45^\circ)$ Amps. Find $i_1 - i_2$ and represent in the similar form.

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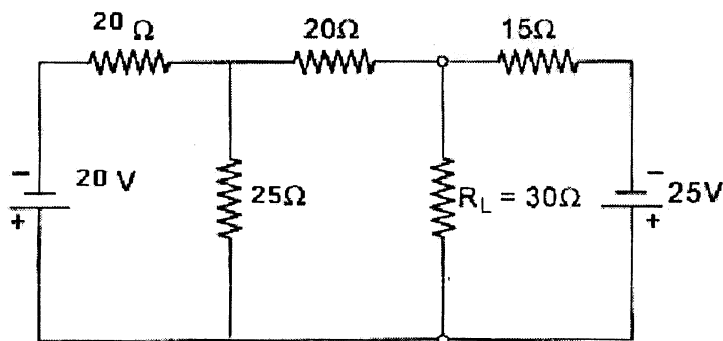
- 6 Define Q-Factor of Series resonant circuit.
- 7 Show that the power consumed in a R-L series circuit is $VI \cos \theta$, from the instantaneous equations of voltage and current.
- 8 Why a parallel resonant circuit is called as rejector circuit.
- 9 Define phase angle difference in a poly phase circuit.
- 10 The phase voltage of a 3 phase, 5MVA star connected, Alternator is 6500 volts Calculate.
- (i) The line voltage
- (ii) Full load line current of the alternator.

PART - B

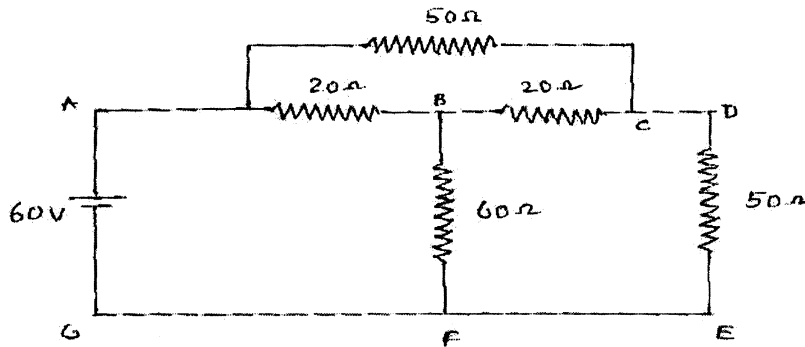
10×5=50

- Instructions :**
- (1) Answer any **FIVE** questions.
- (2) Each question carries **TEN** marks.
- (3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

- 11 (a) State maximum power transfer theorem. 4
- (b) Find the current through 30Ω resistor of the network 6
shown in figure by using Kirchoff's laws.

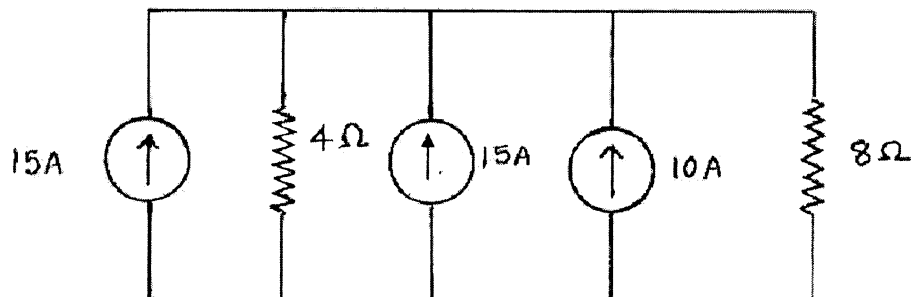


- 12 Determine the load current through the branch DE in the circuit shown in fig. by using Thevenin's theorem.



- 13 A current has the following steady values in amperes for equal intervals of time changing instantaneously from one value to the next: 0,10,20,30,20,10,0, -10, -20, -30, -20, -10, 0 etc. Calculate (i) average value (ii) RMS value (iii) Form factor (iv) peak factor.
- 14 (a) Derive an expression for the impedance of an A C 5
Circuit consisting of resistance and capacitance in series.
Draw a neat vector diagram.
- (b) A resistor of 10 Ohms is connected in series with a 5
capacitor of 100 micro farads across 230 v, 50 Hz ac
supply. Calculate (i) Impedance (ii) power factor.
- 15 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
230 V, 50 Hz supply. Calculate
- (a) Current
- (b) Power consumed
- (c) P.F. of the total circuit

- 16 (a) The current flowing through a pure inductor is 20A. 5
Find the inductance and power consumption when the voltage applied across the inductor is $V = 200\sin 314t$.
- (b) Show that the power consumed by a pure inductor is 5
zero when AC supply is applied to it.
- 17 Three identical coils each having a resistance of $100\ \Omega$ and a reactance of $100\ \Omega$ are connected across 440V, 3 phase supply. Calculate line current and phase current when connected in (i) Star and (ii) Delta.
- 18 (a) Convert the current sources of network shown in the fig into a single voltage source.



- (b) Two circuits having impedances $Z_1 = (10 + j15)$ ohms, $Z_2 = (6 - j8)$ ohms are connected in parallel. If the total current supplied is 20A, what is the total power consumed by the circuit ?
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