



P-003-1153001

Seat No. \_\_\_\_\_

M. Sc. (Electronics) (Sem. III) (CBCS) Examination

May / June - 2018

P9 : Circuits & Networks

Faculty Code : 003

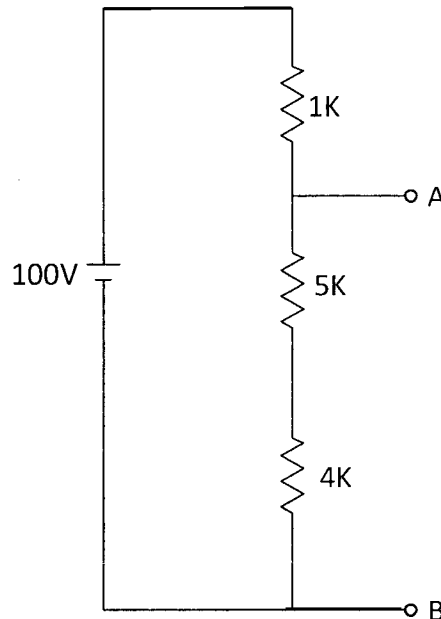
Subject Code : 1153001

Time :  $2\frac{1}{2}$  Hours]

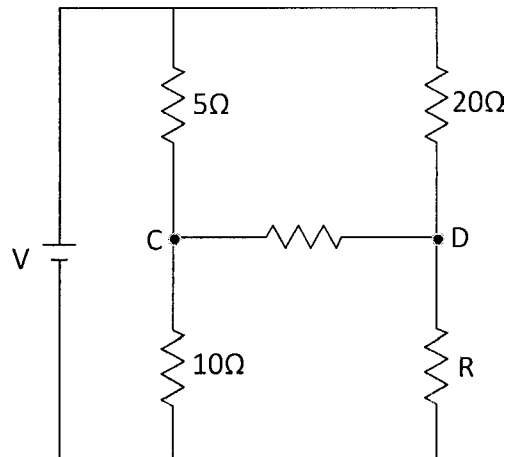
[Total Marks : 70

1 Answer any **seven** from the following : 14

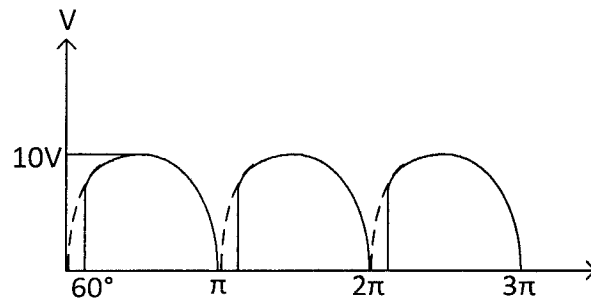
(1) Find the voltage between A and B in the following circuit.



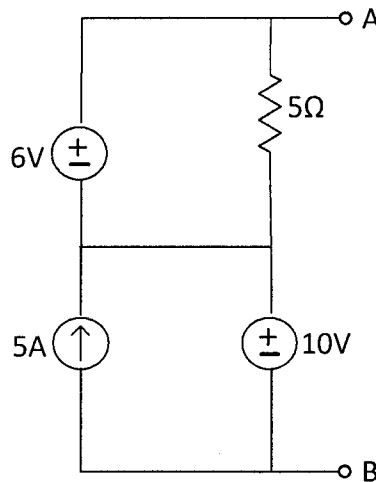
(2) Determine the value of R in the following circuit when the current is zero in the branch CD.



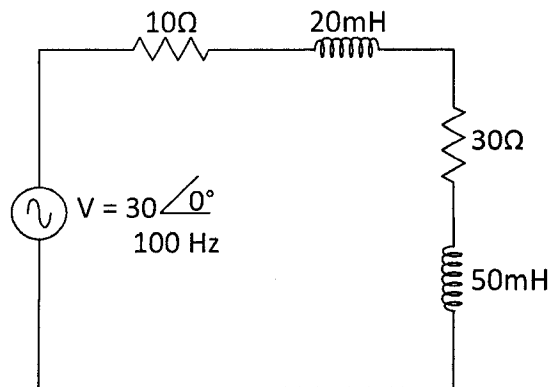
- (3) Briefly explain "Supermesh" and "Supernode" with examples.
- (4) For following waveform find out  $V_{\text{rms}}$ . The waveform is a full wave rectifier sinewave with a delay angle of  $60^\circ$ , i.e., each pulse starts at  $60^\circ$  and ends at  $180^\circ$ .



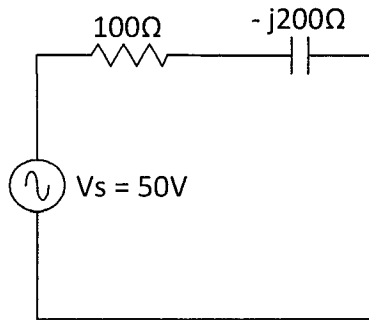
- (5) Determine the voltage across the terminals AB in the following circuit.



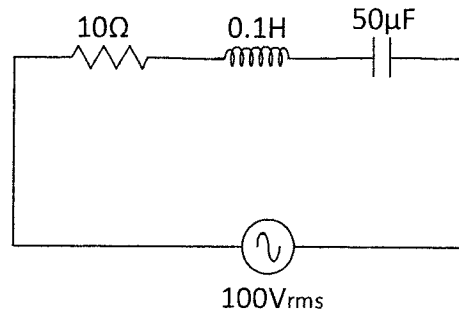
- (6) Determine the current flowing in the following circuit.



- (7) Find out the power factor,  $\cos\theta$ , for following circuit.



- (8) For what frequency the following circuit resonates ?



- (9) Explain magneto motive force and reluctance.  
 (10) Explain "Natural response" and "Transient response".

2 Answer any **two** from the following :

- (a) Derive the formula for the voltage division in series circuit and current division in parallel circuit. **7**  
 (b) Explain mesh equations by inspection method with one example. **7**  
 (c) Explain super node with one example. Also discuss source transformation technique. **7**

3 Answer the following :

- (a) Write on superposition and Thevenin's theorems with one example for each one. **7**  
 (b) Explain how to get a dual circuit of a given circuit with one example. **7**

OR

- 3** Answer the following :
- (a) Explain following for sinewave. **7**
- (1) Peak value
  - (2) Peak to peak value
  - (3) Average value
  - (4) RMS value
  - (5) Peak factor
  - (6) Form factor
  - (7) Phase relation
- (b) Draw a parallel RL circuit driven by an AC source **7**  
voltage. Derive the formula for its impedance.  
Draw and explain phase relation of  $I_R$  and  $I_L$ .
- 4** Answer the following :
- (a) Explain resonance in RLC series circuit and discuss **7**  
the impedance and phase angle for the same.
- (b) Explain the circle diagram of series  $R_L$  and RC **7**  
circuits. Derive the circle equation for  $R_L$  circuit  
where reactance is fixed but resistance is varying.
- 5** Answer any **two** from the following :
- (a) Define coefficient of coupling. Derive its formula. **7**
- (b) Draw the diagrams of series connected coupled **7**  
circuit. Derive the expression of resultant inductance.
- (c) Draw the circuit of a double tuned coupled circuit. **7**  
Derive the expression for voltage transfer ratio and  
current at the resonance. Also, derive the expression  
for maximum amplification and the current at maximum  
amplification.
- (d) Draw the series RLC circuit for its DC response. **7**  
Derive the equations for its total current and draw  
the response curves for current.