



**PBA-003-027301** Seat No. \_\_\_\_\_

**M. Sc. (ECI) (Sem. III) (CBCS) Examination**

November / December - 2018

**Circuit & Network : Paper - 9**

**Faculty Code : 003**

**Subject Code : 027301**

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

[Total Marks : 70

- Instructions :** (1) All questions carry equal marks.  
(2) Figures on right hand side indicate marks.

**1** Answer the following : (Any Seven) **14**

- (1) Define the Laplace transform.
- (2) Define the Step function and Impulse function.
- (3) What is transfer function? Explain for series RLC circuit.
- (4) Why we chose 5 time constant value of t for charging and discharging of capacitor/inductor circuit?
- (5) Draw the Phasor diagram in case both real and imaginary part is available.
- (6) What is transient and steady state regarding circuit?
- (7) Define the transfer impedance.
- (8) What is two port network?
- (9) Write about damped natural frequency and un-damped natural frequency.
- (10) Where transmission parameter is useful?

**2** Answer the following : (Any Two) **14**

- (a) Prove final value theorem and verify for **7**

$$f(t) = e^{-t} (\sin 3t + \cos 5t).$$

- (b) Explain "why we choose Laplace transform to solve circuit problem" with suitable example. **7**

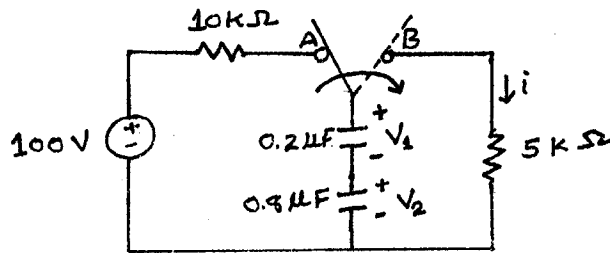
- (c) Find the Laplace transform of the function **7**

$$f(t) = \frac{2 - 2e^{-2t}}{t}$$

3 Answer the following : 14

(a) Write a note on Transfer function and use of transfer function in circuit analysis. 7

(b) The switch in the following circuit shown has been in position A for a long time. At  $t = 0$ , the switch is thrown to position B. Find the current  $I$  as rational function of  $s$ . Find the time-domain expression for the current  $i$ . 7



OR

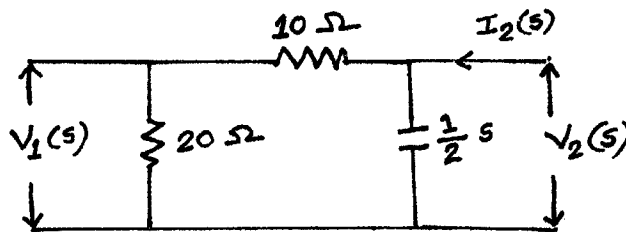
3 Answer the following : 14

(a) Write a note on initial value theorem and verify for  $f(t) = e^{-t}(\sin 3t + \cos 5t)$ . 7

(b) Write the necessary conditions for driving point function and also for transfer functions. 7

4 Answer the following : 14

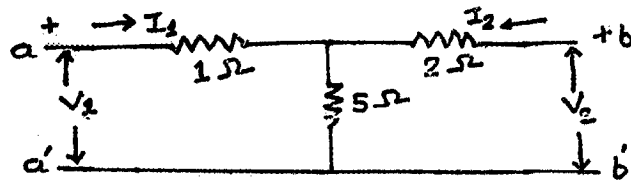
(a) For the following network, determine the transfer functions  $G_{21}(s)$  and  $Z_{21}(s)$ . Also find the driving point impedance  $Z_{11}(s)$ . 7



(b) Find the DC response of series RLC circuit for  $\zeta = 0$ . 7

5 Answer the following : (Any Two) 14

(a) Find the transmission or general circuit parameters 7  
for the following network.



(b) Determine the interrelation between impedance 7  
and admittance.

(c) Explain Hybrid parameter for any two port network. 7

(d) Write a note on real integral and differential theorem 7  
with suitable example.

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