



**KC-6241**  
**B. E. - II (Sem. III) (IT) Examination**  
**November / December – 2012**  
**Elements of Electrical Engineering**  
**(Old Course)**

Time : 3 Hours]

[Total Marks : 100

**Instructions :**

(1)

<p>नीचे दर्शावेल निशानीवाणी विगतो उत्तरवही पर अवश्य लभवी. Fillup strictly the details of signs on your answer book.</p> <p>Name of the Examination : B. E. - 2 (SEM. 3) (IT)</p> <p>Name of the Subject : ELEMENTS OF ELECTRICAL ENGINEERING (OLD)</p> <p>Subject Code No. : 6 2 4 1 Section No. (1, 2,.....): NIL</p>	<p>Seat No. : <input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/></p> <div style="border: 1px solid black; border-radius: 15px; padding: 10px; text-align: center; margin-top: 10px;">Student's Signature</div>
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- (2) Attempt all questions.  
(3) Figures to the right indicate full marks.  
(4) Assume suitable data if necessary.

- |   |   |        |
|---|---|--------|
| 1 | (a) Short questions   | 10     |
|   | (1) Explain the term "BACK-EMF"<br>(2) What is the function of commutator?<br>(3) Define an ideal transformer.<br>(4) Define turns ratio. On the basis of turns ratio classify transformers.<br>(5) What is the frequency of rotor current under running condition? |        |
|   | (b) (1) Draw and explain difference characteristics of DC shunt generator.<br>(2) Draw and explain different characteristics of DC series motor   | 6<br>4 |

2 Attempt any two : 16

- (1) Explain procedure for obtaining transformer parameters from open circuit and short circuit Test.
- (2) Why transformer rating is in KVA ? Define and explain voltage regulation in transformer.
- (3) Write short note on armature reaction.
- (4) Explain operating principle of transformer. Discuss the construction in detail and classify transformers.

3 Attempt any two : 14

- (1) Why rotor can not achieve synchronous speed ? Draw and explain speed Torque characteristics of three phase induction motor.
- (2) Explain No load and blocked rotor test on 3-phase induction motor.
- (3) Explain different techniques used for controlling speed of slip ring induction motor.

4 (a) Short questions : 10

- (1) Find Laplace of unit ramp function.
- (2) Explain independent energy source.
- (3) Define  $Z$  - parameters.
- (4) If  $f_1(t) = 2u(t)$  and  $f_2(t) = e^{-3t}u(t)$ . Determine convolution between  $f_1(t)$  and  $f_2(t)$ .
- (5) Define self and mutual inductance.

(b) (1) Explain Dirichlet's conditions for Fourier series 4

- (2) Apply nodal voltage analysis and find  $V_2$  such that the current through  $j2\Omega$  impedance of network shown in fig.1 will become zero. 6

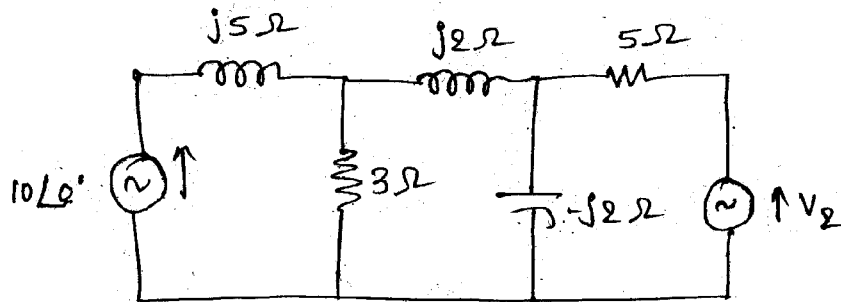


Fig. 1  
2

- 5 (a) In the series circuit of fig.2 switch is closed on position 1 at  $t = 0$ , thereby applying the 100 V source to the R-L Branch and at  $t = 500 \mu\text{sec}$  the switch is moved to position 2. Obtain equation for current in both interval. 10

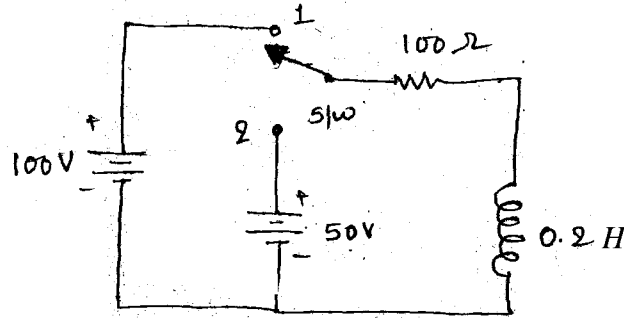


Fig. 2

OR

- (a) Find trigonometric Fourier series for the waveform shown in fig.3. 10

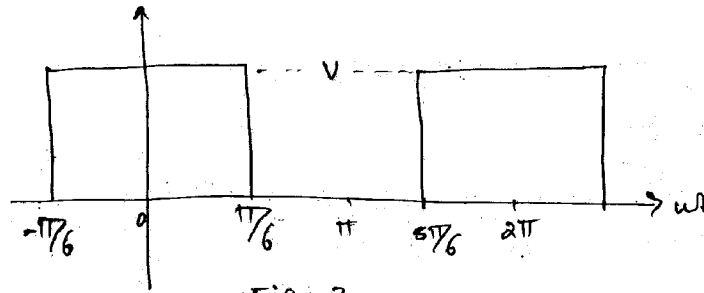


Fig. 3

- (b) Evaluate the Fourier coefficient for the Fourier series (trigonometric). 5

- 6 Attempt any **three** : 15

- (a) Obtain inverse Laplace transformation for the following transfer functions

$$F(s) = \frac{s}{(s+1)(s+3)}, \quad F(s) = \frac{5s}{(s^2+25)^2}$$

- (b) Obtain Y-parameters of given resistive network of fig.4.

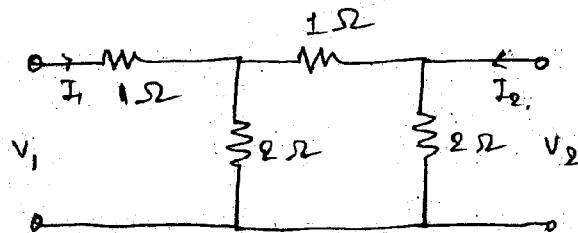


Fig. 4.

- (c) A delta connected unbalanced load with  $Z_{AB} = 25 \angle 90^\circ \Omega$ ,  $Z_{BC} = 15 \angle 30^\circ \Omega$  and  $Z_{CA} = 20 \angle 0^\circ \Omega$  is connected to 3-phase 3-wire CBA system having a line voltage of 240 V. consider VBC as reference and obtain currents.
- (d) Obtain Laplace transform of the pulse shown in fig.5 below.

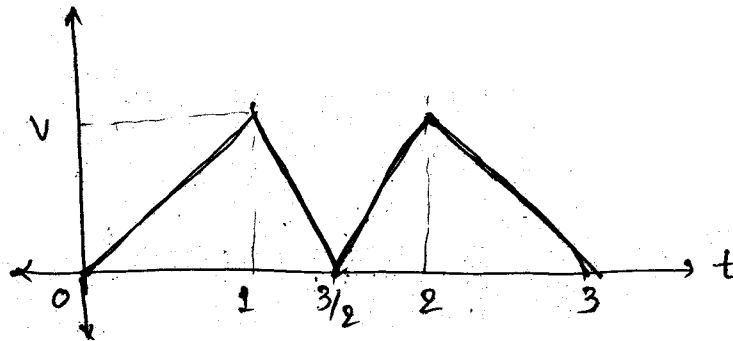


Fig 5.

- (e) Find short - circuit parameters for the circuit shown in fig.-6.

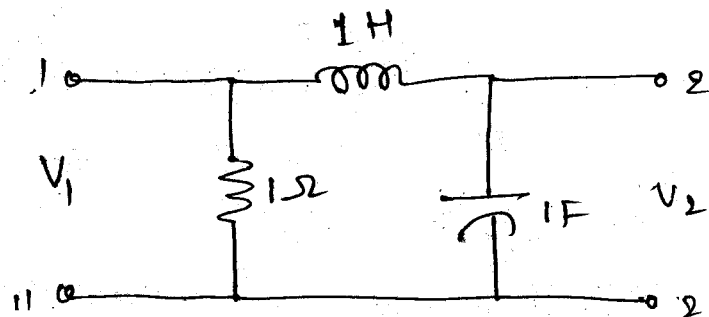


Fig. 6.