C 5776 (Pages 4) Name.....

Reg. No.....

COMBINED FIRST AND SECOND SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION JUNE 2005

CS 2K 109/IT 2K 109—BASIC ELECTRICAL ENGINEERING

Time : Three Hours Maximum : 100 Marks

Part A

I. (a) What is the voltage across A and B in the circuit shown in Fig (1).

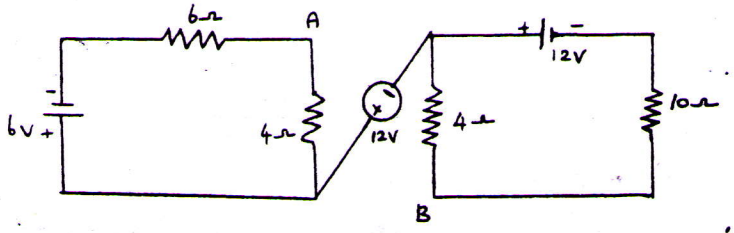

Fig. 1

(b) Obtain the Thevenin's equivalent circuit for the network shown in Fig. (2).

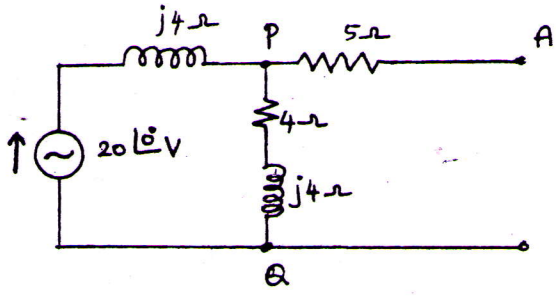

Fig. 2

(c) A series RC circuit consists of resistor of 10 Ω and capacitor of 0.1 F as shown in Fig. (3). A constant voltage of 20 V is applied to the circuit at $t = 0$. Obtain the current equation. Determine the voltage across the resistor, and the voltage across the capacitor.

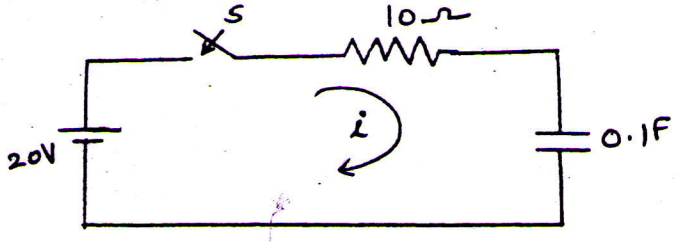

Fig. 3

Turn over

(d) Explain natural and forced response.

(e) Make a comparison between electric and magnetic circuits.

(f) Explain the concept of mutual inductance behind the principle of transformer.

(g) Differentiate between Slip-ring and Cage IM.

(h) Write about the different types of d.c. generators.

(8 × 5 = 40 marks)

Part B

Unit I

II. (a) Determine the voltage V_{AB} in the circuit shown in Fig. (4).

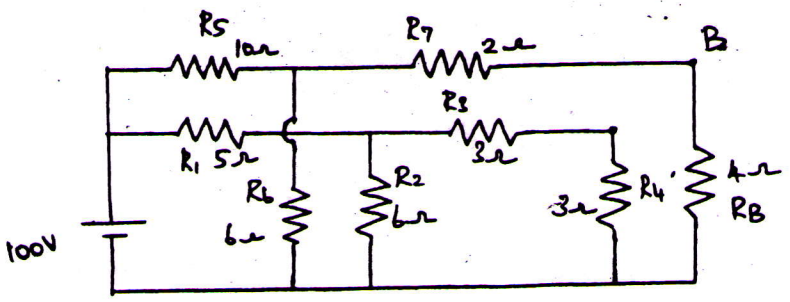

Fig. 4

(15 marks)

Or

(b) Find the voltage across the 2 Ω resistor by using superposition theorem as shown in Fig. (5).

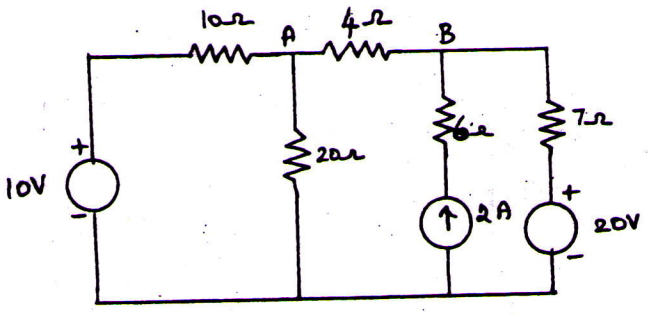

Fig. 5

(15 marks)

UNIT II

III. (a) The circuit shown in Fig. (6) consists of R-L series elements with R = 150 Ω and L = 0.5 H. The switch is closed when $\phi = 30°$. Determine the resultant current when voltage $V = 50 \cos(100t + \phi)$ is applied to the circuit at $\phi = 30°$.

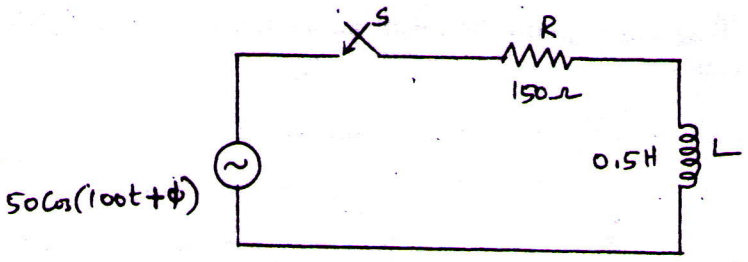

Fig. 6

Or

(b) For the network shown in Fig. (7) determine the transfer functions $G_{21}(s)$ and $Z_{21}(s)$. Also find the driving point impedance. $Z_{11}(s)$.

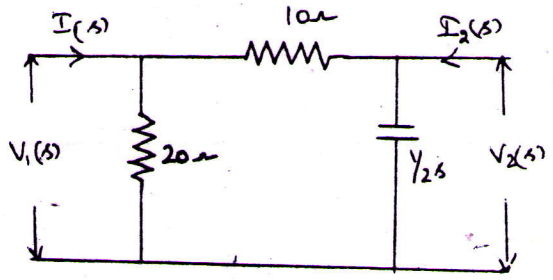

Fig. 7

(15 marks)

UNIT III

IV. (a) (i) Derive from the first principles the e.m.f. equation of a transformer.

(ii) Explain with suitable expression the condition for maximum efficiency.

(15 marks)

Or

(b) Discuss in detail the construction and working of Electrodynamometer type wattmeter with a neat sketch and with relevant expressious (if any).

(15 marks)

UNIT IV

V. (a) Explain the construction and principle of operation of an alternator with relevant diagrams mentioning its applications.

(15 marks)

Or

(b) With a neat diagram, explain the construction and working of a d.c. motor. Also enumerate its applications.

(15 marks)

[4 × 15 = 60 marks)