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(Pages 3)

Name.....

Reg. No.....

THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, DECEMBER 2007

Computer Science Engineering/Information Technology

CS/IT 2K 306/PTCS 2K 305—ELECTRIC CIRCUITS AND SYSTEMS

Time : Three Hours

Maximum : 100 Marks

Answer **all** *questions.*

I. (a) Explain the applications of graph theoretic method for the formation of network equations.

(b) What are coupled circuits ? Why are they called so ? Explain.

(c) State and explain superposition theorem with a neat circuit diagram.

(d) What are polyphase circuits ? Bring out their advantages.

(e) Explain in detail the principles of Maxwell's Bridge with a neat circuit diagram.

(f) The Z-parameters of a z port network are $Z_{11} = 50\ \Omega$, $Z_{22} = 45\ \Omega$, $Z_{12} = 15\Omega$. Find the Y-parameters.

(g) Write Mason's Gain Formula. Explain the significance of this formula.

(h) Differentiate open loop control from closed loop control systems.

(8 × 5 = 40 marks)

II. (a) Find the current through the galvanometer in the circuit shown by mesh method.

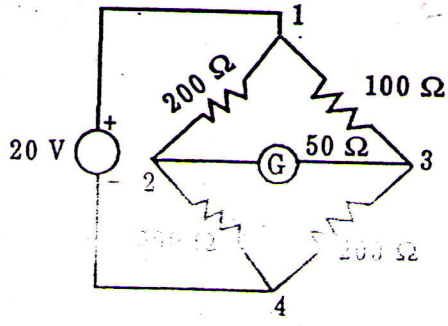

Fig. 1.

Or

(b) (i) State and prove the properties of Laplace transform.

(ii) Find inverse Laplace transform of $F(s) = \frac{s + 5}{s^2 + 2s + 5}$.

Turn over

III. (a) Determine the Thevenin's equivalent circuit with respect to terminal a and b.

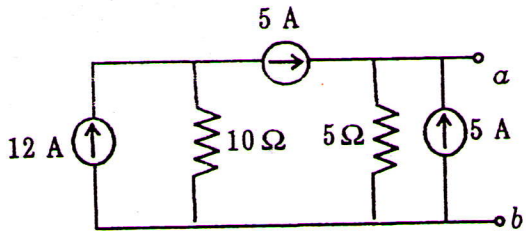

Fig. 2.

Or

(b) Find the current through 10Ω resistor by Delta star conversion :

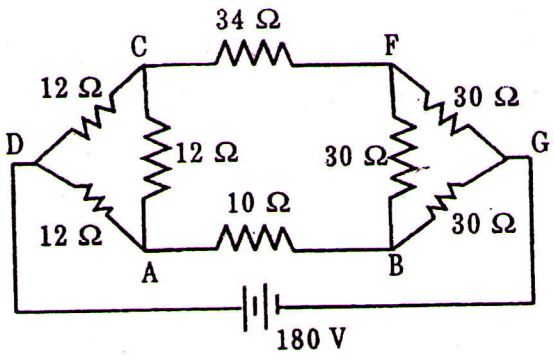

Fig. 3.

IV. (a) Draw a neat circuit diagram of scherring bridge and explain its principle of operation. Deriv the condition for bridge balance.

Or

(b) Obtain the Impedance and admittance parameters of the 2 port networks shown :

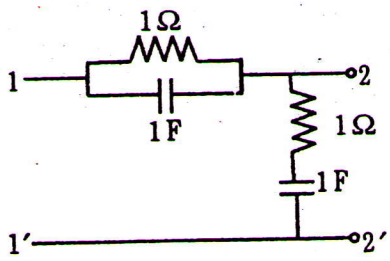

Fig. 4.

V. (a) Using block diagram reduction technique. Find the closed-loop transfer function of the systems for the following :—

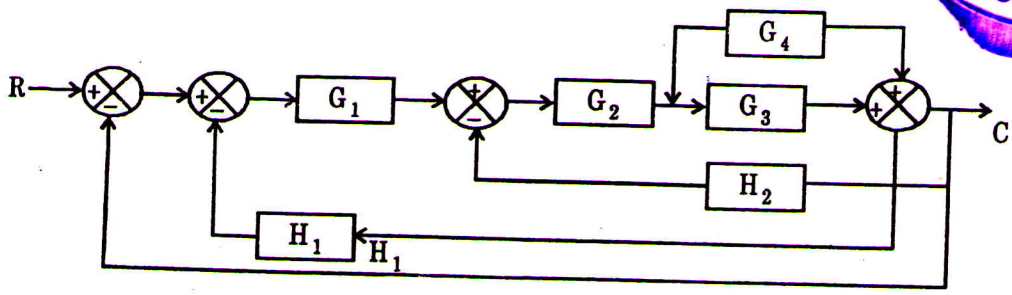

Fig. 5.

Or

(b) A unity feedback system is characterised by $G(s) = \frac{1}{s(s+1)(2s+1)}$.

(i) Determine the steady-state errors to unit-step function.

(ii) Determine rise time, peak time, peak overshoot, and setting time for the unit step response.

(4 × 15 = 60 marks)