Code: 9A02405

R09

II B. Tech II Semester (R09) Supplementary Examinations, November/ December 2011

ANALOG ELECTRONIC CIRCUITS

(Electrical & Electronics Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Show that in the case of transformer coupled class A power amplifier, maximum theoretical efficiency is 50%.

(b) Compare series fed and transformer coupled class A amplifiers.

2 (a) Compare the performances of CB, CE, CC amplifiers.

(b) Draw the AC equivalent circuit of a CC amplifier using h-parameter model and derive the equations for input impedance, output impedance, voltage gain and current gain.

3 Explain the method of unsymmetrical triggering of the binary with relevant circuit diagram.

4 Draw and explain voltage-shunt amplifier using h-parameter model, derive voltage gain, input resistance, output resistance and current gain closed loop and open loop.

5 Consider the FET Hartley oscillator circuit with source resistance Rs (omit the bias and supply). If the resistances of the inductors are r_1 and r_2, find the frequency of oscillation and find the value of Rs for which the value of the loop gain will just equal unity.

6 (a) Explain how transistor can be used as a switch in the circuit, under what condition a transistor is said to be 'OFF' and 'ON' respectively.

(b) A germanium transistor is operated at room temperature in the CE configuration. The supply voltage is 6 V, the collector-circuit resistance is 200 and the base current is 20 percent higher than the minimum value required to drive the transistor into saturation. Assume the following transistor parameters: Ico =-5μA, I_{EO}=-2μA, h_{FE}=100 and rbb0=250. Find V_{BE}(Sat) and V_{CE} (Sat).

7 (a) Discuss the response of RC High Pass circuit for square wave input, also sketch necessary waveforms.

(b) Explain how low pass RC circuit acts as integrator.

8 (a) What is diffusion capacitance of a transistor and derive its equation.

(b) In a given germanium PNP transistor whose base width is 10^{-4} cm. At room temperature and for a dc emitter current of 2mA, find emitter diffusion capacitance and gain - band width product.

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R09

Code: 9A02406

II B. Tech II Semester (R09) Supplementary Examinations, November/December 2011

NETWORK THEORY

(Electrical & Electronics Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Obtain the relation between the phase and line values of a 3-phase balanced star-connected system.

(b) Three impedances each of (10+j24) Ω are connected in delta to a 240v, 3-phase, 50 HZ supply. Calculate the line and phase currents.

2 (a) Derive the expression for power and p.f. of a 3-phase system using two-watt meter method.

(b) A balanced 3-phase, 200v, 50HZ supply is given to a load consisting of 3-impedances (4+j2), (1+j3) and (2+j4) ohms connected in star. Calculate the voltages across and currents in three phases of load.

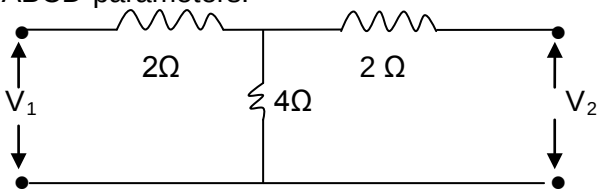
3 (a) Derive the expression for i(t), when the RL-series circuit is excited by a D.C. voltage applied at t=0 sec.

(b) In a series RLC-circuit R=5Ω, L=0.1H and C=0.01F. A d.c. voltage of 20v is applied at t=0sec. Obtain i (t).

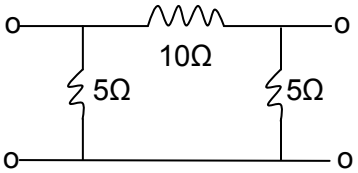
4 Obtain the expression for current when a series RLC- circuit is excited by a sinusoidal voltage source $v=v_m \sin(wt+\theta)$, When switch is closed at t=0 sec, using Laplace transforms.

5 (a) Obtain the y-parameters.

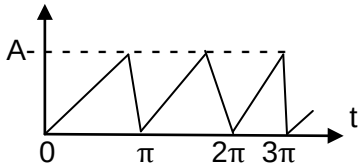
(b) Obtain the ABCD-parameters.



6 Two identical networks are connected in cascade. Find z-parameters of combination.



7 Determine two Fourier series of the given wave form.



8 Discuss the properties of Fourier transforms in detail.

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Code: 9A02407

R9

II B. Tech II Semester (R09) Supplementary Examinations, November/ December 2011

ELECTRICAL MACHINES - II

(Electrical & Electronics Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Explain the Scott connection in transformers.
(b) Explain ON-load and OFF-load tap changers.

2 An efficiency of an induction motor is 0.85 when the load in 70kW. At this load, the station resistance and rotor resistance loss each equals the in loss. The machine loss are one fourth of the no load loss. Calculate the slip.

3 (a) Explain the no load and blocked rotor tests on 3-phase induction motor.
(b) Explain how the equivalent circuit parameters 3-phase induction motors are obtained from the tests.

4 (a) Give the constructional features of "CORE" and "Shell" types of transformers, and give the advantages and disadvantages of each type.
(b) Derive the emf equation of a transformer.

5 (a) Explain the various simple tests conducted on a single transformer to find the approximate equivalent circuit of transformer.
(b) OC test is preferred to conduct on LV side & SC test is preferred to conduct on HV side. Explain the reasons.

6 (a) Derive the relationship between mechanical power developed, rotor input and rotor copper loss.
(b) Explain the tests to be conducted to find the equivalent circuit of an induction motor.

7 (a) Describe static slip power recovery scheme of speed control with neat sketch.
(b) What are the merits of this method over classical methods?

8 (a) What is the efficiency of transformer? How the efficiency of transformer can be calculated?
(b) The turn's ratio of a single phase transformer is 4. The resistance & leakage reactance of HV windings are 1.4 & 1.6 respectively and that of LV windings are 0.06 & 0.08 respectively. If 200 V is applied to HV winding & LV winding is short circuited, find the current supplied by the source. (Neglect magnetizing current).

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Code: 9A04401 R09

II B. Tech II Semester (R09) Supplementary Examinations, November/ December 2011

SWITCHING THEORY & LOGIC DESIGN

(Common to Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering & Electronics & Computer Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 Using PLA logic, implement a BCD to excess 3 code converter. Draw its truth table and logic diagram.

2 A clocked sequential circuit is provided with a single input x and single output Z. Whenever the input produce a string of pulses 1 1 1 or 0 0 0 and at the end of the sequence it produce an output Z = 1 and overlapping is also allowed.
(a) Obtain State - Diagram.
(b) Also obtain state - Table.
(c) Find equivalence classes using partition method & design the circuit using D- flip-flops.

3 (a) Implement the following Boolean functions using decoder and OR gates.
$F_1 (A, B, C, D) = \sum (1, 5, 7, 9)$.
$F_2 (A, B, C, D) = \sum (12, 13, 14, 15)$.
(b) What is Hazard in switching circuits? Explain the design of Hazard free Switching circuit with an example.

4 (a) Find the complement of the following Boolean functions.
i) F = AB' + A'B
ii) F = (V'W + X)Y +Z'
(b) Prove that OR-AND network is equivalent to NOR-NOR network.
(c) Implement the Boolean function F = A (B + CD) + BC' using only NOR gates.

5 a. Draw the logic diagram of a 4 bit binary ripple counter using positive edge triggering.
b. Draw the block diagram of a 4 - bit serial adder and explain its operation.

6 Simplify the following Boolean expressions using K-map and implement them using NOR gates.
i) F (A, B, C, D) = AB'C' + AC + A'CD'
ii)F (W, X, Y, Z) = W'X'Y'Z' + WXY'Z' + W'X'YZ + WXYZ

7 Draw the ASM chart for full adder and tabulate the state table for the same. Design the control circuit for the above using Multiplier.

8 (a) What is the necessity of binary codes in computers?
(b) Why the ASCII code was developed? Explain ASCII code with table.
(c) Encode the word DIGITAL in to 7 bit ASCII code.

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R09

Code: 9A02403

II B. Tech II Semester (R09) Supplementary Examinations, November/December 2011
GENERATION OF ELECTRIC POWER
(Electrical & Electronics Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 Draw the schematic diagram of a modern thermal power station and explain its operation.

2 (a) Discuss the merits and demerits of BWR (Boiler Water Reactor).
(b) Mention the factors to be considered for selection of site for hydro power stations.

3 (a) Explain the role of solar energy in the present scenario.
(b) Explain any two applications of solar energy.

4 Explain the working of horizontal axis wind mill with neat diagram.

5 Explain the types of biogas digester with neat diagram.

6 (a) Explain the principle of ocean energy.
(b) Give the economical justification of geothermal plants.

7 (a) Define:
(i) Load factor.
(ii)Diversity factor.
(b) The maximum demand on a power station is 100MW. If the annual load factor is 40%. Calculate total energy generated per year.

8 Explain the different types of tariffs in detail.

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Code: 9A02404 R09

II B. Tech II Semester (R09) Supplementary Examinations, November/ December 2011

ELECTROMAGNETIC FIELDS

(Electrical & Electronics Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) State and explain Coulomb's law of electrostatic field in vector form.
(b) It is required to hold four equal point charges to each in equilibrium at the corners of a square. Find the point charge, which will do this if placed at the center of the square.

2 (a) A co axial cable with inner and outer conductor radii 'a' and 'b' respectively have the respective voltage V_a and V_b by using Laplace's equation, find E at all points.
(b) The construction of a paper capacitor is as follows: Aluminum foil of 100 cm^2 area is placed on both sides of paper of thickness 0.03 mm. If the dielectric constant of paper is given as 3, and its dielectric breakdown strength is 200 kV/cm, what is the rating of the capacitor.

3 (a) Two large parallel conducting plates are separated by a distance d m in air. Find the capacitance per unit area.
(b) A conducting sheet of thickness tm (t<d) is now introduced between the plates, parallel to them but not touching them. Find the new capacitance per unit area between the outer plates.

4 (a) State and explain Biot-savart's law.
(b) Develop an expression for the magnetic field at any point on the line through the centre at a distance 'h' from the centre and perpendicular to the plane of a plane circular loop of radius 'a' and carrying current 'I' amperes.

5 (a) Using Amperes law find the magnetic field intensity due to an infinite current sheet of current density J and hence prove that magnetic field intensity at any point in between two infinite parallel surface current sheets carrying current in opposite direction is equal to sheet current density of each sheet.
(b) Express the value of H in rectangular components at P (0, 0.2, 0) in the field of a current filament 2.5 A in the a_z direction at x = 0.1 and y= 0.3.

6 (a) Explain magnetic dipoles and magnetic moment.
(b) A rectangular coil of area 10 cm^2 carrying a current of 50A lies on plane 2x+6y-3z = 7 such that the magnetic moment of the coil is directed away from the origin. Calculate its magnetic moment.

7 (a) The vector magnetic potential A due to a direct current in a conductor in free space is given by $A= (x^2 + y^2)\, a_z$ micro wb/m^2. Determine the magnetic field produced by the current element at (1, 2, 3).
(b) What is the inductance of a pair of transmission lines separated by 2 m in air and the diameter of each wire is 5 cm the line is 15m in length?

8 Write down the Maxwell's equation in their general integral form. Derive the corresponding equations for fields varying harmonically with time.

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