R09

Code: 9A02407

B. Tech II Year II Semester (R09) Supplementary Examinations, November/December 2012

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) Draw & explain the phasor diagram of transformer under loaded conditions.
(b) Explain the principle of working of 1-phase transformer on no-load conditions. Also explain the nature of no-load current.

2 (a) Obtain an expression for the regulation of a single-phase transformer from its equivalent circuit/phasor diagram.
(b) A 20 kVA, 2500/250 volts, 50 Hz, 1-phase transformer gave the following test results:
O.C. test (L.V. side): 250 V 1.4 A 105 W.
S.C. test (H.V. side): 104 V 8 A 320 W.
Compute the parameters of the approximate equivalent circuit referred to L.V.

3 (a) Explain. How a two winding transformer can be converted into an auto transformer? What is its new rating?
(b) Two single phase transformers with equal turns have impedances of (0.5+j 3) ohm and (0.6+j 10) ohm with respect to the secondary. If they operate in parallel, determine how they will share a total load of 100 kW at pf 0.8 lagging.

4 (a) What are the conditions required for the parallel operation of two transformers?
(b) Derive the equations for the currents supplied by each transformer when two transformers are operating in parallel with equal voltage ratios.

5 The rotor of a slip ring induction motor is connected to an AC source, where as its stator winding is short circuited. If rotating magnetic field produced by rotor winding' rotates clock wise. Explain the direction in which rotor must revolve.

6 (a) Draw the torque speed characteristics of 3-Φ induction motor and clearly explain the effect of change of rotor resistance.
(b) Explain the effect of skewing the rotor slots in squirrel cage induction motor and discuss the factor determining the choice of rotor slots in a squirrel cage induction motor.

7 It is desired to install a 3-phase cage IM is restricting the maximum line current drawn from 400 V, 3-phase supply to 120 A. If the starting current is 6 times the full load current, what is the maximum permissible full load kVA of motor when:
(a) It is directly connected to mains.
(b) It is connected through an auto transformer with 65% tapping.
(c) It is designed for use with star-delta starter.

8 (a) Explain the speed control of induction motor by rotor rheostat control and injecting e.m.f in the rotor side.
(b) The rotor of 3-phase slip ring induction motor has an induced voltage of 100 V and impedance of 0.2 + j 1 ohm at stand still. The induction motor has full load slip of 0.04 driving constant torque load and running at 1440 rpm. Calculate the voltage to be injected if the motor is to be driven at 800 rpm.

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Code: 9A04401

R09

B. Tech II Year II Semester (R09) Supplementary Examinations, November/December 2012

SWITCHING THEORY & LOGIC DESIGN

(Common to EEE, EIE, E.Con.E, ECE & ECC)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Explain the ASCII code with table.

(b) Encode the following text in to 7-bit ASCII code

JNTU ANANTAPUR

2 (a) Prove that AND-OR network is equivalent to NAND-NAND network.

(b) Prove the identity of the following Boolean equations:

i) Y + X'Z + XY' = X + Y + Z

ii) X'Y' + Y'Z + XZ + XY + YZ' = X'Y' + XZ +YZ'

(c) Determine the canonical sum of minterms form of the following function:

F(X,Y,Z) = (XY+Z)(Y+XZ).

3 (a) Simplify the following Boolean function for minimal SOP form using K-map

F(A,B,C,D) = ∑(0,1,2,4,5,6,8,9,12,13,14).

(b) Simplify the following Boolean function for minimal POS form using K-map

F(X,Y,Z) = X'YZ + XY'Z' + XYZ + XYZ'

4 (a) Design BCD to gray code converter and realize using logic gates.

(b) Design 2*4 decoder using NAND gates.

5 (a) Realize the following function using a PROM of size 8 x 3

F_1= Σ m(0,3,6)

F_2= Σ m(1,4,6,7)

F_3= Σ m(1,2,6)

(b) Write short notes on PLDs.

6 (a) What do you mean by triggering? Explain the various triggering modes with examples.

(b) Draw the logic diagram of a JK flip flop using excitation table and explain its operation.

7 (a) Explain mealy model with logic diagram.

(b) Explain moore model with logic diagram.

8 (a) Draw the ASM chart for binary divider.

(b) Draw the state diagram for a full adder circuit and convert it to ASM chart.

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Code: 9A02403

R09

II B. Tech II Semester (R09) Supplementary Examinations, November/December 2012

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 What are the methods of producing nuclear reaction? What is chain reaction?

2 Explain the principles of solar energy radiation.

3 What are the types of fuels used in thermal power plants? Briefly discuss.

4 What methods are used to overcome the fluctuating power generation of a windmill? Discuss their merits and demerits.

5 Explain the constructional detail and working of KVIC digester.

6 Classify the various geothermal energy sources and discuss their relative merits and demerits.

7 Explain the term depreciation and depreciation reserve. Why is it necessary to maintain it? Discuss the methods to calculate the depreciation charges.

8 Describe the desirable characteristics of a tariff.

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Code: 9A02404

R09

II B. Tech II Semester (R09) Supplementary Examinations, November/December 2012

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 for the vector force between two point charges in free space.

(b) Find the flux of the electric field through a spherical surface of radius 5 m and center origin, in free space, If there is a charge of 10 μc at the point (0, 0, 4 m). What are its units?

2 (a) What are the important properties of the potential in a charge free region that can be obtained from the Laplace's equation?

(b) The region between two concentric right circular cylinders contains a uniform charge density ρ use Poisson's equations to find V.

3 What is the capacitance of a capacitor consisting of two parallel plates 40 cm by 40 cm, separated by 6 mm in air? What is the energy stored by the capacitor if it is charged to a potential difference of 600 volts?

4 Derive an expression for magnetic field intensity at a point along the axis, due to a circular current carrying loop.

5 (a) What are the limitations of Amperes current law? How this law can be modified to time varying field.

(b) A circular loop located on $x^2 + y^2 = 9$, $z = 0$ carries a direct current of 10 A. Along a_Φ direction. Determine H at (0, 0, 5) and (0, 0, -5).

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) Derive an expression for energy density in a magnetic field

(b) A toriod has air core and has a cross sectional area of 10mm^2 it has 1000 turns and its mean radius is 10mm. find its inductance

8 (a) What is the inconsistency of Amperes circuital law? How was this modified by Maxwell?

(b) What is displacement current? Find the displacement current density within a parallel plate capacitor having a dielectric with area of plates = 0.01m^2 distance of separation = 0.05 mm and the capacitor voltage is 200 sin 200 t.

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Code: 9A02405

R09

B. Tech II Year II Semester (R09) Supplementary Examinations, November/December 2012

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 Derive all components in the hybrid - π model in terms of h parameters in CE configuration.

2 Draw the hybrid – π model of a transistor and derive its parameters and explain its frequency response.

3 (a) What is the effect of a current series negative feedback in the following performance measures of a BJT amplifier: (i) Input resistance. (ii) Output resistance. (iii) Bandwidth. (iv) Distortion and noise. (v) Gain stability.

(b) An amplifier requires an input signal of 60 mV to produce a certain output. With a negative feedback to get the same output, the required input signal is 0.5 V. The voltage gain with feedback is 90. Find the open loop gain and feedback factor.

4 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.

5 (a) Discuss the effect of nonlinear region of i_B-V_{BE} characteristic of each transistor used in complementary - symmetry class-B power amplifiers in detail.

(b) The power amplifier supplies 4 watts for 8 ohms load. The zero-signal d.c. collector current is 35 mA and it rises to 40 mA when the signal is applied. Determine the percent second harmonic distortion.

6 (a) Draw and explain circuit of two diode clipper, also draw necessary waveforms.

(b) Discuss the applications of voltage comparator.

7 (a) Explain in detail the junction diode switching times.

(b) Give a brief note on piece-wise linear diode characteristics.

8 (a) Discuss the different methods of triggering a flip-flop. Explain the role of commutating capacitors in a binary circuit.

(b) Draw the circuit diagram of a fixed bias binary with speed up capacitors.

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R09

Code: 9A02406

II B. Tech II Semester (R09) Supplementary Examinations, November/December 2012

NETWORK THEORY

(Electrical & Electronics Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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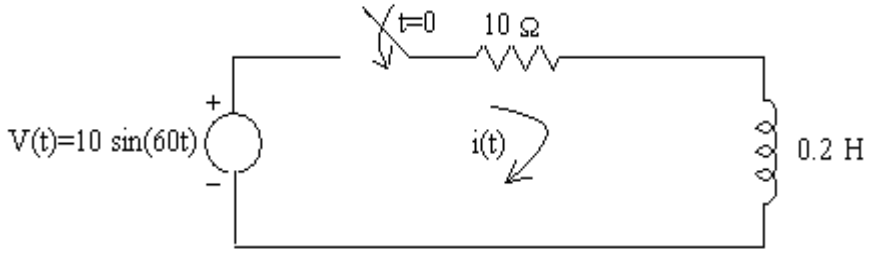
1 (a) Explain the measurement of power in a 3-phase system using three watt meter method.

(b) Three inductive coils, each with a resistance of 10 Ω and an inductance of 0.06 H are connected in delta to three phases, 440 V, 50 Hz supply. Calculate: (i) Phase current and line current. (ii) Total power absorbed.

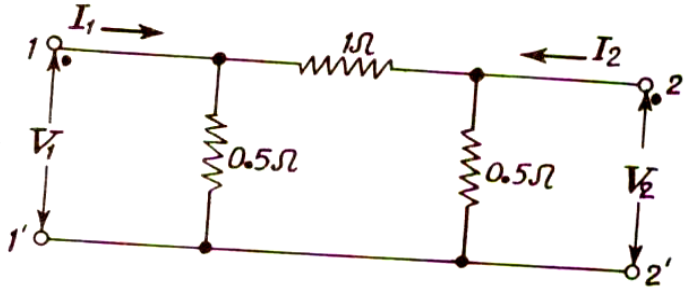
2 The power flowing in 3-Φ, 3 wire balanced load system is measured by the two-wattmeter method. The reading of wattmeter A is 4000 W and on wattmeter B is -1000 W. What is the power factor of the system and also derive the expression for power factor?

3 A series R-L circuit has R=25 Ω and L=5 H. A dc voltage of 100 V is applied at t=0. Find: (a) the equations for charging current, voltage across R and L and (b) the current in the circuit 0.5 sec. later and (c) the time at which the drop across R and L are same.

4 A series RL circuit is shown in figure below. If the switch 'K' in the circuit is closed at t=0, Find an expression for i (t) by using Laplace transform method.



5 Compute the ABCD parameters for the network shown below:



6 Write short notes on: (i) Transformed network. (ii) Cascaded networks.

7 Derive the Fourier series of a triangular wave.

8 Let $f(t) = 5e^{-(t-2)}u(t)$. Find $F(w)$ and use it to find the total energy in $f(t)$.

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