Code :9A02406 **1**

II B.Tech II Semester(R09) Regular Examinations, April/May 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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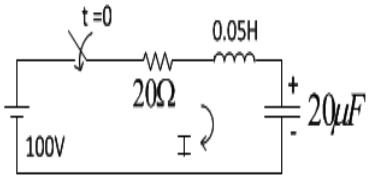
1. (a) Derive the relation between phase and line values of a 3-phase balanced delta connected system.
   (b) Three impedances each of (5+j12) ohm are connected in star to a 220V, 3-phase, 50Hz supply. Calculate the line currents.

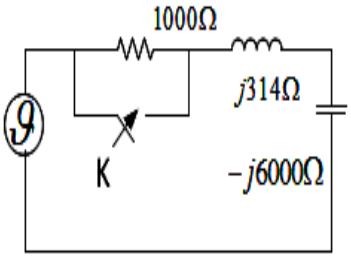
2. (a) Derive the expression for power factor of a 3-phase system by using two-wattmeter method.
   (b) A balanced 3-phase, 3 wire, 50Hz, 100v supply is given to a load consisting of three inpedances (1+j1) ohm, (1+j2) ohm and (3+j4) ohms connected in star. Compute the voltages across and currents in three phases of the load using loop current method.

3. (a) Derive the expression for i(t) of R-L series circuit when DC voltage in applied to it at t=0 by closing the switch. Define time constant of R-L circuit.

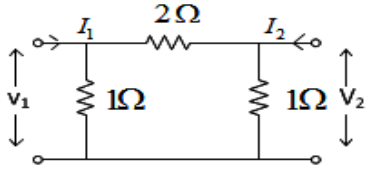


   (b) Using classical method find i(t) for $t \geq 0$.

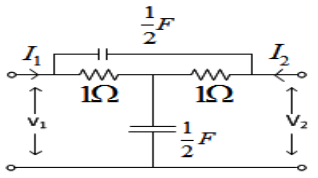
4. With the switch open steady state is reached with ϑ=100 sin 314 t volts. The switch is closed at t=0. The circuit is allowed to come to steady state again. Determine steady state current and complete solution of transient current.



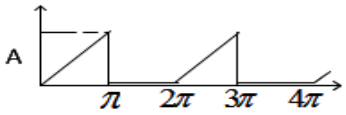
5. (a) State and explain Z-parameters.
   (b) obtain ABCD parameters.



6. Find Y and Z parameters.



7. Find the fouries series of the given wave form.



8. Find the fouries transform of the following signals.
(i) f(t)=8(t) (ii) f(t)=e^{-at}u(t).

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Code :9A02406 **2**

II B.Tech II Semester(R09) Regular Examinations, April/May 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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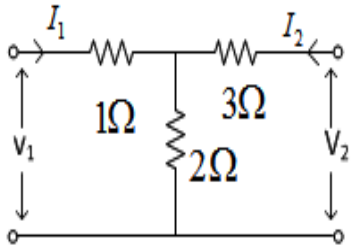
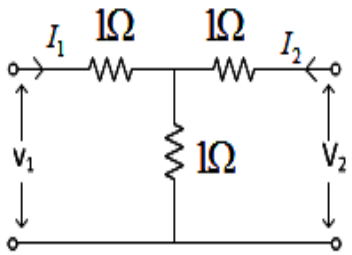
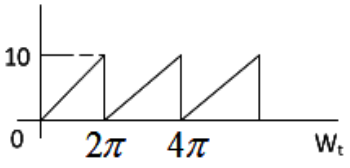
1. (a) Derive the relation between phase and live values in a 3-phase balanced star connected system.
   (b) Three impedances each of (3-j4) ohm are connected its delta to a 230V, 3-phase, 50Hz balanced supply. Calculate the live and phase currents in delta connected load and the power delivered to the load.
2. (a) Derive the expressions for power and power factor of a 3-phase system using two-wattmeter power measurement.
   (b) Three impedances (3+j4) ohm, (5+j0) ohm and (2-j2) ohm are connected in delta to a 100V, 3-phase, 50Hz balanced supply. Calculate the line currents and total power consumed.
3. (a) Derive expression for i(t) when R-C series circuit is excited by a DC voltage 'V' applied at t=0.
   (b) A dc voltage of 200V is suddenly applied to a series L-R circuit having $R = 20\Omega$ and inductance 0.2H. Determine the voltage drop across the inductor at the instant of switching on and at 0.02 sec later.
4. A 50Hz, 400V (peak value) simusoidal voltage is applied at A=0 to a series R-L circuit having resistance 5 ohms and inductance 0.2H. Obtain an expression of current at any instant 't', calculate the value of the transient current 0.01sec after switching on.
5. (a) State and derive the expression for Y parameters.



   (b) obtain hybrid parameters.
6. Two identical sections of the given network are connected its cascade. Obtain the ABCD parameters of the remitting circuit.



7. Find the value of f(t) of the given wave form.



8. Discuss the properties of fourier transforms in detail.

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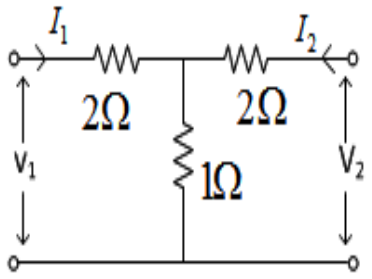
Code :9A02406 **3**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
NETWORK THEORY
(Electrical & Electronics Engineering)

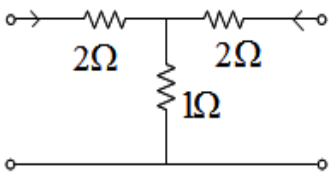
Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

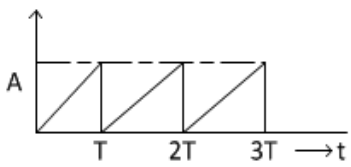
1. (a) Derive the expression for power of a 3-phase balanced star connected system using phasor diagrams.
   (b) Three impedances each (3-j4) ohms are connected its delta to a 230V, 3-phase, 50Hz supply. Calculate the real power, reactive power and total power delivered to the load.
2. (a) Derive the expressions for phase and line currents of unbalanced delta connected load to the balanced 3-phase supply using phasor diagrams.
   (b) Two wattmeters connected to measure the power input to a 3-phase circuit indicate 15 and 1.5 kw respectively, the latter reading being obtained after reversing the current, coil connections. Calculate the power and power factor of the load.
3. (a) Derive the expression for i(t) when series R-L-C circuit excited by dc voltage 'V' when the switch is closed at t=0.
   (b) In a series R-L-C circuit, $R = 5\Omega$, L=1H and C=1F. A dc voltage of 20V is applied at t=0 obtain i(t).
4. A series R-c circuit how $R = 20\Omega$ and $C = 100\mu f$. A voltage of V=200 Sin 314t is applied at t=2.14 m sec. Obtain the expression for i. Also find the value of current after time 1m.sec from the switching instant.
5. (a) State and derive the expression for ABCD parameters.
   (b) Obtain Z parameters.



6. Two identical sections of the given network are connected in cascade. Obtain z parameters of the combinations. Derive the formulae cued.



7. Determine the effective value of f(t) of the given wave form.



8. Discuss the properties of fourier transforms in detail.

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Code :9A02406 **4**

II B.Tech II Semester(R09) Regular Examinations, April/May 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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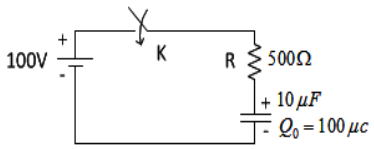
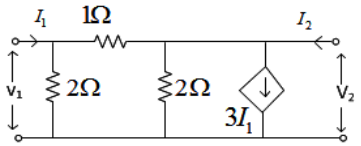
1. (a) Derive the expression for power of a 3-phase balanced delta connected system using phasor diagrams.
   (b) Three impedances each of (5+j12) ohms are connected in star to a 220V, 3-phase, 50Hz supply. Calculate the real power, reactive power and total power delivered to the load.
2. (a) When the system is said to be an unbalanced system?
   (b) A balanced 3-phase, 3-wire, 50Hz, 100V supply is given to a load consisting of three impedances (1+j1) ohm, (1+j2) ohm, and (3+j4) ohm connected in star connection. Compute the voltage across and currents in the three phases of the load using Millman's theorem.
3. (a) When series R-L circuit is excited by a d.c voltage of 'V' find i(t) when the switch is closed at time t=0.



   (b) A 500 ohm resister and $10\mu f$ capacitor are connected in series. A dc voltage of 100V is applied at time t=0. Capacitor has an initial charge of $100\mu C$ with polarities as shown. Find the expression for the current.
4. Obtain the expression for current when series R-L-C circuit is excited by sinusoidal voltage source $V = \vartheta m \sin(wt + \varphi)$ when switch is closed at t=0.
5. (a) State and derive expressions for hybrid parameters.
   (b) Obtain Z parameters for this given network.



6. Two identical network are connected in cascade. Find the ABCD parameters of combination. see figure 1.

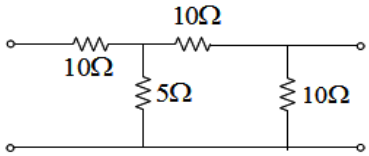


Figure 1: Figure for Question No.6

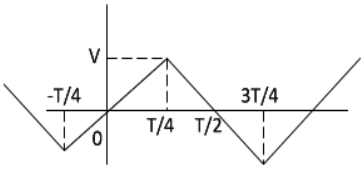


Figure 2: Figure for Question No.7

7. Obtain the fourier series for the given wave form. see figure 2.
8. Find the fourier transform of the following signals.
   (a) f(t)=δ(t) (b) f(t) = e^{-at}u(t).

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Code :9A02407 **1**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
ELECTRICAL MACHINES-II
(Electrical & Electronics Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) With the help of phasor diagram, explain the operation of single - phase transformer on No-load.
   (b) A single - phase transformer has 500turns on the primary and 40 turns on the secondary winding. The mean length of the magnetic path in the iron core is 150cm and the joints are equivalent to an air gap of 0.1mm. When a P.d of 3000V is applied to the primary, maximum flux density is 1.2wb/m^2. Calculate
      i. the cross-sectional area of the core
      ii. no-load secondary voltage
      iii. the no load current drawn by the primary
      iv. power factor on no-load. Given that AT/cm for a flux density of 1.2wb/m^2 in iron to be 5, the corresponding iron loss to be 2watts/kg at 50Hz and the density of iron as 7.8 gram/cm^3.

2. (a) Obtain an expression for approximate voltage drop in a single-phase transformer.
   (b) Calculate the percentage voltage drop for a transformer with a percentage resistance of 2.5% and a percentage reactance of 5% of rating 500KVA when it is delivering 400KVA at 0.8 pf lagging.

3. (a) Explain how equivalent circuit parameters of a transformer are determined experimentally.
   (b) A 250/500V transformer gave the following test results;
   SC test : with lv wdg shorted 20V, 12A, 100W
   OC test : on lv side 250V, 1A, 80W
   Determine the circuit constants, insert these on the equivalent circuit diagram and calculate applied voltage and efficiency when the output is 10A at 500 volt and 0.8 pf lagging.

4. (a) Discuss about the different methods of starting of squirrel-case induction motor.
   (b) The full -load ship of a 400v, 3-phase case induction motor is 3.5% and with locked rotor, full-load current is circulated when 92volt is applied between lines. Find necessary tapping on an auto-transformer to limit the starting current to twice the full-load current of the motor. Determine also the starting torque interms of the full load torque.

5. Describe the following speed control methods of induction motors
   (a) Cascade connection
   (b) Injection of emf into rotor circuit.

6. (a) From fundamentals, deduce a relationship between Rotor power input, rotor copper loss and mechanical power developed in case of Induction motor.
   (b) A 3-phase, 440V, 50Hz, 40 pole, Y-connected induction motor has rotor resistance of 0.1 Ω and reactance 0.9 Ω per phase. The ratio of stator to rotor turns is 3.5. Calculate
      i. gross output at a slip of 5% and
      ii. the maximum torque in sync. Watts and the corresponding slip.

7. (a) Explain the principle of operation of Induction motor.
   (b) A 1100V, 50Hz delta connected induction motor has a star-connected slip ling rotor with a phase transformation ratio of 3.8. The rotor resistance and stand still leakage reactance are 0.012 Ω and 0.25 Ω per phase respectively. Neglect stator impedance and magnetizing current. Determine
      i. the rotor current at start with slip-rings shorted
      ii. the rotor power factor at start with slip- rings shorted.
      iii. the rotor current at 4% slip with slip- rings shorted.
      iv. the rotor power factor at 4% slip with slip- rings shorted.
      v. the external rotor resistance per phase required to obtain a starting current of 100A in the stator supply lives.

8. (a) Describe the most common 3-phase transformer connections.
   (b) Two single - phase furnaces working at 100V are connected to 3300V, 3-phase mains through scott-connected transformers. Calculate the current in each line of the 3-phase mains when the power taken by each furnace is 400 KW at a power factor of 0.8 lagging. Neglect losses in the transformer.

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Code :9A02407 **2**

II B.Tech II Semester(R09) Regular Examinations, April/May 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) Describe the constructional details of different types of single-phase transformers.
   (b) Explain how hysteresis and eddy current losses are minimized in a single-phase transformer.
2. (a) Obtain the condition for maximum efficiency of a transformer.
   (b) A 600KVA single phase transformer when working at UPF has an efficiency of 92% at full-load and also at half -load. Determine the efficiency when it operates at unity pf and 60% of full-load.
3. (a) Derive an expression for saving of copper in case of auto transformer when compared with two winding transformer.
   (b) Two single-phase transformer with equal turns have impedances of (0.5+j3)Ω and (0.6+j10)Ω with respect to the secondary. If they operate in parallel, determine how they will share a total load of 100KW at 0.8pf lagging.
4. A 415V, 29.84KW, 50Kz, delta-connected motor gave the following test data:
   No-load test : 415V; 21A; 1250W
   Locked-rotor test:100V; 45A; 2730W
   Construct the circle diagram and determine(a) the line current and power factor for rated output (b) the maximum torque. Assume stator and rotor Cu losses equal at stand still.
5. (a) Explain how the speed of induction motor is controlled by cascade connection.
   (b) Explain the the principle of operation of Induction generator.
6. (a) With the help of torque-speed characteristics, explain the operation of double squirrel case motor.
   (b) The resistance and reactance (equivalent) values of a double-case induction motor for stator, outer and inner case are 0.25,1.0 and 0.15Ω resistance and 3.5, zero and 3.0 ohm reactance respectively. Find the starting torque if the phase voltage is 250V and the synchronous speed is 100rpm.
7. (a) Explain the principle of operation of Induction motor.
   (b) The star connected rotor of an induction motor has a standstill impedance of (0.4+j4) ohm per phase and the rheostat impedance per phase is (6+j2)ohm. The motor has an induced emf of 80V between slip-rings at stand-still when connected to its normal supply voltage. Find
      i. rotor current at standstill with the rheostat is in the circuit and
      ii. when the slip-rings are short-circuited and motor is running with a slip of 3%.
8. (a) Describe the constructional details of 3-phase transformer.
   (b) Two furnaces are supplied with 1-phase current at 50V from a 3-phase, 4.6 KV system by means of two 1-phase, Scott connected transformers with similar secondary windings. When the load on the main transformer is 350 KW and that on the other transformer is 200KW at 0.8 pf lagging, what will be the current in each 3-phase line? Neglect phase displacement and losses in transformers.

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Code :9A02407 **3**

II B.Tech II Semester(R09) Regular Examinations, April/May 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) Describe the EMF equation of a single-phase transformer.
   (b) A 25 KVA transformer has 500turns on the primary and 50 turns on the secondary winding. The primary is connected to 3000V, 50Hz supply. Find the full load primary and secondary currents, the secondary emf and the maximum flux in the core. Neglect leakage drops and noload primary current.
2. (a) Describe the effect of variations of frequency and supply voltage on iron-losses.
   (b) Find all day efficiency of a transformer having maximum efficiency of 98% at 15KVA at unity pf and loaded as follows:
   12hours - 2KW at 0.5 pf lag
   6 hours - 12 KW at 0.8 pf lag
   6 hours - at no load
3. (a) What are conditions that must be satisfied for successful parallel operation of single-phase transformers-Explain.
   (b) Two transformers have the following particulars:

	Transformer A	Transformer B
Rated current	200A	600A
Per unit resistance	0.02	0.025
Per unit reactance	0.05	0.06
No-load emf	245V	240V

   Calculate the terminal voltage when they are connected in parallel and supply a load impedance of (0.25+j0.1) Ω.
4. Draw the circle diagram of a 7.46KW, 200V, 50 Hz, 3-phase slip-ring induction motor with a star-connected stator and rotor, a winding ratio of unity, a stator resistance of 0.38Ω /phase and a rotor resistance of 0.24Ω /phase. The following are the test readings:
   No-load: 200V; 7.7A; $\cos\phi_0$ =0.195
   Short circuit: 100V; 47.6A; $\cos\phi_s$ =0.454
   Find (a) Starting torque and (b) maximum torque, both in sync.watts (c) the maximum power factor (d) the slip for maximum torque (e) the maximum output
5. (a) Describe the different speed control methods of Induction motors.
   (b) Explain the principle of operation of Induction generator with the help of torque -speed characteristics.
6. (a) Obtain the equivalent circuit of a double-case induction motor.
   (b) The useful full load torque of 3-phase, 6 pole, 50Hz inductor motor is 162.84 N-m. The rotor emf is observed to make 90 cycles per minute. Calculate (a) motor output (b) cu loss in rotor (c) motor input and (d) efficiency if mechanical torque lost in windage and friction is 20.36 N-m and stator losses are 830W.
7. (a) Describe the constructional details of case and wound rotor induction machines.
   (b) A 3ϕ induction motor having a star connected rotor has an induced emf of 80 volts between slip-rings at standstill on open-circuit. The rotor has a resistance and reactance per phase of 1Ω and 4Ω respectively. Calculate current/phase and power factor when
   (i) slip-rings are short-circuited (ii) slip-rings are connected to a star connected rheostat of 3Ω per phase.
8. (a) Describe Three-phase to Two-phase conversion by using Scott connection.
   (b) A 120 KVA, 6000/400V,Y/Y, 3 phase, 50Hz transformer has an iron loss of 1600W. The maximum efficiency occurs at 3/4 full load. Find the efficiencies of the transformer at (i) full -load and 0.8 power factor and (ii) the maximum efficiency.

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Code :9A02407 4

II B.Tech II Semester(R09) Regular Examinations, April/May 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) With the help of phasor diagram. Explain the operation of single-phase transformer on load(lagging).
   (b) A single-phase transformer with a ratio of 440/110V takes a no-load current of 5A at 0.2 pf lagging. If the secondary supplies a current of 120A at a pf of 0.8 lagging, estimate the current taken by the primary.

2. (a) Deduce the equivalent circuit if a single-phase transformer referred to primary side.
   (b) The parameters of a 2300/230V, 50Hz transformer are given below:
   $R_1 = 0.286\Omega, X_1 = 0.73\Omega, R_0 = 250\Omega$,$X_0 = 1250\Omega$,$R_2^1 = 0.319\Omega, X_2^1 = 0.73\Omega$
   The secondary load impedance, Z_L=0.387+j0.29. Calculate the efficiency and voltage regulation with normal voltage across the primary.

3. (a) With a neat circuit diagram, explain how sumpner test is conducted on a pair of similar transformers.
   (b) Two similar 250KVA single - phase transformers gave the following results when tested by back-to-back method.
   Mains Wattmeter, W_1=5.0KW primary series circuit wattmeter, W_2=7.5KW(at full load current)
   Find out the individual transformer efficiencies at 75% full load and 0.8pf lead.

4. (a) Discuss about the different methods of starting of slip-ring induction motor.
   (b) The full - load efficiency and power factor of a 12KW, 440V, 3-phase induction motor are 85% and 0.8 lag respectively. The blocked rotor line current is 45A at 220V. Calculate the ratio of starting to full -load current, if the motor is provided with a star-delta starter. Neglect magnetising current.

5. (a) Explain how the speed of induction motor is controlled by injecting emf into the rotor circuit.
   (b) Explain the principle of operation of Induction generator.

6. (a) Explain the phenomenon of crawling of an Induction motor with the help of torque-speed characteristics.
   (b) Derive Induction motor Torque equation.

7. (a) Explain how rotating magnetic field of constant amplitude is produced.
   (b) A 4 pole, 3-phase induction motor operates from a supply whose frequency is 50Hz. Calculate.
      i. the speed at which the magnetic field of the stator is rotating.
      ii. the speed of the rotor when the slip is 0.04
      iii. the frequency of the rotor currents when the slip is 0.03
      iv. the frequency of the rotor currents at standstill.

8. (a) Describe Three-phase to Two-phase conversion by using scott connected transformers for balanced and unbalanced loads.
   (b) A 500KVA, 3-phase, 50Hz transformer has a voltage ratio (line voltages) of 33/11 KV and is delta/star connected. The resistances per phase are: high voltage 35Ω,low voltage 876Ω and the iron loss is 3050W. Calculate the value of efficiency at full load and one-half of full load respectively (i) at unity pf and (ii) 0.8pf .

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Code :9A04401 **1**

II B.Tech II Semester(R09) Regular Examinations, April/May 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
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) A person on SATURN possessing 18-fingers has a property with$(1{,}00{,}000)_{18}$. He has 3 daughters and two sons. He wants to distribute half of the money equally to his sons and remaining half to his daughters equally. How much his each son and each daughters will get in Indian currency?
   (b) An Indian started on an expedition to SATURN with Rs 1,00,000. The expenditure on SATURN will be in the ratio of 1:2:7 for food, clothing and travelling, How much he will be spending on each item in the currency of SATURN.

2. (a) Find the complement of the function f=A+BC, then show that $F.\overline{F} = 0$ and $F + \overline{F} = 1$.
   (b) Reduce the following Boolean expressions into the indicated number of literals:
      i. A^1C^1+ABC+AC^1 to 3 literals
      ii. ($x^1.y^1+z^1$)+z+xy+wz to 3 literals
      iii. $A^1B(D^1+C^1D)$+B(A+A^1CD) to 1 literal.
      iv. (A^1+C)(A^1+C^1)(A+B+C^1D) to 4 literals.

3. Define cyclic PI chart and using branching method find the minimal expression of the switching function: f(w,x,y,z)= $\sum m(0,1,5,7,8,10,14,15)$.

4. (a) Design BCD to xs-3 code converter using logic gates.
   (b) What is meant by Hazards? Explain the different types of Hazards. Obtain Hazard free realization circuit for the function:f(A,B,C,D)= $\sum m(0, 2, 6, 7, 8, 10, 12)$.

5. (a) Find the minimal threshold-logic realization for the function f(A,B,C,D)= $\sum m(2, 3, 6, 7, 10, 12, 14, 15)$
   (b) What are the capabilities and limitations of T-gate?

6. (a) Design a sequential circuit with two D-Flip-Flops A and B and one input x. When x=0, the state of the circuit remains the same. When x=1, the circuit goes through the state transitions from 00 to 01 to 11 to 10 back to 00 and repeats.
   (b) Convert SR-Flip-Flop into JK-Flip-Flop.

7. Find the equivalence partition for the machines'M' shown in fig(1) below:
   (a) Show the standard form of the corresponding machine.
   (b) Find a min. length sequence that distinguishes states A and B.

PS	NS,Z	
	X=0	X=1
A	B,1	H,1
B	F,1	D,1
C	D,0	E,1
D	C,0	F,1
E	D,1	E,1
F	C,1	E,1
G	C,1	D,1
H	C,0	A,1

8. (a) Explain the Salient features of the ASM chart
   (b) Draw an ASM chart and state diagram for the synchronous circuit having the following description: "The circuit has a control input 'x', clock and outputs A and B. If x=1, on every clock edge(rising of falling) the code on BA changes from 00 → 01 → 10 → 11 → 00 and repeats. If x=0, the circuit holds the present state".

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Code :9A04401 **2**

II B.Tech II Semester(R09) Regular Examinations, April/May 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. (a) What is self complematary code? Explain with example?
   (b) Convert the following numbers.
      i. $(3456)_{10}$ to base 8
      ii. $(6547)_{12}$ to base 16
2. (a) Show that the dual of the exclusive-or is equal to its complement?
   (b) Show that a positive logic NAND gate is negative logic NOR gate and ViceVersa.
3. Minimize the function using karraugh-map and obtain minimal SOP function? f(A,B,C,D)= π(1,2,3,4,6,9,10,12,14)+d(5,7,11).
4. (a) Write a short notes on 4 - to - 1 multiplexer?
   (b) What are the applications of decoders and multiplexer?
5. (a) Realize the following Boolean function using threshold gate?
   F(a,b,c,d)= Σ(0,1,3,4,5,7,9,11,13)
   (b) What is programmable logic array?
6. (a) Draw the circuit of a negative edge triggered JK filp flop with active high preset & clear, explain its operation with the help of truth table
   (b) Define:
      i. Hold time
      ii. Setup time
7. (a) Distinguish between melay and moore machines?
   (b) Find the equivalence partition for the given machine and standard form of corresponding reduced machine.

PS	NS^2	
	X=0	X=1
A	B,0	E,0
B	E,0	D,0
C	D,1	A,0
D	C,1	E,0
E	B,0	D,0

8. Construct an ASM block that has 3 i/p variables (A,B,C), 4 output variables(W,X,Y,Z) and 2 exit paths for this block, output Z is always 1 and W is 1 if A and B both are 1, If C=1 and A=0 ,Y=1 and exit path 1 is taken. If C=0 or A=1,X=1 and exit path 2 is taken. Realize the above using multiplexer and register?

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Code :9A04401 **3**

II B.Tech II Semester(R09) Regular Examinations, April/May 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. (a) Explain error correction and error detection codes with examples?
   (b) Convert the following hexadecimal number to octal, decimal and binary (i) CA 732 (ii) 1AC78
2. (a) Draw the logic diagram to implement the following Boolean expressions
      i. Y=A+B+B^1(A+C^1)
      ii. Y=A(B⊕D)+C^1
      iii. Y=A+CD+ABC
      iv. Y=(A⊕C)^1+B
   (b) Express the Boolean function F=A+B^1C as a sum of min - terms.
3. For the given function
   F(A,B,C,D)= $\Sigma(0,3,4,7,8,9,11,12,14,15,16,20,23,24,27) + \Sigma d(1,2,10,13,17,18,19,22,26)$
   obtain the minimal SOP expression using kmap.
4. (a) Explain the operation of priority encoder?
   (b) Give the applications of multistage synthesis.
5. (a) Design a BCD to excess - 3 code converter using
      i. ROM
      ii. PAL
   (b) Compare combinational and sequential logic circuits?
6. (a) Design a Mod -6 synchronous counter using JK flip flop?
   (b) Classify the sequential circuits with one example?
7. Find the equivalence partition and corresponding reduced machine instandard form for the machine given below.

PS	NS,Z	
	X=0	X=1
A	E,0	C,0
B	C,0	A,0
C	B,0	G,0
D	G,0	A,0
E	F,0	B,0
F	E,0	D,0
G	D,0	G,0

8. Construct an ASM block that has 3 input variable(A,B,C), 4 output variables(W,X,Y,Z) and 2 exit paths. For this block, output Z is always 1, and W is 1. If A and B both are 1, If C=1 and A=0,Y=1 and exit path 1 is taken. If C=0 or A=1,X=1 and exit path2 is taken, Realize the as one using PLA control and give the PLA table.

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Code :9A04401 4

II B.Tech II Semester(R09) Regular Examinations, April/May 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. (a) The message below has been coded in Hamming code for BCD transmitted through a noisy channel. Decode the message assuming that at most a single error has occurred in each code word.
   10010010111001111101100011011
   (b) Noting that 3^2=9, formulate a simple procedure for converting base-3 numbers directly to base-9. Use the procedure to convert
   $2110201102220112)_3$ to base -9.

2. (a) Develop a circuit for each of the following Boolean expression using only NAND gates
   (i)Y=(A+C)(B+D) (ii) Y=AB(C+D)
   (b) What are the Huntington postulates. List out.
   (c) What are the differences between ordinary algebra and Boolean algebra.

3. (a) Simplify the following five variable Boolean function using K-map technique:
   F(A,B,C,D,E)= $\Sigma_M(0,4,8,12,16,18,20,22)+\Sigma_d(24,26,28,30,31)$.
   (b) Explain the following with respect to Q.M. Method
      i. Essential Row
      ii. Dominated Row
      iii. Dominating column

4. Implement the following function
   F(A,B,C,D)=$\Sigma_M(0,1,3,4,7,10,12,14)$ using
   (a) 16:1 MUX (b) 8:1 MUX (c) 4:1 MUX

5. (a) Design BCD to xs-3 code converter using PLA.
   (b) Discuss the comparision between PROM,PLA and PAL.

6. (a) Design the sequence detector which detects 110010 using T - Flip-Flops.
   (b) Draw the state diagram and state table of the serial binary adder and implement by using D-Flip-Flop.

7. (a) What are the capabilities and limitations of FSM
   (b) For the machine 'M' shown in fig(1) below, find a minimal state reduced macine using merger table.

PS		A	B	C	D	E	F
NS,Z	I_1	E,0	F,0	E,-	F,1	C,1	D,-
	I_2	B,0	A,0	C,0	D,0	C,0	B,0

   Fig: 1 Machine 'm' state table.

8. (a) What is ASM chart? How it differs from the conventional flow chart? What are the symbols in ASM?
   (b) Draw an ASM chart and state diagram for the circuit fig(2) shown below:

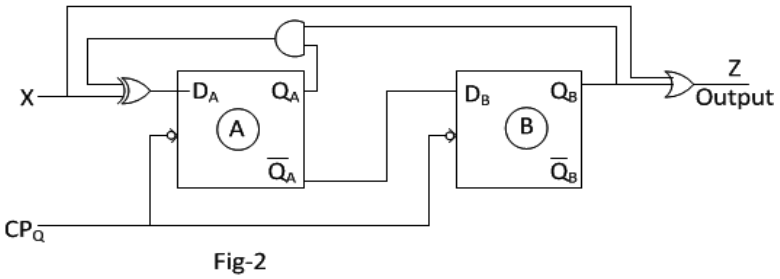

Fig-2

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Code :9A02403 **1**

II B.Tech II Semester(R09) Regular Examinations, April/May 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. (a) Explain the cooling arrangement used in the thermal power station.
   (b) What are the different electric equipment used in the thermal power station? Explain.
2. (a) What is a moderator? Name some common moderators and discuss their advantages and limitations.
   (b) Discuss the advantages and disadvantages of boiling water reactor.
3. (a) Explain the different methods of solar energy storage.
   (b) Explain any one type of solar energy collector with neat diagram.
4. Explain any one type of wind mill with neat diagram.
5. Explain the type of biogas digester with neat diagram.
6. (a) Give the economical justification of using geothermal plants.
   (b) List out the advantages and disadvantages of tidal power plants.
7. (a) Explain the load curve.
   (b) The maximum demand of a generating station is 200MW. The annual load factor being 60%. calculate the total electrical energy generated per year.
8. Explain different types of tariffs in detail.

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Code :9A02403 **2**

II B.Tech II Semester(R09) Regular Examinations, April/May 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. (a) What is the function of electrostatic precipitator used in the chimney of a thermal power station? Explain.
   (b) Explain how the steam boilers are classified.
2. (a) Mention the factors to be considered for selection of site for hydro power station.
   (b) Draw the layout of hydro power station and discuss it's generation.
3. (a) What is the importance of solar power in the present energy crisis in the world?
   (b) Why the flat plate energy collectors are classified as low temperature collectors? Explain flat plates energy collector with neat diagram.
4. Explain the working of horizontal axis wind mill with neat diagram.
5. (a) Explain the principles of bio-conversion.
   (b) Explain the environmental aspects of biogas energy generation in detail.
6. (a) What are the specific environmental effects if the geothermal source of energy is used for power generation?
   (b) List out the advantages of tidal power plants over the conventional hydel power plants.
7. Define the factors which effect the cost of generation and explain their division into fixed, semi fixed and running costs.
8. (a) Briefly explain how "Two part tariff" is most justified.
   (b) A consumer has a maximum demand of 200 KW at 40% load factor. If the tariff is Rs 100/- per KW of maximum demand plus 10paise per KWh. Find the overall cost per KWh.

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Code :9A02403 **3**

II B.Tech II Semester(R09) Regular Examinations, April/May 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. (a) Explain the fire tube boiler used in thermal power station.
   (b) Explain the necessity of a condenser used in the thermal power station.
2. Draw the schematic diagram of nuclear power station and discuss it's generation.
3. (a) Explain the role of solar energy in the present scenario.
   (b) Explain flat plate energy collector with neat diagram.
4. Explain the working of vertical axis wind mill mentioning the specific arrangement of blades.
5. (a) Explain the advantages and disadvantages of biogas energy generation.
   (b) Explain one type of biogas digester with neat diagram.
6. (a) List out the advantages and disadvantages of tidal power plants.
   (b) What are the specific environmental effects if the geothermal source of energy is used for power generation?
7. The annual peak load on a 30MW power station is 25MW. The power station supplies loads having maximum demands of 10MW, 8.5MW, 5MW and 4.5MW. The annual load factor is 45% .Find:
   (a) Average load
   (b) Energy supplied per year
   (c) Demand factor
   (d) Diversity factor
8. Explain different types of tariffs in detail.

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Code :9A02403 4

II B.Tech II Semester(R09) Regular Examinations, April/May 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 a typical layout of a thermal power plant and describe the functions of the following components
   (a) Coal and ash handling plant
   (b) Steam generating plant
   (c) Steam turbine
   (d) Feed water circuit
   (e) Cooling towers.
2. Explain the working of boiling water reactor with a neat diagram and also discuss it's advantages and disadvantages.
3. (a) Explain the role of solar energy in brief.
   (b) Explain concentrating solar energy collector with neat diagram.
4. Discuss the advantages and disadvantages of horizontal and vertical axis wind mills with neat sketches.
5. (a) Explain the advantages and disadvantages of biogas energy generation.
   (b) Explain any one type of biogas digester used in biogas energy generation.
6. (a) List out the advantages and disadvantages of tidal power plants over the conventional hydel power plants.
   (b) Give the economical justification of using geothermal plants.
7. (a) Explain integrated load duration curve.
   (b) The maximum demand on a power station is 100MW. If the annual load factor is 40%, calculate total energy generated in a year.
8. (a) Briefly explain how "Two part tariff is most justified."
   (b) A consumer has an annual consumption of 176400 KWh. The change is Rs 150/-per KW of maximum demand plus 15 paise per KWh. Find the annual bill if the load factor is 40%.

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Code :9A02404 **1**

II B.Tech II Semester(R09) Regular Examinations, April/May 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 Gauss's law of slutro magnetics in integral form.
   (b) Two points $Q_1 = 2X10^{-4}C$ located at (1,2,4) and $Q_2 = 2X10^{-4}C$ located at (1,2,-3) and $Q_3 = -4X10^{-4}C$ located at (2,0,6) arc situated. Find the factor force F_2 on change Q_2.
2. (a) Derive Laplaci's equation from fundamentals.
   (b) Find the potential 'V' at the point (2,3,4) for the field of two co-axial conducting cylinders. Given V=60v at $\rho = 3m$ and $v = 10v$ at $\rho = 5m$
3. (a) State equation of continuity and derives the expression for the same.
   (b) A condenser is built of two parallel plates each 50cm^2 in area separated in air by 1mm. If $100\mu j$ of energy are required to increase distance between the plates to 3mm. calculate the initial and final voltages across the plates. Assume perfect insulation.
4. (a) Derive Maxwell's second equation div(B)=0.
   (b) Derive magnetic field intensity due to a spare current carrying element.
5. (a) Derive the Maxwell's third equation $\nabla XH = J$
   (b) Obtain expression for 'H' both inside and outside a cylindrical conductor of radium 'R' having uniform current denity also plot graphically the variationof 'H' with the radial distance from the centre of the conductor.
6. (a) Derive the torque on a current 100p placed in a magnetic field.
   (b) A single phase circuit comprises two parallel conductors A and B each 1cm diameter and spaced 1m apart. The conductors carry current of 100A and -100A respectively. Determine the field intensity at the surface of each conductor and also in space exactly midway between A and B.
7. (a) Derive the self inductance of a soleurid.
   (b) Two mutually coupled coils are connected in series $L_1 = 0.1H, L_2 = 0.6H, M = 0.1H$ A dc. Current of 2A is passed through their system in such a way that the current increase at a uniform rate of 1A/sec. what is the voltage developed across the end point if the coils connected in a magnitically
      i. Aiding connection
      ii. Opporing connection
      Derive formulae used.
8. (a) Derive the expression of one of the maxwell's equation curl $(E) = \frac{-\partial b}{\partial t}$
   (b) A Square coil rotates at a constant speed of 500rpm about an axis perpendicular to a stationary uniform field of magnetic induction 0.75 tesla. The coil has mean dimension of 15cmx15cm and it would with 1000 turns determine dynamically induced emf in the coil when the plane of the coil is
      i. In the same plane as the field
      ii. At right angles to the field
      iii. Inclined 60^0 to the field.

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Code :9A02404 **2**

II B.Tech II Semester(R09) Regular Examinations, April/May 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 in electro statics.
   (b) The non uniform field E=Y_{ax}+X_{ay}+Z_{az}, Determine the work expended in carrying 2'C' from B(1,0,1) to A(0.8,0.6,1) along the shorter arc of the circle x^2+y^2=1, Z=1.

2. (a) Show that the torque on a physical dipole $\bar{P}\,e-m$ in a uniform electric field $\bar{E}$ is given by $\bar{T}=\bar{P}\,x\,\bar{E}$ Extend the result to a pure dipole.
   (b) An electric dipole located at the origin its tree space has a moment $p=3_{ax}-2_{ay}+a_Z$ n.c.m. find
      i. Vat P_A(2,3,4)
      ii. Vat r=2.5, $\theta=30^0$, $\varphi=40^0$

3. (a) State and prove the boundary conditions at the dielectric surface.
   (b) A parallel plate capacitor consists two square plate metals with 500mm side and separated by 10mm. A slab of sulphur (E_r=4) 6 mm thick is placed on the lower plate and air gap of 4mm. Find the capacitance of a capacitor.

4. (a) State-Biot-Savartis law for the magnetic field $\bar{B}$ due to a steady line current element in tree space.
   (b) A uniform solenoid 100mm in diameter and 400mm long has 100 turns of wire and a current of I=3A. Find the magnetic field on the axis of the sole noid:
      i. At the centre
      ii. At one end
      iii. Half way from the centre to one end.

5. (a) State and explain Amper's circuital law? Describe any two application of Ampere's circuital law.
   (b) A steady current of 20A flow in a filament in the az direction on the Z-axis. Also $3a_Z$(A/m) be at $\rho=3$. sketch $H_\varphi, V_s\rho$, $0<\rho<5m$.

6. (a) Define a magnetic dipole. What is the magnetic moment? Describe how a differential current loop behave like a magnetic dipole.
   (b) Evaluate the inductance of a solenoid of 2800 turns wound uniformly over a length 0.6m on a cylindrical paper tube 4cm in diameter. The medium is air.

7. (a) Derive the expression for mutual inductances.
   (b) An iron ring has mean circumferences of 125cm, c.s area of $10cm^2$. It is wound with 500turn when it carries 1.54, the flux produced in 1m wb. What is the relative permeability of the Iron material and what is the inductances of the system. If a length of 1mm is removed from the iron ring , what is the new value of inductances of the system.

8. (a) Explain Faraday's laws of electromagnetic induction and derive the expression for induced emf.
   (b) Find the conduction and displacement current deurities is a material having conductivity of 10^{-3}s/m and E_r=2.5, if the electric field in material is E=5.8x10^{-6} Sin(9x10^9t).v/m.

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Code :9A02404 **3**

II B.Tech II Semester(R09) Regular Examinations, April/May 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 force between any two point changes and states the limits of force.
   (b) A change Q_1=-20 μc is located at $\rho(-6, 4, 6)$ and a change $Q_2 = 50\mu c$ is located at R(5,8,-2) it's a free space. Find the force exerted on Q_2 by Q_1 its vector form. The distances are given its metre's.

2. (a) Derive the poision's and caplace's equations.
   (b) Determine whether or not the following potential fields satisfy the laplace's equation.
      i. $V = r\ \cos\theta + \varphi$
      ii. $V = 2x^2 - 3y^2 + z^2$

3. (a) Derive the ohm's law its point form.
   (b) Determine the capacitance of a capacitor consisting of two parallel metal plates 30cm x 30cm surface area, separated by 5mm its air. What is the total energy stored by the capacitor if the capacitor 5 changed to a potential differences of 500V ? What is energy density ?

4. (a) State and explain Biot-sarart law.
   (b) Derive the magnetic field intensity due to a square current carrying element.

5. (a) Using Ampere circuital law, find the $\bar{H}$ due to infinity long straight conductor.
   (b) A Steady current of 20A flow in a filament in the az direction on the Z axis. Also 3_{az} (A/m) be at $\rho = 3m$. Sketch $H_\varphi V_{s\rho,} 0 < \rho < 5m$

6. (a) Derive Lorentz force equation.
   (b) Derive the expression for force on a straight and a long current carrying conductor in a magnetic field.

7. (a) Derive the expression for energy stored it's a magnetic field.
   (b) A solenoid of 500 Turns has a length of 50cm and its radium of 10cm. A steel rod of circular cross sectors is fitted in the solenoid coaxially. Relative permeahility of steel in 3000. A dc current of 10A is passed through solenoid. Computes inductance of the system energy stored it's the system.

8. (a) State and explain poynting's theorem and polynting vector.
   (b) Do the fields $\bar{E} = EM$ Sin x Sin t $\bar{a}\, y$ and $\bar{H} = \frac{Em}{\mu_0} \cos x. \cos t\, \bar{a}_z$satisfy maxwell's equations derived from faraday law.

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Code :9A02404 4

II B.Tech II Semester(R09) Regular Examinations, April/May 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 prove the Gauss's law.
   (b) Given $\bar{A} = 2xy\bar{a}\,x + z\,\bar{a}\,y + yz^2\,\bar{a}\,z$ find $\nabla.\,\bar{A}$ at P(2,-1,3).
2. (a) Derive the passions equations.
   (b) Determine whether or not the following potential fields satisfy the Laplace's equation
      i. V=x^2-y^2+z^2
      ii. $V = r\cos\varphi + z$
3. (a) State and explain continuity equation.
   (b) Determine the capacitances of a capacitor consisting of two parallel metal plates 30cmx30cm, surface area, separated by 5mm in air, what is the total energy stored by the capacitor if the capacitor is charged to potential difference of 500v ? What is the energy density.
4. (a) Using Biot savart's law. Find $\bar{H}$ due to infinity long straight conductor.
   (b) A uniform solenoid 100mm is diameter and 400 mm long has 100 turns of wire and a current of I=3A. Find the magnetic field on the axis of the solenoid.
      i. At the centre.
      ii. At one end
      iii. Half way from the centre to one end.
5. (a) State the point forms of Ampere's circuital law and explain in detail.
   (b) Derive maxwell's third equation curl (H)=JC.
6. (a) Derive the expression for force on a current element it's a magnetic field.
   (b) A point change of Q=-1.2C has velocity $\bar{v} = (5\,\bar{a}\,x + 2\,\bar{a}\,y - 3\,\bar{a}_z$m/sec. find the magnitude of the force extend on the change it
      i. $\bar{E} = -18\,\bar{a}\,x + 5\,\bar{a}\,y - 10\,\bar{a}\,zV/m$
      ii. $\bar{B} = -4\,\bar{a}\,n + 4\,\bar{a}\,y + 3\,\bar{a}\,z$ T
      iii. Both are prevent simultaneously.
7. (a) Derive the expression for inductance of a solenoid.
   (b) A coil of 500 turn is wound on a closes iron ring of mean radius 10cm and c.s area of $3cm^2$. Find the self inductance of the winding if the relative permeability of iron is 800.
8. (a) Derive and explain Faraday's law of electromagnetic inductor.
   (b) A square civil rotates at a constant speed of 500rpm about axis perpendicular to a stationary uniform field of magnetic induction 0.75 tesla. The coil has mean dimention of 15cm x 15cm and is wound with 100 Turns. Determine dynamically induced emf in the coil when the plane of the coil is
      i. in the same plane as the filed
      ii. At right angles to the field
      iii. inclined 60^0 to the field.

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Code :9A02405

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II B.Tech II Semester(R09) Regular Examinations, April/May 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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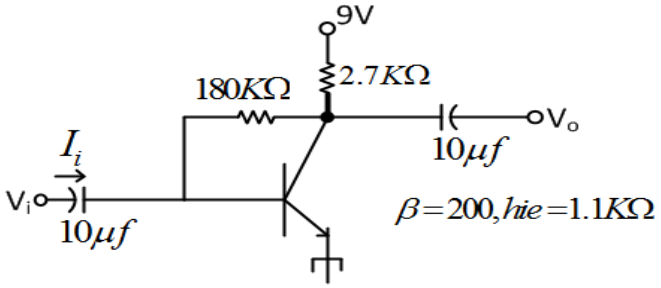
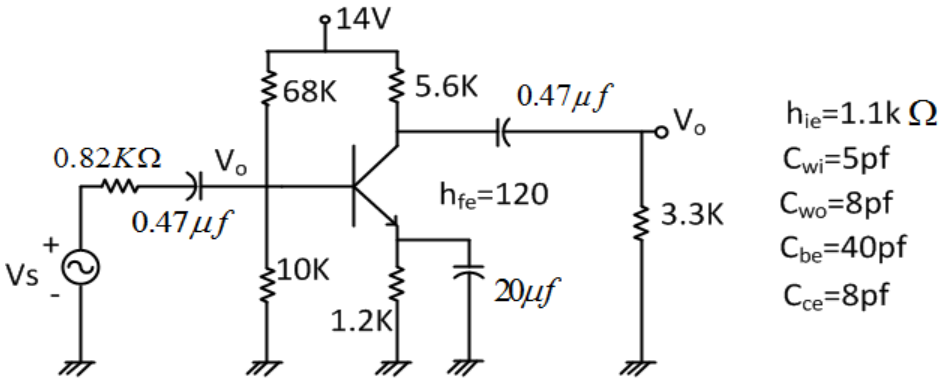
1. (a) Explain about different types of distortions that occur in amplifier circuits.
   (b) For the network show in figure, determine:
   (i) Z_i (ii) Z_0 (iii) A_V.



2. (a) Derive the expression for f_T and f_B of CE amplifier using high frequency model.
   (b) For the network shown in figure determine:
   i. $f_{L_S}, f_{L_C}, f_{L_E}$, low cutoff frequency.
   ii. Midband voltage gain.
   iii. f_{H_i}, f_{H_0}, High cut off frequency.



3. (a) What is meant by feedback in amplifiers ? Describe the types of feedback ?
   (b) An amplifier has a bandwidth of 200kHz and a voltage gain of 1000.
   i. What will be the new bandwidth & gain if 5% negative feedback is introduced.
   ii. What is the gain-bandwidth product with & without feedback.
   iii. What should be the amount of feedback if the bandwidth required is 1MHz.

4. (a) Explain Barkhausen's criteria for self sustained Oscillations.
   (b) Find the frequency of Oscillation and condition of Oscillation for BJT phase shift Oscillator.

5. (a) Derive an expression for the output power of a Class A large signal amplifier in terms of V_{max}, V_{min}, I_{max} and I_{min}.
   (b) Explain why even harmonics are not present in a push-pull amplifier.

6. (a) Draw the response of high pass circuit for square wave and derive the expression for percentage tilt?
   (b) What is meant by a dc restoration circuit and explain.

7. (a) Write short note on diode switching times ?
   (b) Sketch neatly the waveforms of current and voltages for a transistor switch with capacitance loading effect.

8. Draw the circuit diagram of an Astable multi vibrator. Explain its working with waveforms. Derive the expression for frequency of Oscillations.

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Code :9A02405 **2**

II B.Tech II Semester(R09) Regular Examinations, April/May 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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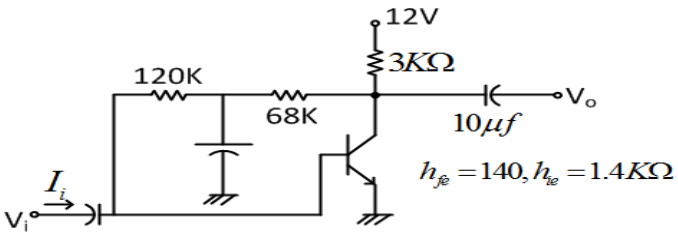
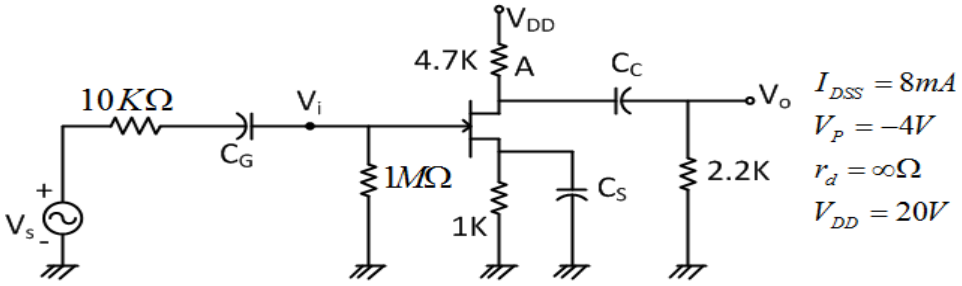
1. (a) Classify the amplifier circuits based on frequency range, type of coupling, power delivered and signal handled.
   (b) For the network shown in figure, determine.
   (i) A_V (ii) Z_i (iii) Z_0



2. (a) Explain about Tniller effect capacitance.
   (b) Determine the 10w cut off frequency and mid band gain for the network shown in figure using the following parameters.
   $C_G = 0.01\mu f$, $C_C = 0.05\mu f$, $C_S = 2\mu f$



3. (a) Explain the effect of negative feedback on:
   (i) Sensitivity of transfer gain.
   (ii) Linear distortion
   (iii) Bandwidth.
   (b) An amplifier without feedback provides an output signal of 15V with 10% second harmonic distortion when the input signal is 15mv.
   i. if 1.5% of the output is feedback to the input in a negative series shunt amplifier, what is the output voltage.
   ii. if the fundamental output remains at 15V but the second harmonic distortion is reduced to 1% , what is the input voltage.

4. (a) Define:
   (i) Damped oscillation
   (ii) Undamped oscillation
   (b) Explain the working of crystal oscillator.
   (c) Give the two Barkhausen condition required for sinusoidal oscillations to be sustained.

5. (a) Classify the large signal amplifiers on the basis of conduction angle.
   (b) Determine the maximum conversion efficiency of a class A series fed and transformer coupled power amplifier.

6. (a) Explain the operations of RC low pass circuit for exponential input.
   (b) Explain positive peak voltage limites above and below reference level.

7. (a) Explain the behavior of a BJT as a switch in electronic circuits. Give an example.
   (b) Draw the circuit diagram of transistor clipper. Explain the operation of it with the help of voltage and current waveforms.

8. Design a Schmitt trigger circuit for the following specifications.
   $V_{CC} = 12V$, $UTP = 3.5V$, $LTP = 2.5V$, $h_{fe} = 50$, $i_{c_2=2mA}$

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Code :9A02405

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II B.Tech II Semester(R09) Regular Examinations, April/May 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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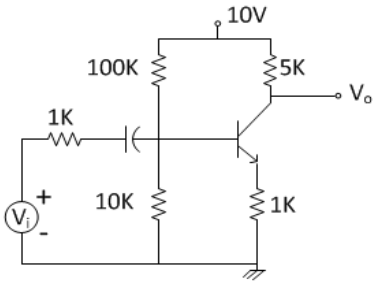
1. (a) Draw a typical CE amplifier and explain the function of each component in it.
   (b) The h-parameters of a transistor amplifier shown in figure are $h_{ie} = 1.1K, h_{re} = 2.5x10^{-4}, h_{fe} = 50, h_{0e} = 24\mu A/v$. calculate A_v, A_{VS}, Z_0 and Z_i.



2. (a) Draw the high frequency hybrid -Π model for a transistor in CE configuration and explain the significance of each components.
   (b) Derive the expression for the CE short circuit current gain Ai as a function of frequency.

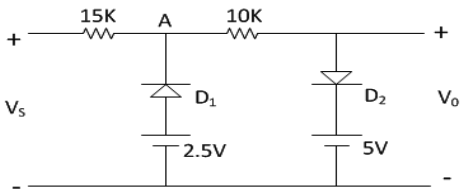
3. (a) Give the block diagram of a feedback amplifier and explain the function of each block.
   (b) A current amplifier without feedback has the following parameter values.
   Short circuit current gain A_i=-200,
   Input resistance R_i=1K, output resistance R_0=40K load resistance R_L=1k, Bandwidth = 300KHz.
   Compute A_{if}, R_{if}, R_{of} & BW_f if 5% -ve current shunt feedback is used.

4. (a) Explain briefly about frequency and amplitude stability of oscillators ?
   (b) Explain the working of a wien Bridge oscillator. Derive the expression for frequency of oscillation and the value of gain required for sustained oscillations.

5. (a) What is cross over distortion ? How it can be minimized ?
   (b) A particular transistor has a power rating at 25^0C of 200mw, and a maximum junction temperature of 150^0C. What is its thermal resistance ? What is its power rating when operated at an ambient temperature of 70^0C ? what is the junction temperature when dissipating 100mw at an ambient temperature of 50^0C.

6. (a) A symmetrical square wave is applied to a high pass circuit having $R = 20K\Omega$ and $C = 0.05\mu f$. If the frequency of input signal is 1KHz and the signal swings $\pm 0.5v$, draw the output wave shape and indicate the voltages.
   (b) What is meant by comparator ? Explain diode differentiator comparator operation when ramp input signal is applied.

7. (a) Write short note on:
   (i) Diode switching times.
   (ii) Transistor as a switch.
   (b) For the circuit shown in figure, V_S is a sinusoidal voltage of peak 7.5v. Assuming ideal diodes sketch one cycle of output voltage. Determine the maximum diode currents.



8. What is a monostable multi vibrator ? Explain with the help of neat circuit diagram the principle of operation of monostable multi vibrator and derive an expression for pulse width. Draw waveforms at collector and base of both transistors.

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Code :9A02405 **4**

II B.Tech II Semester(R09) Regular Examinations, April/May 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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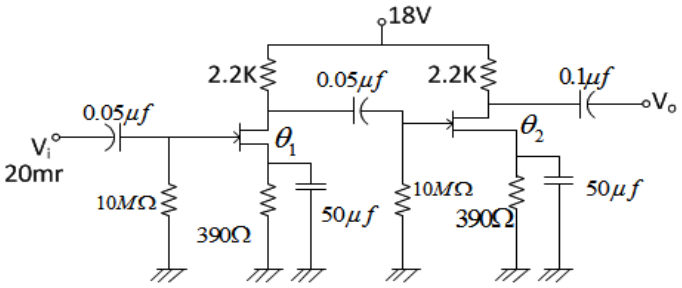
1. (a) Draw the circuit of an emitter follower and its equivalent circuit.
   (b) Derive the expression for its current gain, input resistance, voltage gain, output admittance using CE h-parameters.

2. (a) For the JFET cascade amplifier shown in figure using identical JFET & with I_{Dss}=8mA and V_P=-4.5V, calculate voltage gain of each stage, the overall gain of the amplifier the o/p voltage V_0.



   (b) Discuss about different types of coupling schemes used in multistage amplifiers.

3. (a) Give the advantages of negative feedback.
   (b) An amplifier has an open loop gain of 1000, its lower and upper 3dB frequencies are 50Hz and 200 kHz respectively. It has a distortion of 5% without feedback. Determine the values of AV_f, lower and upper 3dB frequencies and new distortion if a negative feedback with $\beta = 0.01$ is applied.

4. (a) Explain the principle of operation of RC phase shift oscillator.
   (b) Draw the circuit of Hartley and Colpift's oscillator using BJT and derive the expression for frequency of oscillation and condition on loop gain.

5. (a) Discuss the advantages of a push-pull amplifier.
   (b) A class B push-pull amplifier uses V_{CC}=15V and R_L=8 Ω. Determine the maximum input power, ac output power, conversion efficiency and power dissipated by each transistor.

6. (a) A symmetrical square wave whose peak to peak amplitude is 2V and whose average value is zero is applied to an RC integrating circuit. The time constant is half the period of the square wave. Find the peak to peak value of the output amplitude.
   (b) Draw the basic circuit diagram of a negative peak clamper circuit and explain its operation.

7. (a) Write short note on switching characteristics of transistors.
   (b) Give the expression for rise time and fall time in terms of transistor parameters and operating currents.

8. (a) Draw the circuit of a bistable multi vibrator with symmetrical collector triggering.
   (b) Design a monostable circuit that produces a pulse width of 10ms (Assume necessary date).

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