Code: 9A04406

1

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

ELECTROMAGNETIC THEORY & TRANSMISSION LINES

(Electronics and Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Give the statements of strokes and divergence theorems.

(b) Through Gauss law, prove divergence theorem and interpret the Gauss law in the point relation?

2 Derive Poisson's and Laplace's equations. Explain their applications

3 (a) State and prove ampere's work law? And derive the expansion of its differential vector form in cylindrical co-ordinates?

(b) Find the flux density at the center of a square loop of 10 turns carrying a current of 10 Amps. The loop is in air and has a side of 2 m.

4 State and explain Faraday's law of induction. And hence Introduce the concept of time varying electromagnetic fields through this law.

5 (a) Prove the perpendicular nature and direction of uniform plane waves.

(b) A plane wave traveling in a dielectric with $\epsilon_r = 3$ has a peak electric field of 6 V/m. Find the phase velocity, phase constant and peak magnetic field.

6 A uniform plane wave is propagating in the a_z direction through a lossy material with $\gamma = 0.1 + 1.2\ m^{-1}$ and $\eta = 300 + j25\ \Omega$. Let E = 100 V/m at z = 0.

(i) Find $P_{z, av}$ at z = 0 and

(ii) How much average power per cubic meter is being dissipated at P (2, 3, and 4)?

7 The characteristic impedance of a certain line is $710\angle -16^0$ when the frequency is 1 KHz. At this frequency the attenuation is 0.01 neper/km and the phase constant is 0.035 rad/km. Calculate the primary constants and the phase velocity.

8 A certain transmission line 2 m long operating at $\omega = 10^6$ radians/sec has α = 8 db/m, β = 1 radian/m, and $Z_0 = 60 + j40\ \Omega$. If the line is connected to a source of $10\angle 0^0$, $Z_g = 40\ \Omega$ and terminated by a load $20 + j50\ \Omega$. Determine:

(i) the i/p impedance (ii) the sending end current (iii) the current at the middle of the line.

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Code: 9A04406

2

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

ELECTROMAGNETIC THEORY & TRANSMISSION LINES

(Electronics and Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Find the energy stored in a system of four equal point charges Q = 5 nC arranged in a line with 2 m separation between them?

(b) State divergence theorem and discuss its application?

2 (a) Differentiate between conduction current and convection current.

(b) Prove that $\nabla.J = 0$ for static fields.

3 (a) Using Biot-Savart law derive an expression for inductance per unit length of long co-axial cable.

(b) A coil of 500 turns is wound on a closed iron ring of radius 10 cm and cross section area of $5\ \mathrm{cm}^2$ find the self inductance of the coil if $\mu_r = 800$ for iron.

4 Are all the Maxwell's equations independent? Explain through justifications.

5 (a) Compare wave propagation in good conductors and in good dielectrics.

(b) A non magnetic medium has an intrinsic impedance of $240 \angle 30^0\ \Omega$. Find its
(i) Loss tangent. (ii) Dielectric constant. (iii) Complex permittivity.
(iv) Attenuation constant at 1MHz.

6 Consider the boundary between free space and glass having $\epsilon_r = 4$, $\mu_r = 1$, and $\sigma = 0$. If a uniform plane wave with $E_m = 1$ V/m and a frequency of 200 MHz is incident from free space normal to the glass, determine (i) the time domain forms of the incident, reflected, and transmitted fields (ii) the time average power transmitted through a 5 m^2 surface of the glass and (iii) the SWR in free space.

7 An open wire line which is 200 km long is correctly terminated. The generator at the sending end has V_{oc} = 10 V, f = 1 KHz and internal impedance of 500 Ω. Z_0 of the line is 683 - j138 Ω and propagation constant is 0.0074 + j0.0356 per km. Determine sending end voltage, current, and power and receiving end voltage, current, and power.

8 (a) Discuss about quarter wave transformer.

(b) Explain the reactance properties of transmission lines.

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Code: 9A04406

3

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

ELECTROMAGNETIC THEORY & TRANSMISSION LINES

(Electronics and Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Derive the boundary relations for static electric fields at the interface between:
(i) Dielectric- Dielectric. (ii) Dielectric – Conductor.

(b) Two perfectly conducting infinite planes are separated by a distance 'd' carrying uniformly distributed surface charges of equal and opposite densities ρ_0 and $-\rho_0$, find the potential difference between the two when the medium is free space

2 (a) Show that the electric potential due to electric dipole satisfies Laplace's equation.

(b) Develop an expression for potential difference at any point between spherical shells in terms of applied potential using Laplace's equation.

3 (a) Discuss the concept of energy storage in magnetic field?

(b) Find the energy stored in the field in establishing a current of 'I' amps in a solenoid of 'n' turns.

4 Explain with justification the modification of static field continuity equation for time varying fields.

5 A wave propagating in a lossless dielectric has the components, E = 500 cos (10^7 t - βz)a_x V/m and H = 1.1 cos (10^7 t - βz)a_y. If the wave is traveling at V = 0.5c.
Find: (i) μ_r (i) ε_r (iii) β (iv) λ (v) η.

6 (a) Write instantaneous electric and magnetic field expressions for the case of oblique incidence of a uniform plane wave with parallel polarization on a perfect conducting plane boundary.

(b) Determine reflection coefficients of an EM wave incident normally on:
(i) A sheet of copper.
(ii) A sheet of iron. Use f = 1 MHz. Assume $\sigma = 1 \times 10^6$ mhos/m, $\mu = 1000\ \mu_0$ for iron.

7 The characteristic impedance of a uniform transmission line is 2309.5 Ω at frequency of 800 Hz. At this frequency the propagation constant was found to be $0.054 \angle 87.9^0$. Determine the primary constants.

8 Describe about smith chart and transients on transmission lines.

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Code: 9A04406

4

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

ELECTROMAGNETIC THEORY & TRANSMISSION LINES

(Electronics and Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Explain the concept of energy density with the help of a simple parallel plate capacitor

(b) A sphere with volume of $0.5\ \mathrm{m}^3$ has a charge density of $4\ \mathrm{nC/m}^3$, if its center is at origin find electric field intensity at a point (0, 3, 6)

2 (a) Define the following with respect to a medium:
(i) Homogeneous. (ii) Isotropic. (iii) Charge free.

(b) Derive relative permeability expression from the concept of magnetic polarization.

3 (a) In a certain region the current density is given by $\mathrm{j} = 3\mathrm{x}\,\mathrm{i}_\mathrm{x} + (\mathrm{y} - 3)\,\mathrm{i}_\mathrm{y} + (2 + \mathrm{z})\,\mathrm{i}_\mathrm{z}\ \mathrm{A/m}^2$. Find the total current flowing out of a spherical surface of radius 5 cm.

(b) Write about the principle of radiation from a wire carrying time varying current.

4 (a) In time varying fields are electric and magnetic fields dependent? Explain.

(b) In free space electric flux density $\mathrm{D} = \mathrm{D}_0 \sin(\omega\mathrm{t} + \beta\mathrm{z})\mathrm{i}_\mathrm{x}$, find the magnetic flux density using Maxwell's equations?

5 The electric field intensity of a 300 MHz uniform plane wave in free space is given as E = (20 + j50) (a_x + 2a_y) $e^{-j\beta z}$ V/m.
(i) Find ω, λ, v, and β
(ii) Find E at t = 1ns, z = 10 cm.
(iii) What is $|H|_{max}$?

6 Explain reflection of uniform plane wave by a perfect dielectric in the case of oblique incidence for perpendicular polarization and obtain expression for E_r/E_i.

7 The constants of a line per Km are R = 6 Ω, L = 2.2 mH, C = 0.005 mF, and G = 0.25 x 10^{-6} mhos. Calculate at the frequency of 1 KHz (i) the terminating impedance for which no reflection will be set up in the line. (ii) The attenuation in db suffered by signal while traveling a distance of 100 Km when the line is properly terminated and the phase velocity with which the signal would transmit.

8 (a) Explain how standing waves occur in an imperfectly matched transmission line.

(b) Discuss the importance of a half wave length line.

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Code: 9AHS401

1

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS

(Common to EIE, E.Con.E and ECE)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 What is demand? Explain the various factors that influence the demand for a computer.

2 What elasticity of demand is important? Explain the factors governing elasticity of demand.

3 How are short run and long run identified? What do you understand by long run average cost curve? Explain how it is different from short run average cost curves.

4 What are the main features of monopoly? How does it differ from perfect competition?

5 Define partnership. What are the differences between a business and company form of organization?

6 (a) What is capital? Explain the types and significance of capital**.**

(b) Explain the concept of working capital, its features and limitations.

7 Journalize the following transactions and prepare ledger accounts in the books of Mr. A. V. Narayana.

2006, June,1	Commenced business with cash worth Ra 80,000
5	Discount allowed worth Rs 5,000
8	Cash received from Swamy worth Rs 25,000
12	Rama Rao purchased goods worth Rs 6,000
15	Audit fees worth Rs 2,000
18	Received interest from Narayana worth Rs 18,000
24	Bought goods from Prasad and Co.worth Rs 12,000
30	Printing and stationary expanses worth Rs 4,000

8 Explain how the capital structure ratios and profitability ratios are calculated. What do you understand?

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Code: 9AHS401 **2**

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS

(Common to EIE, E.Con.E and ECE)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 Discuss the nature and scope of Managerial economics.

2 From the following data, using method of least squares, estimate the sales for the years 2011 and 2012.

Year	2004	2005	2006	2007	2008	2009	2010
Sales (Rs. in Lakhs)	140	100	170	180	200	210	190

3 What do you understand by cost-volume-profit analysis? What are its managerial applications? Illustrate any four.

4 Compare and contrast between perfect competition and monopoly.

5 (a) What are the characteristics of a business unit?
(b) Explain the features of sole traders' form of business organization.

6 What is the importance of capital budgeting? Explain the basic steps involved in evaluating capital budgeting proposals.

7 (a) Explain briefly about different types of accounts.
(b) Define the term 'journal' and explain its advantages and importance.

8 How ratios' are classified for the purpose of financial analysis? With assumed data, illustrate any two types of ratios under each category.

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Code: 9AHS401

3

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS

(Common to EIE, E.Con.E and ECE)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

*****

1 Explain the nature of demand. What could be the different variations in the nature of demand?

2 What the methods of forecasting demand?

3 (a) What are the managerial applications of BEA?

(b) A firm has a fixed cost of Rs 5,00,000 selling price per unit is Rs 500 and variable cost per unit is Rs 250. Present level of production is 35,000 units. Calculate
(i) Breakeven point in terms of volume and sales value.
(ii) Margin of safety.
(iii) The change in BEP and margin of safety if fixed costs increase by 10%.

4 What is perfect competition? How is market price determined under conditions of perfect competition?

5 (a) Differentiate a private and public company.

(b) What is a joint sector management?

6 Explain the concept of capital budgeting and what is its practical utility.

7 (a) How are accounts finalized at the end of an accounting period with the help of a trial balance? Illustrate.

(b) Define financial statements. Explain its objectives and importance.

8 What is the importance of ratio analysis?

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Code: 9AHS401

4

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS

(Common to EIE, E.Con.E and ECE)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

*****

1 Briefly explain the following:
   (a) Law of demand and its exceptions.
   (b) Changes in demand.

2 What is demand forecasting? Explain.
   (a) Test marketing.
   (b) Controlled experiments as methods of demand forecasting.

3 What is break even analysis? How do you determine breakeven point? Illustrate.

4 (a) Distinguish between perfect and imperfect markets.
   (b) What are the different market situations in imperfect competition?

5 Differentiate between partnership, sole-proprietorship and company form of organizations.

6 (a) What are the factors determining the working capital requirements?
   (b) Explain the importance and nature of capital budgeting.

7 (a) Define the concepts ‘accounting, financial accounting and accounting system’.
   (b) Explain trail balance and its characteristics.

8 (a) Explain the significance and the computation of liquidity ratio.
   (b) A firm has sold goods worth Rs.3,00,000 with a gross profit margin of 20%. The stock at the beginning and the end of the year was Rs.35,000 and Rs.45,000 respectively. What is the inventory turnover ratio?

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Code: 9A02401

1

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

PRINCIPLES OF ELECTRICAL ENGINEERING

(Common to EIE, E.Con.E, ECE and ECC)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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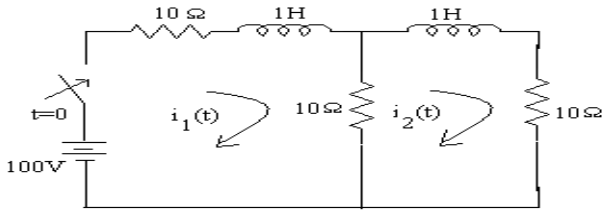
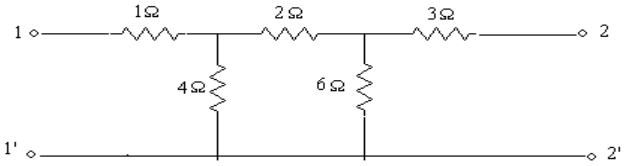
1 In the network shown in the fig below, the switch is closed at t = 0. Find the values of $i_1(t)$ and $i_2(t)$ assuming zero initial currents through inductors.



2 (a) Obtain the transmission line parameters when the two transmission networks having the transmission parameters A_1, B_1, C_1, D_1 and A_2, B_2, C_2, D_2 are connected in cascade.

(b) Obtain 'Z' – parameters for the given network shown below.



3 Design an m-derived low pass filter having design resistance R_0 = 500 Ω, cut-off frequency f_c = 1500 Hz and infinite attenuation frequency f_α = 2000 Hz.

4 (a) What is an attenuator? Derive the design equations for bridged T-type attenuator.

(b) Design a T-pad attenuator to give an attenuation of 60 dB and to work in a line of 800 Ω.

5 (a) Explain the operating principle of a DC generator in detail.

(b) A 4-pole wave connected DC generator having 60 slots on its armature with 6 conductors per slot, runs at 750 rpm and generates an open circuit voltage of 230 V. Find the useful flux per pole.

6 (a) Explain the principle of operation of DC motors.

(b) The constant and variable losses in the DC machine under full load condition are 400 W and 600 W respectively. What will be these losses when the load on the motor is reduced to one-fourth?

7 A single phase transformer working at 0.6 power factor has an efficiency of 75% at both half loads, at full load of 2 KW. Determine the efficiency at 90% of full load.

8 Explain the principle of operation and characteristics of stepper motors.

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Code: 9A02401

2

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

PRINCIPLES OF ELECTRICAL ENGINEERING

(Common to EIE, E.Con.E, ECE and ECC)

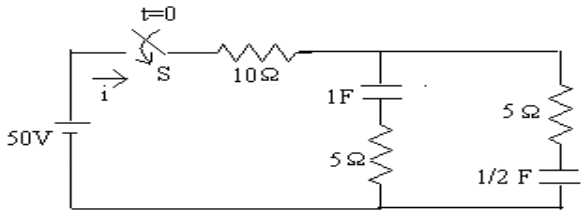
Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

*****

1 In the network shown in fig below, the switch is closed at t = 0 and there is no initial charge on either of the capacitors. Find the current 'i' by Laplace transform method.



2 (a) Derive the relation between 'Y' and hybrid parameters.

(b) A two port network has the following parameters: Z_{11} = 17 kΩ, Z_{12} = 12 kΩ, Z_{21} = 12 kΩ and Z_{22} = 15 kΩ. Calculate short circuit parameters.

3 Design a constant-K, high pass filter having cut off frequency f_c = 10 kHz and nominal characteristic impedance Z_0 = 600 Ω. Find the characteristic impedance and phase constant of the filter at 25 kHz and calculate the attenuation of the filter at 6 kHz.

4 (a) What is an attenuator? Derive the design equations for lattice attenuator.

(b) Design a symmetrical bridged-T attenuator with an attenuation of 20 dB and terminated into a load of 750 Ω.

5 (a) Derive the emf equation of a DC generator.

(b) A 4-pole DC shunt generator with lap connected armature supplies a load of 100 A at 200 V. The armature resistance 0.1 ohms and the shunt field resistance is 80 ohms find the (i) total armature current (ii) current per armature path (iii) emf generated.

6 A 20 KW, 250 V dc shunt generator has armature and field resistances of 0.04 ohm and 200 ohm respectively. Determine the total armature power developed when working.
(i) As generator delivering 20 KW output and (ii) As a motor taking 20 KW input.

7 A 50 KVA single-phase transformer of 2300 V/230 V rating has the primary and secondary winding resistance of 2 Ω and 0.02 Ω respectively. The iron losses equal 412 W. Calculate the efficiency (i) at full-load, and (ii) at half-load, when the power factor of the load is 0.8.

8 (a) Explain the principle of operation of shaded pole motor.

(b) Explain the characteristics of capacitor motor.

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Code: 9A02401

3

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

PRINCIPLES OF ELECTRICAL ENGINEERING

(Common to EIE, E.Con.E, ECE and ECC)

Time: 3 hours Max Marks: 70

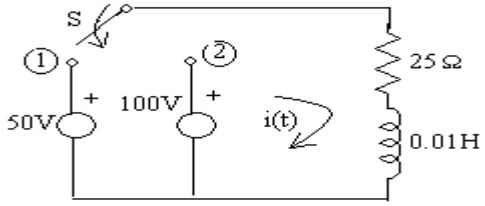
Answer any FIVE questions

All questions carry equal marks

*****

1 (a) Derive the expression for current when a dc voltage V is applied suddenly (i.e. at time = 0) by closing a switch in a series R-L circuit.

(b) In the circuit shown in fig below, the switch is in position (1) to establish steady state condition and at t = 0, it is switched to position (2). Find the resulting current.



2 (a) Define and obtain transmission or ABCD parameters by taking any one example.

(b) A two port network has the following parameters: Z_{11} = 20 Ω, Z_{12} = 5 Ω, Z_{21} = 20 Ω and Z_{22} = 15 Ω. Calculate hybrid parameters.

3 Design an m-derived high pass filter having a design impedance of 500 Ω, cut-off frequency of 6 kHz and m = 0.35. Also determine the frequency of infinite attenuation.

4 (a) What is an attenuator? Derive the design equations for π-type attenuator.

(b) Design a symmetrical bridged-T attenuator with an attenuation of 60 dB and terminated into a load of 1000 Ω.

5 (a) Explain the basic nature of the emf induced in the armature of a DC generator and also explain the principle of DC generator.

(b) A 4-pole, dc generator has a lap wound armature having 400 conductors. It generates an emf of 300 V when the flux per pole is 0.02 Wb. Find the speed of rotation of its armature.

6 (a) Define the efficiency of a DC machine. How will you pre determine the efficiency of a DC machine?

(b) The constant and variable losses in the DC machine under full load condition are 300 W and 700 W respectively. What will be these losses when the load on the motor is reduced to half?

7 (a) Draw and explain the phasor diagram of transformer when it is operating under leading load.

(b) When a single phase transformer is supplied at 400 V, 50 Hz. The hysteresis loss is found to be 600 W and eddy current loss is 300 W. Determine the hysteresis loss and eddy current loss when the input voltage to the transformer is 200 V, 100 Hz.

8 (a) Explain the principle of operation of synchros.

(b) Explain the characteristics of stepper.

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Code: 9A02401

4

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

PRINCIPLES OF ELECTRICAL ENGINEERING

(Common to EIE, E.Con.E, ECE and ECC)

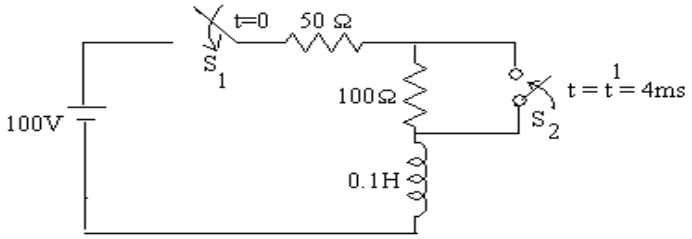
Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

*****

1 In the circuit shown in fig below, switch (1) is closed at t = 0 and then switch (2) is closed at $t = t^1 = 4ms$. Find the expression for current i(t) in the intervals $0 < t < t^1$ and $t > t^1$.



2 (a) Obtain the admittance parameters when the two networks having the admittance parameters Y_{11X}, Y_{12X}, Y_{21X}, Y_{22X} and Y_{11Y}, Y_{12Y}, Y_{21Y}, Y_{22Y} are connected in parallel.

(b) A two port network has the following parameters: $Z_{11} = 20\ \Omega$, $Z_{12} = Z_{21} = 5$ and $Z_{22} = 15\ \Omega$. Calculate hybrid parameters.

3 Design a prototype band pass filter section-T and π having cut-off frequencies of 3000 Hz and 6000 Hz and nominal characteristic impedance of 600 Ω. Also find the resonant frequency of shunt arm or series arm.

4 Derive an expression for, and calculate the values of the series and shunt resistances of a T-attenuator to give an attenuation of 60 dB in a 1000 Ω system.

5 (a) Explain the open circuit characteristics of DC shunt generator.

(b) A 6-pole dc generator has 600 wave wound conductors in its armature. If the flux per pole is 0.02 Wb and the generator runs at a speed of 1000 rpm. Calculate the induced emf.

6 (a) Explain the iron losses that occur in a dc machine.

(b) The constant and variable losses in the DC machine under full load condition are 1.5 KW and 2.5 KW respectively. What will be these losses when the load on the motor is reduced to one-fourth?

7 A single phase transformer working at 0.8 power factor has an efficiency of 90 per cent at both one half load and at the full load of 500 W. Determine the efficiency at 75 percent of full load.

8 (a) Explain the principle of operation of AC tacho meter.

(b) Explain the characteristics of AC servo motor.

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Code: 9A04401

1

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

SWITCHING THEORY AND LOGIC DESIGN

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

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

*****

1 (a) Distinguish between weighted and non-weighted codes with examples.

(b) Represent the decimal number 8620 in: (i) BCD (ii) XS3 (iii) Gray codes

2 (a) What are universal gates? Realize AND, OR, NOT, XOR gates using universal gates.

(b) Given Boolean expression AB' + A'B = C. Show that AC' + A'C = B.

(c) Prove that OR-AND network is equivalent to NOR-NOR network.

3 (a) What are the advantages of tabulation method over K-map?

(b) Simplify the following Boolean function using tabulation method.

$Y(A,B,C,D) = \sum(1,3,5,8,9,11,15)$

4 Design BCD to XS3 code converter and realize using logic gates.

5 (a) The following memory units are specified by the no of words times the number of bits per word. How many address lines and input-output data lines are needed in each case? (i) 5K × 16 (ii) 3G × 8 (iii) 32M × 32 (iv) 256K × 64.

(b) Give the number of bytes stored in the memories listed above.

6 (a) Distinguish between a state table and a flow table.

(b) Draw the logic diagram and write functional table of an SR latch using NAND gates. Explain the operation.

7 (a) Define state equivalence and machine equivalence with reference to sequential machines.

(b) A clocked sequential circuit with single input and single output Z is defined by the following D - flip-flop input equations and output equations of Z.

$$D_1 = \overline{Q_1}Q_2\overline{Q_3}x$$
$$D_2 = Q_1\overline{Q_2Q_3}$$
$$D_3 = \overline{Q_1Q_3}\overline{x} + \overline{Q_1}Q_3\overline{x}$$
$$Z = Q_1Q_2Q_3x$$

(i) Obtain state table.

(ii) Draw the state diagram.

8 Draw the state diagram for mod-6 counter and obtain ASM chart.

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Code: 9A04401

2

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

SWITCHING THEORY AND LOGIC DESIGN

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

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

*****

1 (a) Why 8421 BCD code is widely used in computers?

(b) What are the rules for 8421 BCD addition? Add the two decimal numbers 7546 and 3462 in 8421 code.

(c) Distinguish between weighted and non-weighted codes with examples.

2 (a) State duality theorem. List Boolean laws and their duals.

(b) Simplify the following Boolean functions to minimum number of literals.
(i) F = ABC + ABC' + A'B. (ii) F = (A+B)' (A'+B').

(c) Realize XOR gate using minimum number of NAND gates.

3 (a) List the Boolean function simplification rules using tabulation method.

(b) Simplify the following Boolean function using tabulation method.
$Y(A, B, C, D) = \sum(0, 1, 2, 3, 5, 7, 8, 9, 11, 14)$

4 (a) Implement full adder using decoder and OR gates.

(b) Realize the Boolean function $T(X, Y, Z) = \sum(1, 3, 4, 5)$ using logic gates for hazard free.

5 (a) Design a combinational circuit using ROM that accepts 3-bit number and generates output binary number equal to the square of the input number.

(b) Write short notes on types of read only memory.

6 (a) Design a serial binary adder using D-Flip Flop.

(b) Draw the circuit diagram of J-K Flip-Flop with NAND gates with positive edge triggering and explain its operation with the help of truth table. How race around condition is eliminated?

7 Define:
(i) Finite state machine.
(ii) State equivalence and machine minimization.
(iii) Distinguishable states and sequence.

8 Design a half adder and half subtractor circuit using multiplexer.

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Code: 9A04401

3

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

SWITCHING THEORY AND LOGIC DESIGN

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

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Explain error detection codes.

(b) What is the drawback of error detection codes?

(c) Construct even parity 7 bit hamming code for the message 0100.

2 (a) Draw the symbols and truth tables of all logic gates and explain.

(b) Simplify the following Boolean functions to minimum number of literals.

(i) xy + y'z' + wxz' (ii) w'x' + x'y' + w'z' + yz

(c) Realize XOR gate using minimum number of NAND gates.

3 (a) Define prime implicant and essential prime implicant with example using K-map.

(b) Find all the prime implicants for the following Boolean function using K-map and determine which are essential.

$$F(A,B,C,D) = \sum(1,3,4,5,9,10,11,12,13,14,15)$$

4 Design a combinational circuit that converts a decimal digit from 8, 4,-2,-1 code to 8,4,2,1 BCD code.

5 (a) Find the minimal threshold-logic realization for the function:

$$f(A, B, C, D) = \Sigma m\ (2, 3, 6, 7, 10, 12, 14, 15)$$

(b) Compare programmable logic devices.

6 (a) Design a mod-6 asynchronous counter using T-flip flop.

(b) Compare synchronous and asynchronous sequential circuits.

7 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.

8 (a) Write short notes on ASM chart.

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

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Code: 9A04401

4

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

SWITCHING THEORY AND LOGIC DESIGN

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

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Explain the method of error detection in binary codes.

(b) Construct the BCD code with even parity and odd parity bit for decimal 0 to 9.

(c) Construct 7 bit hamming code for data1001. Use even parity.

2 (a) State duality theorem. List Boolean laws and their duals.

(b) Simplify the following Boolean functions to minimum number of literals.

(i) xy + xy' (ii) (x + y)(x + y')

(c) Realize XOR gate using minimum number of NAND gates.

3 (a) Draw 3-variable and 4-variable K-map and define pair, quad and octet.

(b) Simplify the following Boolean function for minimal POS form using K-map and implement using NOR gates.

F(W, X, Y, Z) = ∑(1, 2, 5, 6, 9) + d(10, 11, 12, 13, 14, 15)

4 (a) Design 4-bit even parity generator. Mention truth table.

(b) Design BCD to XS3 code converter using a 4-bit full- adders MSI circuit.

5 (a) Design a combinational circuit using PROM that converts a 3-bit binary number to equivalent excess-3 code.

(b) Write short notes on threshold logic.

6 (a) Convert SR-flip-flop into JK-flip-flop.

(b) Compare sequential and combinational circuits.

7 A Clocked sequential circuit with two inputs x and y and a single output z is defined by the following J - K flip-flops state equations and output equation of z.

$$Q_1^+ = Q_1\overline{x} + Q_1 y + Q_2 x + \overline{Q_1 Q_2}\,\overline{y}$$
$$Q_2^+ = \overline{Q_1} Q_2 \overline{x} + \overline{Q_1} Q_2 y + \overline{Q_1 Q_2}\, x$$
$$Z = (Q_1 + Q_2)\overline{xy}$$

Where Q+1, ξQ+2 are the next states and Q1, ξQ2 are the present states of JK flip-flops. (a) Obtain state table. (b) Obtain state diagram.

8 (a) Explain in detail the block diagram of ASM chart.

(b) Draw the portion of an ASM chart that specifies the conditional operation to increment register R during state T_1 and transfer to state T_2, if control inputs z and y are = 1 and 0 respectively.

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Code: 9A04402 **1**

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

ELECTRONIC CIRCUIT ANALYSIS

(Common to EIE, E,Con.E and ECE)

Time: 3 hours Max Marks: 70

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

1 (a) What are the different types of distribution in amplifier? Explain each.
(b) By using Hybrid model derive performance characteristics for CB transistor amplifier.

2 Draw the circuit diagram of two stage RC-coupled transistor amplifier. Explain operation and calculate the mid and low frequency ranges.

3 (a) What is miller's theory? Derive millers' output capacitance using millers' effect capacitance.
(b) The input power to a device is 10000 W at a voltage of 1000 V. The output power is 500 W and output impendence is 20 Ω.
(i) Find the power gain in decibels.
(ii) Find the voltage gain in decibels.

4 (a) Explain the terms "impedance matching" and "cross-over distortion".
(b) Explain why the complimentary symmetry power amplifier has become more popular in modern circuits.

5 (a) Draw the equivalent circuit of a capacitance coupled single tuned amplifier and derive the equation for voltage gain.
(b) Calculate the maximum bandwidth of a cascaded single-tuned amplifier with a gain of 43.4 dB, given gm = 2 m A/v and C = 300 pF.

6 Explain the principle of stagger tuning technique of transformer-coupled amplifier that is used to obtain band pass characteristic with pass band of 10 KHz.

7 With reference to voltage regulators discuss about:
(a) Output resistance.
(b) Load regulation.
(c) Line regulation.
(d) Stability factor.
(e) Temperature co-efficient.
(f) Ripple regulation.

8 (a) List out the important features of 3-terminal regulators.
(b) What are the limitations of linear regulators over switched mode power supplies?
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Code: 9A04402 **2**

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

ELECTRONIC CIRCUIT ANALYSIS

(Common to EIE, E,Con.E and ECE)

Time: 3 hours Max Marks: 70

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

1 (a) Draw the circuit of an emitter follower and its equivalent circuit. List out its characteristics.
(b) The h-parameters of the transistor used in CE amplifier are h_{fe} = 50, h_{ie} = 1.1 K, h_{re} = 2.5 x 10^{-4}, h_{oe} = 24 $\mu A/V$. Find out current gain and voltage gain with and without source resistance, input and output impedances, given that R_L = 10 K and R_S = 1 K.

2 Draw the circuit diagram of two stages RC coupled transistor amplifier. Explain operation. Calculate the mid frequency range and low frequency range.

3 (a) Derive the expression for CE short circuit current gain and explain the hybrid π model.
(b) The low frequency parameters of a transistor are given below. V_{cc} = 5 V, $I_c = 10\ MA$, $h_{ie} = 500\ \Omega$, h_{oe} = 4 × 10^5 A/V, h_{fe} = 10^4, f_p = 50 MHz, C_{ob} = 3 pf.
Compute the values of all hybrid π parameters.

4 (a) What are the two disadvantages of push pull amplifier?
(b) Give the schematic of class B push pull amplifier with complimentary symmetry and explain its working.

5 (a) State the functions and frequency range of operations of tuned amplifiers with relevant reasons.
(b) Draw the circuit of typical single tuned RF amplifier stage employing a transistor. Explain its operation. If the tuned circuit contains L = 200 micro Henry, S_C = 120 pF and R_L = 5 kΩ, calculate its bandwidth.

6 Draw the circuit of a class C – tuned amplifier and explain its operation. Derive the efficiency of the amplifier is 100% making necessary assumption.

7 (a) Explain the need for voltage regulation?
(b) What is meant by voltage multiplier? List out the names of 4 different multipliers. Explain their working.

8 (a) What are the limitations of 3-terminal regulators?
(b) Design an adjustable voltage source using LM 317 for the following specifications :
$V_0 = 9$ and 15 v; $I_0 = 1\ A$.

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Code: 9A04402 **3**

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

ELECTRONIC CIRCUIT ANALYSIS

(Common to EIE, E,Con.E and ECE)

Time: 3 hours Max Marks: 70

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

1 (a) Draw the small signal model of CE amplifier and derive the expression for it's A_I, A_V, R_i and R_0.
(b) For the emitter follower with $R_S = 500\ \Omega$ and $R_L = 5\ k\Omega$, Calculate A_I, A_v, A_{vs} and R_0. Assume h_{fe} = 50, h_{ie} = 1 kΩ, h_{oe} = 25 mA/V.

2 (a) Describe the operation of transformer coupled amplifier and also derive the expression for its current gain.
(b) With relevant circuit explain the different coupling schemes used in amplifiers.

3 (a) Describe the emitter follower at high frequency and also derive the equation for higher cutoff frequency.
(b) With hybrid π equivalent circuit, derive the expressions for hybrid conductances.

4 (a) Distinguish between cross-over distribution and harmonic distortion. How they can be eliminated?
(b) Determine the component values of class A series feed amplifier to deliver 75 mW of output power to a load of 4 ohm V_{CC} = 16 V. At the operating point $I_B = 200$ micro Amp, P_o(max) = 200 mW.

5 (a) Draw the circuit of double-tuned transformer coupled amplifier. Discuss the nature of the response of the amplifier for different values kQ = 1; $kQ > 1\ and\ kQ < 1$.
(b) How many stages are required to obtain gain of A = 100 using a tuned amplifier with BW of 500 KHz at f_O = 10 MHz. C = 100 pF and gm = 2 mA/V.

6 (a) Explain the method of adjusting the amplifiers for stabilization of the response.
(b) Explain the low frequency compensation technique to increase the BW of an amplifier.

7 (a) List out different types of voltage regulators. What are the advantages and disadvantages of each type?
(b) A certain voltage doubler has 20 V rms at its input. What is the output voltage? Sketch the circuit indicating the input terminals and PIV rating of the diode.

8 (a) Draw the circuit diagram of a 3-terminal regulator as a current source and explain its operation.
(b) Design a voltage regulator using 723 to given an output voltage of 5 V at 0.1 A current. V_i = 10 V and V_{SC} = 0.65 V.

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Code: 9A04402

4

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

ELECTRONIC CIRCUIT ANALYSIS

(Common to EIE, E,Con.E and ECE)

Time: 3 hours Max Marks: 70

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

1 (a) Draw the small signal hybrid model of CB amplifier and derive and expression for its A_V, A_i, R_j and R_0.
(b) The h-parameters of CE amplifier are h_{ie} = 1100 Ω, h_{fe} = 50, $h_{re} = 2.5 \times 10^4$, h_{oe} = 24 μA/v and R_S = 1 kΩ, R_L = 10 kΩ. Find the current and voltage gain, (with and without source resistance) input & output impedances.

2 (a) Compare emitter follower and Darlington emitter follower configurations in respect of:
(i) Current gain. (ii) Input impedance. (iii) Voltage gain. (iv) Output impedance.
(b) If four identical amplifiers are cascaded each having $f_L = 100$ Hz, determine the overall lower 3 dB frequency. Assume non interacting stages.
(c) Write a short note on Gain-Band width product of amplifiers.

3 (a) Derive all components in the hybrid π model in terms of h parameters in CE configuration.
(b) Describe the emitter follower at high frequency and also derive the equation for higher cutoff frequency.

4 (a) Compare series fed and transformer coupled class A power amplifiers.
(b) Draw the circuit of transformer coupled amplifier and explain the operation graphically.

5 (a) Draw a simple BJT tuned amplifier circuit and its ideal response characteristic.
(b) Calculate the resonant frequency, BW and Q of the tuned transformer amplifier with R_L = 10 kΩ, C = 30 pF and L = 10 mH and turns ratio = 10.

6 (a) What are the main advantages of class-C RF amplifier and explain its operation with necessary waveforms?
(b) Mention the 3-methods of stabilization of double-tuned transformer coupled amplifier circuit performance against the feedback path through the parasitic capacity between input and output and also mention reasons for neutralization schemes.

7 (a) Explain the limitations of unregulated power supplies. To derive regulated DC output from AC mains, what are the important building blocks required. Explain about each block.
(b) A certain voltage doubler has 20 V rms at its input. What is the output voltage? Sketch the circuit indicating the input terminals and PIV rating of the diode for (i) Voltage Tripler and (ii) Quadrupler.

8 (a) Draw the circuit of 7805 voltage regulator and explain its operations.
(b) 7824 regulator IC can deliver a maximum current of 700 mA. Design a circuit using 7824 to deliver a current of 3 A.

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Code: 9A04404

1

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

PULSE AND DIGITAL CIRCUITS

(Common to EIE, E.Con.E, ECE, ECC and MCT)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Derive the conditions necessary for good integrator.

(b) A square wave whose peak to peak amplitude is 1 V extends ± 0.5 V with respect to ground. The duration of the positive section is 0.1 sec and of the negative section is 0.2 sec. If this wave form is impressed on RC high pass circuits whose time constant is 0.2 sec? What are the steady state maximum and minimum values of the output waveform?

2 (a) Explain transfer characteristics of the emitter coupled clipper and derive the necessary equations.

(b) Draw the basic circuit diagram of positive peak clamper circuit and explain its operation.

3 (a) Explain with relevant diagram the various transistor switching times.

(b) Explain the storage and transition times of the diode as a switch.

4 (a) Explain how a Schmitt trigger can be used as a comparator and as a squaring circuit.

(b) What do you understand by hysteresis? What is hysteresis voltage? Explain how hysteresis can be eliminated in a Schmitt trigger.

5 (a) Draw the circuit of RC ramp generator using bipolar transistor constant current circuit.

(b) Sketch typical input and output waveforms and briefly explain the circuit operation.

6 (a) What are different factors that cause phase delay?

(b) What is 6 to 1 frequency division? Explain.

7 (a) What is synchronization?

(b) What is the condition to be met for pulse synchronization?

8 (a) Explain 3 load configuration of a MOS gate.

(b) Explain why CMOS and TTL gates could not be interfaced directly even though both operate at 5 V supply.

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Code: 9A04404

2

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

PULSE AND DIGITAL CIRCUITS

(Common to EIE, E.Con.E, ECE, ECC and MCT)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

*****

1 Write short note on the following:
   (a) Attenuators.
   (b) RC Double differentiator.
   (c) RLC ringing circuit.

2 (a) Explain the response of the clamping circuit when a square wave input is applied under steady state conditions.
   (b) Explain the effect of diode characteristics on clamping voltage.

3 (a) Explain how transistor will act as switch.
   (b) Discuss about unsymmetrical triggering of multivibrator.

4 A fixed bias bistable has the following circuit parameters R_C = 1 kΩ, R_1 = 3.9 kΩ, V_{CC} = + 9V and V_{BB} = - 9 V. Assume for transistor V_{CEsat} = 0 V, V_{BEsat} = 0.6 V and $V_{BE(cutoff)}$ = 0 V. Analyze the binary, and find the stable state voltages and currents. What is the minimum value of h_{FE} to satisfy the ON-OFF condition? Draw the circuit diagram and corresponding waveforms at both collections and bases.

5 (a) Explain about transistor television sweep circuit.
   (b) List applications of voltage and current sweep generators.

6 (a) Explain the operation of series and shunt FET sampling gates.
   (b) What are the advantages of FET sampling gates over transistor sampling gates?

7 (a) Explain how monostable multi is used as frequency divider.
   (b) Draw and explain the block diagram of frequency divider without phase jitter.

8 (a) Explain and draw the sinking sourcing characteristics of TTL.
   (b) Draw a positive NAND gate with diodes and a transistor (DTL) and explain its operation.

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Code: 9A04404

3

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

PULSE AND DIGITAL CIRCUITS

(Common to EIE, E.Con.E, ECE, ECC and MCT)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

*****

1 (a) A 10 Hz symmetrical square wave whose peak-to-peak amplitude is 2 V is impressed on a high-pass circuit whose lower 3-dB frequency is 5 Hz. Calculate and sketch the output waveform.

(b) What is the peak to peak output amplitude of the above wave form?

2 Draw the circuit diagram of emitter coupled clipper. Draw its transfer characteristics indicating all intercepts, slopes and voltage levels derive the necessary equations.

3 (a) Explain with relevant diagrams the various transistor switching times.

(b) Explain the tests that can be performed for listing of a transistor for saturation.

(c) Give the design considerations of a transistor switch.

4 What is a monostable multivibrator? Explain with the help of a neat circuit diagram the principle of operation of a monostable multivibrator, and derive an expression for pulse width. Draw the wave forms at collector and bases of both transistors.

5 (a) Explain about performance deviations of time base generators.

(b) What are the methods of generating time base waveforms?

6 (a) Define sampling gate and explain.

(b) With neat diagram explain the principle of operation of four diode bidirectional sampling gate.

7 Distinguish between astable frequency division and monostable frequency division with neat wave forms and analysis along with mathematical derivations.

8 Distinguish between static and dynamic power4 dissipation of a CMOS circuit. Derive the expression for dynamic power dissipation.

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Code: 9A04404

4

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

PULSE AND DIGITAL CIRCUITS

(Common to EIE, E.Con.E, ECE, ECC and MCT)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

*****

1 (a) Derive the output and draw the response of high pass RC circuit for:
(i) Step input. (ii) Square input.
(b) What is an attenuator? Explain the under and over compensation in attenuator.

2 (a) Give the circuits of series clipper circuits and explain their operation with the help of transfer characteristics.
(b) Draw the circuit diagram of emitter coupled clipper. Draw its transfer characteristics indicating all intercepts, slopes and voltage levels derive the necessary equations.

3 (a) Explain how diode will act as switch.
(b) Discuss the applications of Schmitt trigger.

4 (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.

5 (a) Compare boot strap time base circuit and miller time base circuit.
(b) Compare voltage time base circuit and current time base circuit.

6 (a) What is pedestal? How it affects the output of a sampling gate?
(b) Describe the operation of chopper amplifier.

7 (a) With the help of a circuit diagram and wave forms explain the frequency division by an astable multivibrator?
(b) Explain the terms synchronization and frequency division of a sweep generator.

8 (a) Design OR and NAND by using CMOS.
(b) What are the advantages and disadvantages of open collector outputs?

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