

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

PRINCIPLES OF ELECTRICAL ENGINEERING

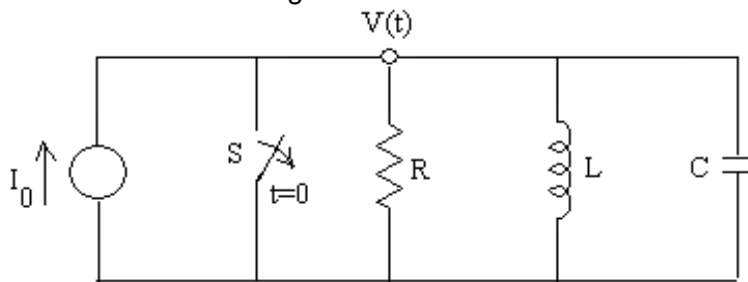
(Common to Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering & Electronics & Computer Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 (a) Derive the expression for current when a dc voltage V is applied suddenly (i.e. at time $t=0$) by closing a switch in a series R-L circuit by using Laplace transform.
(b) Assuming zero initial conditions, Find $V(t)$ given $I_0=2$ A, $L=0.5$ H, $C=1$ F and $R=0.5$ Ω in the network shown in the fig below.



- 2 (a) Define and obtain Open circuit impedance parameters by taking any one example.
(b) A two port network has the following parameters: $Z_{11}=20\Omega$, $Z_{12}=5 \Omega$, $Z_{21}=20 \Omega$ and $Z_{22}=15\Omega$. Calculate Short circuit parameters.
- 3 Design m-derived high pass filter having design impedance of 600Ω , cut-off frequency 4 kHz and infinite attenuation at 3.6 kHz.
- 4 What is an attenuator? Explain T-type attenuator and Bridged T-type attenuator by deriving necessary equations.
- 5 A long-shunt compound generator supplies a load at 200 V through a pair of feeders of total resistance 0.04 ohm. The load consists of five motors, each taking 50 A and a lighting load of 100 bulbs each of 50 W. The armature resistance is 0.03 ohm; series field resistance 0.04 ohm and shunt field resistance 40 ohm. Find:
(i) Load current (ii) Terminal voltage and (iii) emf generated.
- 6 State the various methods to control the speed of a DC shunt motor and explain with neat circuit diagrams.
- 7 Discuss the importance of open-circuit and short-circuit tests on a transformer, and also explain the procedure for open circuit and short circuit tests with neat circuit diagrams.
- 8 Explain the principle of operation of (i) Stepper motor (ii) Capacitor motor.

II B. Tech II Semester (R09) Supplementary Examinations, November/December 2011
PROBABILITY THEORY & STOCHASTIC PROCESSES
 (Electronics & Computer Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
 All questions carry equal marks

- 1 (a) State and prove the Baye's theorem.
 (b) If a fair coin is tossed 4 times. Find the probability that there will appear.
 (i) 2 heads (ii) 1 tail and 3 heads (iii) atleast one head (iv) exactly one head
 (v) not more than one head.

- 2 (a) What is Gaussian random variable? Derive an expression for Gaussian distribution function.
 (b) Life time of IC chips manufactured by a semiconductor manufacturer is approximately normally distributed with mean = 5×10^6 hours and standard deviation of 5×10^5 hours. A main frame manufacture requires that at least 95% of a batch should have a life time greater than 4×10^6 hours will the deal be made.

- 3 (a) Let x be a random variable defused by the density function $f_x(x) = \begin{cases} \frac{\pi}{16} \cos\left(\frac{\pi x}{8}\right) & \text{for } -4 \leq x \leq 4 \\ 0 & \text{else where} \end{cases}$ find $E[3x]$ and $E[x^2]$.
 (b) Define moment generating function.

- 4 (a) Write short notes on point contesting.
 (b) Two independent random variables x and y are having their densities as:
 $f_x(x) = e^{-x} \cdot u(x)$ and $f_y(y) = e^{-y} \cdot u(y)$ find $p(x+y \leq 1)$

- 5 (a) Distinguish between random variable and random processes.
 (b) Let X and Y are independent random variables such that
 $x = 1$ with a probability $1/3$
 $= 0$ with a probability $2/3$
 and $y = 2$ with a probability $3/4$
 $y = -3$ with a probability $1/4$
 find (i) $E(3x+2y)$ (ii) $E(2x^2-y^2)$ (iii) $E(x y)$ (iv) $E(x^2-y^2)$

- 6 (a) Discuss about the classification of Random processes.
 (b) A random processes is defined as $x(t) = A \cdot \sin(\omega t + \theta)$ where A is a constant and 'θ' is a random variable, uniformly distributed over $(-\pi, \pi)$, check x(t) for stationarity.

- 7 (a) Discuss about the correlation crgodie processes.
 (b) If x(t) is a stationary random processes having mean = 3 and auto correlation function $R_{xx}(\tau) = 9+2 e^{-|\tau|}$. Find the mean and variance of the random variable.

- 8 (a) Discuss about the cross spectral density of input x(t) and output y(t) of a system.
 (b) The cross spectral density of two random processes x(t) and y(t) is
 $s_{xy}(\omega) = 1 + \frac{j\omega}{k}$ for $-K < \omega < K$
 $= 0$ otherwise
 Where $k > 0$. Find the cross correction function between the processor.

II B. Tech II Semester (R09) Supplementary Examinations, November/ December 2011
SWITCHING THEORY & LOGIC DESIGN

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

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 Using PLA logic, implement a BCD to excess 3 code converter. Draw its truth table and logic diagram.
- 2 A clocked sequential circuit is provided with a single input x and single output Z. Whenever the input produce a string of pulses 1 1 1 or 0 0 0 and at the end of the sequence it produce an output Z = 1 and overlapping is also allowed.
 - (a) Obtain State - Diagram.
 - (b) Also obtain state - Table.
 - (c) Find equivalence classes using partition method & design the circuit using D- flip-flops.
- 3 (a) Implement the following Boolean functions using decoder and OR gates.

$$F_1(A, B, C, D) = \sum (1, 5, 7, 9).$$

$$F_2(A, B, C, D) = \sum (12, 13, 14, 15).$$
 (b) What is Hazard in switching circuits? Explain the design of Hazard free Switching circuit with an example.
- 4 (a) Find the complement of the following Boolean functions.
 - i) $F = AB' + A'B$
 - ii) $F = (V'W + X)Y + Z'$
 (b) Prove that OR-AND network is equivalent to NOR-NOR network.
 (c) Implement the Boolean function $F = A(B + CD) + BC'$ using only NOR gates.
- 5 a. Draw the logic diagram of a 4 bit binary ripple counter using positive edge triggering.
 b. Draw the block diagram of a 4 - bit serial adder and explain its operation.
- 6 Simplify the following Boolean expressions using K-map and implement them using NOR gates.
 - i) $F(A, B, C, D) = AB'C' + AC + A'CD'$
 - ii) $F(W, X, Y, Z) = W'X'Y'Z' + WXY'Z' + W'X'YZ + WXYZ$
- 7 Draw the ASM chart for full adder and tabulate the state table for the same. Design the control circuit for the above using Multiplier.
- 8 (a) What is the necessity of binary codes in computers?
 (b) Why the ASCII code was developed? Explain ASCII code with table.
 (c) Encode the word DIGITAL in to 7 bit ASCII code.

II B. Tech II Semester (R09) Supplementary Examinations, November/December 2011
ELECTRONIC CIRCUIT ANALYSIS
 (Common to Electronics & Instrumentation Engineering, Electronics & Control Engineering &
 Electronics & Communication Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
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- 1 (a) Derive the expressions for A_i, A_v of CB- amplifier. Explain how A_i, A_v are effected by R_L .
 (b) For the emitter follower with $R_s = 500\Omega$ and $R_L = 5K\Omega$, calculate A_i, A_v, A_{vS} and R_O . Assume $h_{fe}=50, h_{ie}=1k\Omega$ and $h_{oe} = 25mAV$.
- 2 Draw the circuit diagram of two stage RC-coupled transistor amplifier. Explain operation calculate the mid and low frequency ranges.
- 3 (a) Derive the expressions for hybrid conductances with hybrid- π equivalent circuit.
 (b) Given the following transistor measurements made at $I_C=5MA, V_{CE}=10V$ and at room temperature $h_{fe}=100; h_{ie} = 600\Omega; C_C = 3PF. A_{ie}=10$ at 10MHZ. Find f_T and f_B .
- 4 (a) Calculate the voltage gain, input admittance, input capacitance and output resistance for common source amplifier.
 (b) Draw the circuit symbol of a p-channel MOSFET. And explain the small signal MOSFET circuit model.
- 5 (a) Explain the difference types of feedback topologies.
 (b) In a voltage shunt feedback amplifier $R_C=4K\Omega, R_f=40K\Omega, R_S=10K\Omega, h_{ie}=1K\Omega; h_{fe}=100; h_{re}=h_{oe}=0$. Find voltage gain, input and output impedances with feedback.
- 6 (a) Explain the operation of LC-phase shift oscillator and derive the equation for frequency oscillation.
 (b) With neat diagram explain about Hartley oscillator.
- 7 Draw the circuit diagram of class-B-Power amplifier with transformer coupled. Explain the operation and calculate the efficiency.
- 8 (a) Explain the single tuned amplifier with neat diagram.
 (b) Explain the effect of cascading double tuned amplifiers on band width.

Code: 9A04404

II B. Tech II Semester (R09) Supplementary Examinations, November/December 2011
PULSE & DIGITAL CIRCUITS

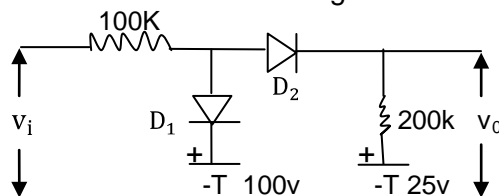
(Common to Electronics & Instrumentation Engineering, Electronics & Control Engineering, Electronics & Communication Engineering & Electronics & Computer Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 (a) Prove that the high pass and low pass RC circuits act as differentiator and integrator respectively.
(b) A square wave whose peak to peak value is 1v extends $\pm 0.5v$ w.r.t ground. The duration of the positive section is 0.1 sec and of the negative section 0.2 sec. If this waveform is impressed upon an RC differentiating circuit whose time constant is 0.2 sec, what are steady state maximum & minimum values of output waveform?
- 2 (a) Explain the working of a two level diode clipper with the help of circuit diagram, waveforms and transfer characteristics.
(b) Assume that diodes are ideal. Make a plot of v_o against v_i for the range of v_i from 0 to 150V. Indicate all slopes and voltage levels. Indicate for each region which diodes are conducting.



- 3 (a) Define rise time, storage time, fall time, turn off time in case of transistor as a switch.
(b) Discuss the switching times of a junction diode.
- 4 (a) Draw the circuit diagram of collector coupled as table multi vibrator and explain its operation.
(b) Design a collector coupled bistable multivibrator with specifications $V_{CC}=10V$, $V_{BB}=6v$, $I_{cset}=5MA$, neglect I_{CBO} , transistor is silicon npn type. Assume junction voltages. Find R_1 , R_2 and R_c .
- 5 (a) Define sweep-speed error, displacement error & transmission error.
(b) Draw the circuit diagram of transistor bootstrap sweep circuit and explain its working with the help of waveforms.
- 6 (a) Draw the circuit diagram of the unidirectional diode gate with more two inputs and explain its operation.
(b) Draw the sampling gate with four diodes and explain its operation.
- 7 (a) Describe the frequency division employing a transistor monostable multivibrator.
(b) What do you mean by synchronization and explain the synchronization of a sweep circuit with symmetrical signals?
- 8 (a) Realize two inputs TTL NAND gate truth table and explain its operation with suitable circuit diagram.
(b) With the help of neat circuit diagram and truth table, explain the working of diode logic AND gate and RTL AND gate.

Code: 9AHS401

R09

II B. Tech II Semester (R09) Supplementary Examinations, November/December 2011
MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS
(Common to Electronics & Instrumentation Engineering, Electronics & Control Engineering &
Electronics & Communication Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 Define managerial economics. Explain its nature and scope.
- 2 (a) What do you understand by Elasticity of demand? How is it classified?
(b) Explain the importance of elasticity of demand in business decision making.
- 3 Define B.E.P. How do you determine it? Show graphical presentation of B.E.A.
- 4 (a) Explain important features of perfect market.
(b) What are the principle differences between monopoly and perfect competition?
- 5 Evaluate partnership form of business organization. How does it overcomes the limitations of sole trading?
- 6 What are the components of working capital? Explain each of them.
- 7 Give a brief account on the important records of accounting under double-entry system and discuss briefly the scope of each.
- 8 What is meant by 'Ratio' analysis? Discuss its objectives and limitations.
