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10AL51

Fifth Semester B.E. Degree Examination, December 2012
Management and Entrepreneurship

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWOquestion from each part.***

PART – A

1 a. Explain different levels of management. **(10 Marks)**
b. What is scientific management? Explain **(10 Marks)**

2 a. What are the different steps involved in planning? **(10 Marks)**
b. What are single use and standing plans? Explain them with examples. **(10 Marks)**

3 a. Briefly explain the principles of organization. **(10 Marks)**
b. Discuss centralization v/s decentralization. **(10 Marks)**

4 a. Briefly explain comparison of Maslow's and Herzberg theories of Human motivation. **(10 Marks)**
b. What are different steps involved in controlling process? **(10 Marks)**

PART – B

5 a. Who are Intrapreuners? Explain the difference between Entrepreneurs and Intrapreuners. **(10 Marks)**
b. Explain the barriers involved in entrepreunership. **(10 Marks)**

6 a. What are the steps involved in starting a small scale industry? **(10 Marks)**
b. Explain the effect of WTO/GATT on Indian SSI. **(10 Marks)**

7 a. Explain the objectives and functions of KSFC and NSIC. **(10 Marks)**
b. Discuss various types of assistance provided by TECSOK and KSSIDC. **(10 Marks)**

8 a. Explain in detail the contents of "Project Report". **(10 Marks)**
b. What are network analysis techniques? Explain PERT and CPM. **(10 Marks)**

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10EE52

Fifth Semester B.E. Degree Examination, December 2012
Signals and Systems

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Define signal and system with examples. **(04 Marks)**

b. Sketch the signal for the following function:

$x(t) = 2t; \quad 0 \le t \le 1$

$4 - 2t; \quad 1 \le t \le 2$. Determine even and odd component of x(t). **(06 Marks)**

c. Using following sequences shown in Fig.Q.1(c) determine and sketch $x(t) = x_1(t)\, x_2(t)$. **(05 Marks)**

Fig.Q.1(c)

d. Check whether sequence $y(t) = x^2(t)$ is linear, time invariant, causal memory and stable. **(05 Marks)**

2 a. Using convolution integral determine and sketch output of LTI system whose input and impulse response is

$x(t) = e^{-3t}\,[u(t) - u(t-2)]$ and $h(t) = e^{-t}\,u(t)$. **(08 Marks)**

b. Given $x(n) = \beta^n\, u(n)$ and $h(n) = \alpha^n\, u(n)$. Find the O/P of LTI system using convolution sum when i) $\alpha \neq \beta$; ii) $\alpha = \beta$. **(07 Marks)**

c. Check whether the response of LTI system $y(n) = 2x(n+1) + 3x(n) + x(n-1)$ is causal and stable. **(05 Marks)**

3 a. Determine zero input, zero state and complete response of LTI system described by difference equation $y(n) - y(n-1) - 2\, y(n-2) = x(n)$ with input $x(n) = 6u(n)$ and initial condition $y(-1) = -1$ and $y(-2) = 4$. **(08 Marks)**

b. Find the forced response of electrical system shown in Fig.Q.3(b). **(08 Marks)**

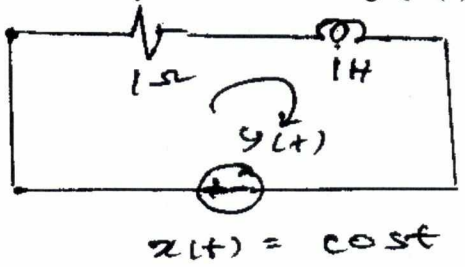

Fig.Q.3(b)

c. Draw the block diagram representation (direct form – I and direct form – II) of LTI system described by differential equation $\ddot{y} + 5\dot{y} + 4\,y(t) = x(t) + 3\dot{x}(t)$. **(04 Marks)**

4 a. State and prove following properties of DTFS:
   i) Convolution
   ii) Periodicity
   iii) Frequency shift. **(10 Marks)**

b. Determine the exponential Fourier series of continuous time periodic wave shown in Fig.Q.4(b). Plot the amplitude and phase spectrum. **(10 Marks)**

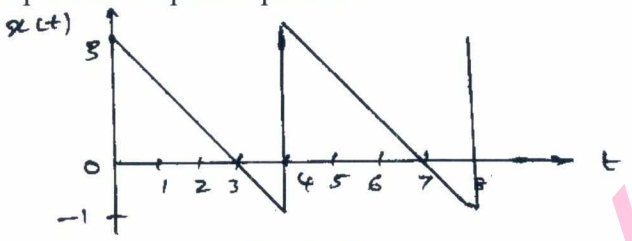

Fig.Q.4(b)

PART – B

5 a. Obtain Fourier transform of $x(t) = te^{-at} u(t)$. **(04 Marks)**

b. State and explain Parseval's theorem. **(06 Marks)**

c. Determine the time domain signal i) $x(jw) = e^{-|w|}$; ii) $x(jw) = \frac{4\sin^2 w}{w^2}$. **(10 Marks)**

6 a. Determine Fourier transform of
   i) $x(n) = a^n u(n)$ for $-1 < a < 1$
   ii) $x(n) = \delta(n)$. **(06 Marks)**

b. Determine the time domain signal corresponding to $x(e^{j\Omega}) = |\sin \Omega|$. **(04 Marks)**

c. Difference equation of casual LTI system is given by $\ddot{y}(t) + 6\dot{y}(t) + 8y(t) = 2x(t)$
   i) Find the impulse response of this system.
   ii) What is response it $x(t) = te^{-2t} u(t)$. **(10 Marks)**

7 a. What is ROC? List properties of ROC. **(06 Marks)**

b. Determine Z-transform of following sequences:
   i) $x(n) = n(-2)^n u(-n)$
   ii) $x(n) = n(-1/2)^n u(n) * (1/4)^{-n} u(-n)$. **(06 Marks)**

c. Find the inverse Z-transform if $x(z) = \frac{(z^3 - 4z^2 + 5z)}{(z-1)(z-2)(z-3)}$ with

ROC: $|z| < 1$; $|z| > 3$ and $2 < |z| < 3$. **(08 Marks)**

8 a. State and explain time reversal and final value theorem. **(08 Marks)**

b. Solve the following difference equation: $y(n) + y(n-2) = x(n)$ with input $x(n) = \delta(n)$ and initial condition $y(-1) = 1$, $y(-2) = 0$. **(06 Marks)**

c. A discrete time LTI system is given by

$$H(z) = \frac{3 - 4z^{-1}}{1 - \frac{7}{2}z^{-1} + \frac{3}{2}z^{-2}}$$

Specify the ROC of H(z) and determine impulse response for the following conditions:
   i) Stable system
   ii) Causal system
   iii) Non causal system. **(06 Marks)**

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10EE53

Fifth Semester B.E. Degree Examination, December 2012
Transmission and Distribution

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Draw the line diagram of a typical transmission and distribution scheme indicating the standard voltages and also explain feeder, distributor and services main of a distribution scheme. **(10 Marks)**

b. Why it is necessary to use high voltage for power transmission? And state the effect of high voltage used in transmission on:
i) Volume of copper required
ii) Line efficiency
iii) Line voltage drop. **(10 Marks)**

2 a. Give the list of supporting structures and the main components used in overhead transmission line. **(05 Marks)**

b. What is sag in a conductor? Derive the expression for the sag when the supports are at equal heights. **(07 Marks)**

c. A transmission line conductor at a river crossing is supported from two towers of height of 40m and 30m respectively above water level. The horizontal distance between the towers is 300m. If the tension in the conductor is 1500 kg, find the clearance of the conductor at a point midway between the supports. Weight of the conductor is 0.8 kg/m. Assume bases of the tower to be at the water level. **(08 Marks)**

3 a. State the various properties of an insulator. Give the list of important insulators and make the comparision of pin and suspension type insulators. **(07 Marks)**

b. Define string efficiency. Explain the method of calculating the string efficiency for a given three insulator string. **(07 Marks)**

c. An insulator string consists of 3 units each having a safe working voltage of 15 KV. The ratio of self capacitance to shunt capacitance of each unit is 8:1. Find the maximum safe working voltage of the string. Also find the string efficiency. **(06 Marks)**

4 a. Explain the following terms with reference to corona:
i) Disruptive critical voltage; ii) Visual critical voltage; iii) Corona power less. **(06 Marks)**

b. Compare the underground cables and over head line systems and give the list of various types of underground cables. **(06 Marks)**

c. A single core lead covered cable has a conductor diameter of 3cm with insulation diameter of 8.5 cm. The cable is insulated with two dielectrics with permittivities 5 and 3 respectively. The maximum stresses in the two dielectrics are 38 KV/cm and 26 KV/cm respectively. Calculate radial thickness of insulating layers and the working voltage of the cable. **(08 Marks)**

PART – B

5 a. Derive an expression for inductance of a single phase, two-wire transmission line. **(07 Marks)**

b. Explain the terms self GMD and mutual GMD. **(06 Marks)**

c. A three phase transmission line has conductor diameter of 1.8cm each, the conductors being spaced as shown in the Fig.Q.5(c). The loads are balanced and the line is transposed. Find the inductance per phase of 50 km long transmission line. **(07 Marks)**

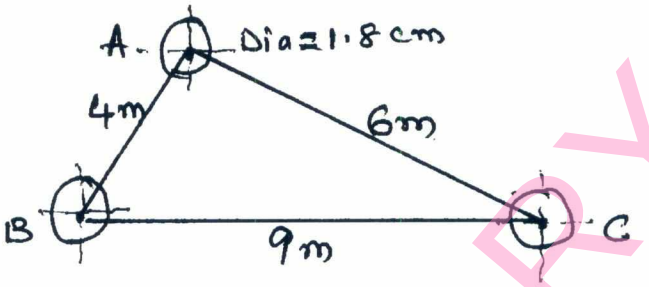

Fig.Q.5(c)

6 a. Deduce an expression for line to neutral capacitance for 3 phase overhead transmission line with equilateral spacing. **(08 Marks)**

b. Write a short note on transposition of conductors. **(04 Marks)**

c. A single phase overhead line 30km long consists of two parallel wires each 5mm in diameter and 1.5m apart. If the line voltage is 50KV at 50Hz. Calculate the line capacitance per km and the charging current with the line open circuited. **(08 Marks)**

7 a. Explain how the transmission lines are classified. **(04 Marks)**

b. Deduce an expression for transmission efficiency and regulation for medium transmission line using nominal T method. **(08 Marks)**

c. A single phase overhead transmission line delivers 1100 kW at 33KV at 0.8 p.f. lagging. The load resistance and inductive reactance of the line are 10 ohms and 15 ohms respectively. Determine:

i) Sending end voltage

ii) Sending end power factor

iii) Line efficiency with circuit and vector diagrams. **(08 Marks)**

8 a. List down the necessary requirements of a power distribution system. **(04 Marks)**

b. Explain the radial and ring main distribution system, bring out their merits and demerits. **(08 Marks)**

c. A two wire D.C. distributor AB, 600m long, is loaded as under. Distance from A (meters) 150, 300, 350, 450. Loads in amperes 100, 200, 250, 300. The feeding point A is maintained at 440V and that of B at 430V. If each conductor has a resistance of 0.01Ω per 100 meters. Calculate:

i) The current supplied from A and B.

ii) The power dissipated in the distributor. **(08 Marks)**

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10EE54

Fifth Semester B.E. Degree Examination, December 2012
D.C. Machine and Synchronous Machines

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. How would you classifies the types of generators (D.C) and explain them in brief, along with their diagrams. **(08 Marks)**

b. A long shunt compound generator delivers a load current of 50A at 500V, and has armature, series field resistance of 0.05Ω and 0.03Ω, 250 Ω respectively. Calculate the generated voltage and the armature current, allow 1 volt per brush for contact drop. **(08 Marks)**

c. What is a commutation, what are its effects, what are the methods to improve commutation? **(04 Marks)**

2 a. What are the different methods of speed control of D.C. shunt motor, explain them in brief. **(10 Marks)**

b. A D. C. series motor drives a load the torque of which varies as the square of the speed. The motor takes a current of 15A. When the speed is 600 rpm calculate the speed and the current when the motor field winding is shunted by a diverter of the same resistance as that of the field winding. Mention the assumptions made, if any. **(10 Marks)**

3 a. What are losses in a D.C. machine, and drive the expression for condition for maximum efficiency. **(10 Marks)**

b. Explain the power flow diagram in D. C. machine as generator and as motor. **(10 Marks)**

4 a. Explain the Swinburn's test to determine efficiency as a motor and generator. **(10 Marks)**

b. The Hopkinson's test on two shunt machine gave the following results for full load. Line voltage, 250 V, line current excluding field currents, 5A, and 4.2 A, calculate the efficiency of each machine, armature resistance of each machine is 0.02Ω **(10 Marks)**

PART – B

5 a. Derive the expression for an emf equation of an alternator. **(10 Marks)**

b. A - 3 phase, 50 Hz, 2 – pole, star connected turbo alternator has 54 slots, with 4 conductors per slot. The pitch of the coils is 2 slots less than the pole pitch. If the machine gives 3300 V, between lines on open circuit with sinusoidal flex distribution, determine the useful flex per pole. **(10 Marks)**

6 a. What is the voltage regulation of a 3ϕ synchronous generator? Explain emf method of determining the voltage regulation. **(10 Marks)**

b. A 550V, 55 KVA, 1ϕ alternator has an effective resistance of 0.2Ω. A field current of 10A produces an D. C. current of 200A, on short circuit and an emf of 450 V on open circuit. Calculate the synchronous reactance and voltage regulation of full load with power factor 0.8 lagging. **(10 Marks)**

7 a. How parallel operation of alternators can be made, what are the conditions to be satisfied. Explain in detail, with a circuit diagram. **(10 Marks)**

b. Derive power angle equation for salient pole machine. **(10 Marks)**

8 a. What are V and inverted V curves. Sketch them and explain their significance. **(08 Marks)**

b. What are the methods for starting the synchronous motors? Explain them. **(08 Marks)**

c. What is hunting what are the factor causes hunting, what are the effects hunting? **(04 Marks)**

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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10EE55

Fifth Semester B.E. Degree Examination, December 2012
Modern Control Theory

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Obtain the sate model by direct decomposition method of a system whose transfer function is

$$\frac{Y(s)}{U(s)} = \frac{5s^2 + 6s + 8}{s^3 + 3s^2 + 7s + 9}$$ **(08 Marks)**

b. Construct the state model using phase variables if a the system is described by the differential equation :

$$\frac{d^3y(t)}{dt^3} + \frac{8d^2y(t)}{dt^2} + \frac{14dy(t)}{dt} + = 4y(t) = 10U(t)$$ **(08 Marks)**

c. What are the important features of matrix A in phase variable form? **(04 Marks)**

2 a. Obtain the state model by Foster's form of a system whose transfer function is

$$T(s) = \frac{(s^2 + 4)}{(s+1)(s+2)(s+3)}.$$ **(10 Marks)**

b. Consider the matrix

$$A = \begin{bmatrix} 2 & -2 & 3 \\ 1 & 1 & 1 \\ 1 & 1 & -1 \end{bmatrix}$$

Find :

i) The eigen values and eigen vector of A.
ii) Write the model matrix
iii) Show that the modal matrix indeed diagonalizes A. **(10 Marks)**

3 a. Given the state model

$$\dot{X} = AX + BU$$
$$Y = CX$$

Where $A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -2 & -3 \end{bmatrix}$ $B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$ and $C = [1\ 0\ 0]$

Simulate and find the transfer function $\frac{Y(s)}{U(s)}$, using Mason's gain formula. **(10 Marks)**

b. Compute e^{At} for the given matrix

$$A_1 = \begin{bmatrix} 6 & 0 \\ 0 & 6 \end{bmatrix} \quad A_2 = \begin{bmatrix} 0 & \omega \\ -\omega & 0 \end{bmatrix} \quad A = \begin{bmatrix} 6 & \omega \\ -\omega & 6 \end{bmatrix}.$$ **(10 Marks)**

4 a. Consider the system with state equation

$$\dot{X} = AX + BU$$

Where $A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & -11 & -6 \end{bmatrix}$ and $B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$

Find the controllability of the system by

i) Karlman's test ii) Gilbert's test. **(10 Marks)**

b. Obtain the state transition matrix

$$x(t) = \begin{bmatrix} 0 & 1 \\ -4 & -4 \end{bmatrix} x(0)$$

using : i) Lapace transformation method ii) Cayley Hamilton method. **(10 Marks)**

PART – B

5 a. With block diagram, explain "Full order state observer". **(08 Marks)**

b. Consider the system defined by

$$\dot{X} = AX + BU$$

Where $A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -5 & -6 \end{bmatrix}$ $B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$

By using the state feed back control u = - kx, it desired to have the closed loop poles at s = - 1 ± j2, s = - 10. Determine the state feed back gain matrix k by using

Direct substitution method

Transformation matrix T. **(12 Marks)**

6 a. Define controllers and classify them. **(06 Marks)**

b. With a block diagram, explain PID controller. **(06 Marks)**

c. Explain the following non linearities

i) Saturation ii) Dead zone iii) Back lash. **(08 Marks)**

7 a. Find out the singular points for the following :

i) $\ddot{y} + 3\dot{y} + 2y = 0$

ii) $\ddot{y} + 3\dot{y} - 10 = 0$. **(08 Marks)**

b. Write a note on "limit cycles". **(04 Marks)**

c. Explain delta method of constructing the phase trajectory. **(08 Marks)**

8 a. Explain : i) Stability ii) Asymptotic stability iii) Instability by graphical representation. **(06 Marks)**

b. Check the sign definiteness of the following quadratic equation :

$V(x) = 8x_1^2 + x_2^2 + 4x_3^2 + 2x_1x_2 - 4x_1x_3 - 2x_2x_3$. **(06 Marks)**

c. Consider the system with differential equation

$$\ddot{e} + k\dot{e} + k_1\dot{e}^3 + e = 0$$

Examine the stability by Liapunov's method, given that $k > 0$ and $k_1 > 0$. **(08 Marks)**

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10EE56

Fifth Semester B.E. Degree Examination, December 2012
Linear ICs and Applications

Time: 3 hrs. Max. Marks:100

Note: *1. Answer FIVE full questions, selecting at least TWO questions from each part.*
2. Standard resistance and capacitance data table may be used.

PART – A

1 a. Sketch and explain a high input impedance voltage follower circuit, hence derive an expression for its input impedance. **(06 Marks)**

b. Design a capacitor coupled non-inverting amplifier to operate with +30V dc supply. The specifications the circuit are, voltage gain = 90, output voltage = 3V, load resistance = 10Ω and lower cut off frequency = 70 Hz. Use a BIFET opamp. **(08 Marks)**

c. Rig up a capacitor coupled inverting amplifier with a single polarity supply, explain its working and summarize design steps. **(06 Marks)**

2 a. What are causes of op amp circuit instability and list precautions to be taken for stability? **(08 Marks)**

b. What is frequency compensation? Explain any one frequency compensation method. **(06 Marks)**

c. An op amp (Bipolar 741 type) is configured as a voltage follower. If the output rise time is not to exceed 3 μ sec. Determine: i) Maximum undistorted output amplitude; ii) Maximum output rise time and corresponding maximum pulse amplitude when op amp is configured as an amplifier with a closed loop gain of 40. (Assume slew rate = 0.5 V/μ sec, UGB = 800 kHz). **(06 Marks)**

3 a. Draw a precision full wave rectifier circuit using a precision half wave circuit and a summing circuit. Explain its working and draw all relevant waveforms. **(08 Marks)**

b. Name the circuit shown in Fig.Q.3(b) and draw input/output waveforms when the input is $v_i = 5 \sin 314t$. **(04 Marks)**

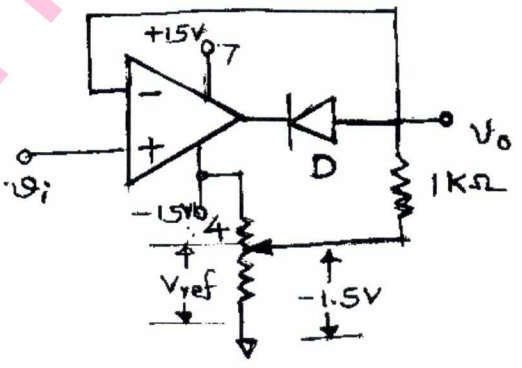

Fig.Q.3(b)

c. A ± 5V 10 kHz square wave from a signal generator with source resistance of 100Ω is to have its positive peak clamped at ground level. The tilt on the output is not to exceed 1% of peak amplitude of the wave. Design a suitable op amp circuit using ± 12V supply. Draw input/output waveforms. **(08 Marks)**

4 a. Design an inverting Schmitt trigger with V_H = 1.5V, UTP = 1.5V, supply voltage = ± 18V and $v_i = 5 \sin 200 \pi t$. Draw input/output waveforms and also show the transfer characteristic for the circuit. **(08 Marks)**

b. Draw an op-amp based monostable multivibrator circuit. Show all relevant waveforms and write an expression for the output pulse width. **(06 Marks)**

c. Design an astable multivibrator circuit using a BIFET op-amp to operate at frequency of 11 kHz and amplitude of ± 9V. **(06 Marks)**

PART – B

5 a. Compare an RC phase shift oscillator with a Wein Bridge oscillator. **(05 Marks)**

b. Draw a rectangular/triangular wave generator circuit. Explain how the frequency and duty cycle of output can be varied. Show the waveforms. **(09 Marks)**

c. Write a short note on signal generator output controls and explain it with a suitable circuit. **(06 Marks)**

6 a. Compare a wide band filter with narrow band filter. **(06 Marks)**

b. What is a band elimination filter? Implement a band elimination filter using:
   i) High pass filter and a low pass filter.
   ii) Band pass filter.
   Show the frequency response. **(08 Marks)**

c. Design a single stage band pass filter with unity gain and a pass band from 300 Hz to 30 kHz. **(06 Marks)**

7 a. Summarize important features of FLT-U2 and give the procedural steps to implement a second order band pass filter in the non-inverting mode using FLT-U2. **(10 Marks)**

b. Distinguish between small signal amplifiers and power amplifiers. **(04 Marks)**

c. Explain a phase lock loop (PLL) based frequency multiplier. **(06 Marks)**

8 a. Define performance parameters of voltage regulators. **(04 Marks)**

b. With a neat circuit, explain working of a precision voltage regulator. **(08 Marks)**

c. Design a voltage follower type regulator circuit using 741 op-amp with following specifications:
   i) Output voltage 12V.
   ii) Maximum load current = 50mA. **(08 Marks)**

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