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10AL51

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Management and Entrepreneurship

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Define Management. List and explain the functions of Management. **(10 Marks)**
b. Explain the scope of management. Explain the characteristics and levels of management. **(10 Marks)**

2 a. Explain Hierarchy of plans. **(05 Marks)**
b. Briefly explain types of planning. **(05 Marks)**
c. State the different types of decisions and explain the steps in decision - making. **(10 Marks)**

3 a. Explain with sketch the line and staff organisation. **(05 Marks)**
b. What are the advantages of Management By Objectives (MBO) and Advantages of Management by Exception (MBE)? **(10 Marks)**
c. What are the advantages of Matrix Organisation? **(05 Marks)**

4 a. Write about Maslow's theory of Motivation. **(05 Marks)**
b. Explain Mc Gregor's theory X and theory Y. **(05 Marks)**
c. Differentiate between Co-ordination and Co-operation. **(05 Marks)**
d. What are barriers of successful communication? **(05 Marks)**

PART – B

5 a. Briefly compare Intrapreneurs, Entrepreneurs and managers. **(06 Marks)**
b. Explain in detail the stages in Entrepreneurial process. **(10 Marks)**
c. Explain the characteristics of Entrepreneurship. **(04 Marks)**

6 a. Define briefly about Ancillary Industry and Tiny Industry. **(06 Marks)**
b. Write a short note on GATT and also mention the challenges faced since its inception. **(10 Marks)**
c. List four prominent functions of WTO. **(04 Marks)**

7 a. Name any five state or Central Government Institutions and state their objectives and functions. **(10 Marks)**
b. Explain the roles of IDBI. **(05 Marks)**
c. Write a note on Single window DIC agency. **(05 Marks)**

8 a. Write short notes on : i) Quantifiable and non – quantifiable projects ii) Sectoral projects. **(05 Marks)**
b. Classify Techno – Economic projects and briefly describe the same. **(06 Marks)**
c. Write short notes on :
i) Project Identification ii) Project Selection iii) Project Report. **(09 Marks)**

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10EE52

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Signals and Systems

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. What is continuous time and discrete time signals? Explain, with examples. **(04 Marks)**

b. Sketch and label for each of the following for the given signal x(t) shown in Fig.Q1(b). **(08 Marks)**

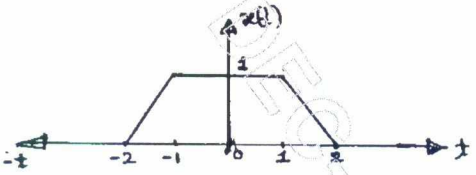


Fig.Q1(b)

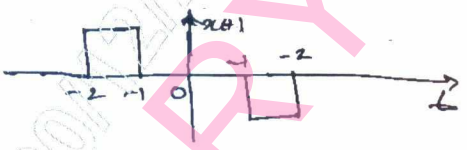


Fig.Q1(c)

i) x(2t + 3) ii) x(–3t + 2) iii) x(2(t/3 – 1)).

c. For the signal x(t) shown in Fig.Q1(C) find the energy in that signal. **(04 Marks)**

d. A system has an input x(t) and corresponding output is $y(t) = \frac{d}{dt}\left\{e^{-t}x(t)\right\}$ determine whether the system is : i) memoryless ii) stable iii) causal iv) linear v) time invariant. **(04 Marks)**

2 a. A system is characterized by impulse response $h(t) = \delta(t) - \delta(t-1)$. Determine the step response and sketch that. **(06 Marks)**

b. Using convolution integral, determine output of LTI system for input $x(t) = e^{-at}$; $0 \le t \le T$ impulse response $h(t) = 1$; $0 \le t \le 2T$. **(08 Marks)**

c. Check whether the system whose impulse response is $h(t) = e^{-t}\,u(t-1)$ is stable, memory less and causal. **(06 Marks)**

3 a. Determine the output of the system described by the following differential equation with input and initial conditions specified.

$$\frac{d^2}{dt^2}y(t) + 6\frac{d}{dt}y(t) + 8y(t) = 2x(t),\ y(0^-) = -1,\ \frac{d}{dt}y(t)\Big|_{t=0} = 1,\ x(t) = e^{-t}u(t).$$ **(10 Marks)**

b. Draw direct Form – I and Form – II implementation for the following difference equations :

i) $y[n] - \frac{1}{9}y[n-2] = x[n-1]$

ii) $y[n] + \frac{1}{2}y[n-1] - y[n-3] = 3x[n-1] + 2x[n-2]$. **(10 Marks)**

4 a. What are the conditions that x(t) should satisfy to have Fourier series? **(04 Marks)**

b. Find the complex Fourier co-efficient x(k) for the given x(t) in Fig.Q4(b). Draw the amplitude and phase spectra of x(k). **(11 Marks)**

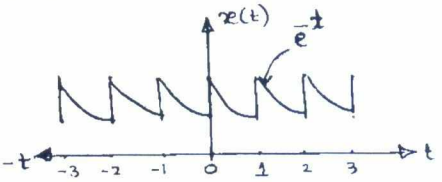


Fig.Q4(b)

c. Determine the complex exponential Fourier series representation of the following signals.

i) $x(t) = \cos \omega_0 t$ ii) $x(t) = \sin \omega_0 t$. **(05 Marks)**

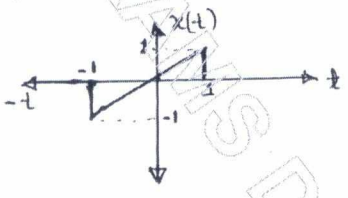
Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

PART – B

5 a. Find the Fourier transform of the following signals.

i) $x(t) = e^{-2t}u(t-1)$

ii)



iii) $x(t) = u(t+1) - u(t-1)$. **(15 Marks)**

b. Prove that differentiation in time domain is equal to multiplication of $X(\omega)$ by $j\omega$ in the frequency domain. **(05 Marks)**

6 a. Use the properties and table of transforms to find discrete time Fourier transformer [DTFT] of :

i) $x[n] = (\frac{1}{3})^n u(n+2)$

ii) $x[n] = (n-2)[u(n+4) - u(n-5)]$. **(10 Marks)**

b. A causal discrete time LTI system is described by $y[n] - \frac{3}{4}y[n-1] + \frac{1}{8}y[n-2] = x[n]$. Determine the frequency response and impulse response of the system. **(10 Marks)**

7 a. Determine the z–transform, the ROC and locations of pole zero of x(z) for the following signals :

i) $x[n] = -(\frac{1}{2})^n u(-n-1) - (\frac{1}{3})^n u(-n-1)$

ii) $x[n] = -(\frac{3}{4})^n u(-n-1) + (-\frac{1}{3})^n u(n)$. **(10 Marks)**

b. Use the properties of z – transforms to determine x(z) for the given signal :

i) $a^{n+1}u(n+1)$

ii) $n\,a^{n-1}u(n)$

iii) $a^{-n}u(-n)$

Name the property used in each. **(10 Marks)**

8 a. Use the method of partial fraction expansion to find inverse – z transform of given X(z)

$$X(z) = \frac{1 + \frac{7}{6}z^{-1}}{\left(1 - \frac{1}{2}z^{-1}\right)\left(1 + \frac{1}{3}z^{-1}\right)}$$ with following conditions : i) $|z| > \frac{1}{2}$ ii) $|z| < \frac{1}{3}$ iii) $\frac{1}{3} < z < \frac{1}{2}$. **(10 Marks)**

b. For the given difference equations and associated input and initial conditions determine the output y[n].

$3y[n] - 4y[n-1] + y[n-2] = x[n]$

With $x[n] = (\frac{1}{2})^n$ and $y[-1] = 1$, $y[-2] = 2$. **(10 Marks)**

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10EE53

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Transmission and Distribution

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Draw a line diagram of a typical power scheme indicating the standard voltages used at different voltage levels. Explain : i) Feeders ii) distributors iii) service mains. **(12 Marks)**

b. For the same power transmitted over the some distance, show that increase in transmission voltage of a transmission line results in :
i) increased efficiency ii) decreased line loss iii) reduced weight of conductor martial. **(08 Marks)**

2 a. Derive an expression for sag when the supports are at equal level for catenary configuration. **(10 Marks)**

b. A transmission line at a river crossing is supported from two towers at height of 40m and 30m above water level. The horizontal distance between two towers is 300m. If the tension in the conductor is 1500kg, find : i) minimum clearance ii) the clearance of the conductor at a point midway between the supports. Weight of conductor is 0.8 kg/m. **(06 Marks)**

c. Discuss the required properties for a conductor material for overhead line conductor. **(04 Marks)**

3 a. With a neat diagram explain Hewlett type suspension insulators. **(05 Marks)**

b. Define string efficiency. Explain the use of guard ring for improving string efficiency. **(06 Marks)**

c. A string of suspension insulator consists of 6 units. If the maximum voltage per unit is 33KV, calculate : i) the maximum voltage for which this string can be used ii) the string efficiency.
Assume capacitance between each link pin and earth as 15% of the self capacitance of each unit. **(09 Marks)**

4 a. Explain the phenomenon of corona on transmission line. Derive the expression for disruptive critical voltage. **(08 Marks)**

b. With a neat diagram, explain the general construction of an underground cable. **(06 Marks)**

c. Derive an expression for insulation resistance of a single core cable. **(06 Marks)**

PART – B

5 a. Derive an expression for inductance of a single phase two wire line. **(08 Marks)**

b. Discuss transposition of transmission line. **(04 Marks)**

c. A two wire single phase line operators at 50Hz. The diameter of each conductor is 20mm and the spacing between the conductor is 3m. Calculate : i) the loop inductance of the line per km ii) the inductance of the line per km iii) the inductive reactance per km. **(08 Marks)**

6 a. Derive an expression for capacitance of a 3 phase line with equilateral spacing. **(12 Marks)**

b. A 3-phase, 3 wire system has its conductors arranged at the corners of an equilateral triangle of 2m side. The diameter of each conductor is 2.5cm. Calculate the inductance and capacitance of each conductor. **(08 Marks)**

7 a. Obtain expression for ABCD constants for a nominal PIE model of a medium transmission line. **(10 Marks)**

b. A 3-phase, 50 50Hz, transmission line, 100km long delivers 20MW at 0.9pf lag and at 110KV. The resistance and reactance of the line per phase per km are 0.2 ohm and 0.4 ohm respectively, while the capacitive admittance is 2.5×10^{-6} mho/km. Calculate :
i) the voltage and current at the sending end ii) the efficiency of the transmission line. Use nominal T method. **(10 Marks)**

8 a. A 2 wire DC distributor AB is fed from both ends. At feeding point A, the voltage is maintained at 230V and at B 235V. The total length of feeder is 200m and loads are tapped off as under :
25A at 50m from A; 50A at 75m from A; 30A at 100m from A; 40A at 150m from A. The resistance per km of one conductor is 0.3ohm. i) the current in various sections of the distributors ii) minimum voltage and the point at which it occurs. **(10 Marks)**

b. A single phase distributor 2km long supplies a load of 120A at 0.8 pf lag at its far end and a load of 80A at 0.9pf lag at its mid point. Both power factors are referred to the voltage at the far end. The resistance and reactance/km (go and return) are 0.05 ohm and 0.1 ohm respectively. if the voltage at the far end is maintained at 230V, calculate : i) voltage at the sending end ii) phase angle between voltages at the two ends. **(10 Marks)**

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10EE54

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018
DC Machines and Synchronous Machines

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Derive the emf equation of DC generator. **(06 Marks)**

b. Define Commutations and explain in detail any one method of commutation. **(08 Marks)**

c. A 4 pole, dc shunt generator with a shunt field resistance of 100Ω and an armature resistance of 1Ω has 378 wane connected in its armature. The flux/pole is 0.02 web. If the load resistance of 10Ω is connected across the armature terminals and generator is driven at 1000 rpm. Calculate the power absorbed by load. **(06 Marks)**

2 a. Explain briefly the importance of Back - emf. **(04 Marks)**

b. Discuss in detail speed control of i) DC series ii) DC compound motors. **(08 Marks)**

c. A 460V, series motor runs at 500 rpm taking a current of 40A. Calculate the speed and percentage change in torque, if the load is reduced so that motor is taking 30A. Total resistance of the armature and field circuit is 0.8Ω. Assume the flux is proportional to the field current. **(08 Marks)**

3 a. Describe the various losses occur in DC machine. **(06 Marks)**

b. Derive the conditions for max efficiency in DC machines. **(08 Marks)**

c. A, 500V shunt generator has a full load current of 200A, Its armature resistance is 0.1Ω and field resistance 100Ω and constant losses including stray – load losses and field copper loss are 4000W. Calculate its efficiency at half – full load. **(06 Marks)**

4 a. Explain with a neat sketch Regeneration method of testing in case of DC machines. **(10 Marks)**

b. A 500V, DC shunt motor takes 4A on no load. The armature resistance including that of brushes is 0.2Ω and field current is 1.0A. Estimate the output and efficiency when the input current is 100A. **(10 Marks)**

PART – B

5 a. List out the differences between salient pole and non salient pole alternators. **(06 Marks)**

b. Derive the e.m.f equations of Alternator considering the winding factors. **(06 Marks)**

c. A 3 phase, 8 pole 50Hz star connected alternator has 4 slot/pole on it stator with 10 conductor/slot. The air gap flux is distributed sinusoidaly and equal to 0.04 web. The stator has a double layer windings with the full pitch coil. Calculate
i) Pitch factor ii) Distributer factor iii) emf genetared/phase iv) the line voltage at no load. **(08 Marks)**

6 a. Define the voltage regulation of Alternator and explain briefly A.S.A method of finding Regulation in Alternator. **(10 Marks)**

b. Define Short Circuit Ratio (S.C.R) and its importance in Alternators. **(04 Marks)**

c. A 3 phase alternator has a direct axis synchronous reactance of 0.7 PU and quadrature axis synchronous reactance of 0.4 PU. Calculate i) Load angle ii) No load per unit voltage, at full load at 0.8 p.f lag. **(06 Marks)**

7 a. Explain briefly i) Synchronizing current ii) Synchronizing power iii) Synchronizing torque. **(06 Marks)**

b. Derive the equation for power output / phase for a salient pole alternator. **(08 Marks)**

c. A 750 KVA, 11KV , 4 pole 3 phase star connected has a % resistance and % reactance of 1 and 15 ohms respectively. Calculate the synchronizing power per mechanical degree of displacement at i) No load ii) at full load of 0.8 p.f lag. The terminal voltage in each case is 11KV. **(06 Marks)**

8 a. Explain briefly the basic principle of operation of synchronous motor. **(06 Marks)**

b. A 3 phase, 400V 50Hz star connected synchronous motor has per phase synchronous impedance of $(0.5 + j4.0)\ \Omega$. It takes a current of 15A at unity power factor for a certain field current. Calculate the excitation voltage and power angle. **(06 Marks)**

c. Write short notes on any two :
i) V and A curves ii) Synchronous condenser iii) Damping. **(08 Marks)**

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10EE55

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Modern Control Theory

Time: 3 hrs. Max. Marks:100

Note: 1. ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***
2. ***Assume suitable missing data.***

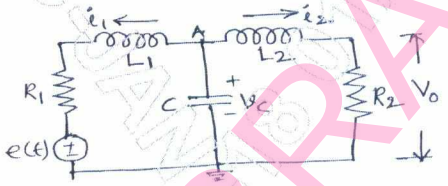
PART – A

1 a. Compare Modern control theory with Conventional control theory. **(04 Marks)**

b. Define the concept of i) State ii) State variables iii) State space iv) State model. **(06 Marks)**

c. Obtain the state model for the circuit shown in fig. Q1(c), by choosing i_1, i_2 and V_c as state variables. The voltage across R_2 is the output (V_0). **(10 Marks)**

Fig.Q1(c)



2 a. Obtain the State model using phase variables if a system is described by differential equation as : **(06 Marks)**

$$5\frac{d^3y}{dt^3}+6\frac{d^2y}{dt^2}+11\frac{dy}{dt}+10y=3u(t).$$

b. Develop the state model in Jordon's canonical form for a system having transfer function as **(06 Marks)**

$$T(s)=\frac{2s^2+6s+7}{(s+1)^2(s+2)}.$$

c. A feedback system is represented by closed loop transfer function, Draw a signal flow graph (SFG) and obtain the state model. **(08 Marks)**

$$T(s)=\frac{8}{s^3+7s^2+14s+8}.$$

3 a. Obtain the state model of the linear system by Direct decomposition method, whose transfer function is **(06 Marks)**

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

b. Find the transfer function of the system having state model as below : **(06 Marks)**

$$X=\begin{bmatrix}1 & -2\\ 4 & -5\end{bmatrix}x+\begin{bmatrix}2\\ 1\end{bmatrix}u \;;\; Y=[\,1\;\;1\,]x.$$

c. For the system matrix given by $A=\begin{bmatrix}-4 & 1 & 0\\ 0 & -3 & 1\\ 0 & 0 & -2\end{bmatrix}$.

Determine i) Characteristic equation ii) Eigen value iii) Eigen vector iv) Modal matrix. **(08 Marks)**

4 a. What is State transition matrix $\phi(t)$. List out the properties of STM. **(06 Marks)**

b. Given that

$$A_1 = \begin{bmatrix} \sigma & 0 \\ 0 & \sigma \end{bmatrix} \; ; \; A_2 = \begin{bmatrix} 0 & w \\ -w & 0 \end{bmatrix} \; ; \; A = \begin{bmatrix} \sigma & w \\ -w & \sigma \end{bmatrix}. \text{ Compute } e^{At}. \quad \textbf{(06 Marks)}$$

c. Determine the State transition matrix by Caley – Hamilton method for the system described by $\dot{x}(t) = \begin{bmatrix} 0 & 1 \\ -2 & 0 \end{bmatrix} x(t)$. **(08 Marks)**

PART – B

5 a. Define Controllability and Observability. A system is describe by **(10 Marks)**

$$\dot{x}(t) = \begin{bmatrix} 0 & 1 \\ 9 & 0 \end{bmatrix} x + \begin{bmatrix} 0 \\ 9 \end{bmatrix} u.$$

Determine the state feedback gain matrix (k), so that control law u = -kx will place the closed loop poles at $-3 \pm j3$ by using Ackerman's formula.

b. Design a full order state observer for the system with

$$\dot{x}(t) = \begin{bmatrix} -1 & 1 \\ 1 & 2 \end{bmatrix} x \quad ; \quad y(t) = [1 \;\; 0]x.$$

The desired eigen values for the observer matrix are $\mu_1 = -5$ and $\mu_2 = -5$. **(10 Marks)**

6 a. What are P, PI and PID controllers? What are their effects on system performance? **(06 Marks)**

b. Explain the following non – linearities as : i) Saturation ii) Dead zone iii) Friction and iv) Backlash. **(08 Marks)**

c. Explain the properties of the non linear system. **(06 Marks)**

7 a. What are Singular Points? Explain the types of a singular points. **(06 Marks)**

b. Explain the construction of the phase trajectory by delta method. **(08 Marks)**

c. Identify and classify the singular points of the system with differential equation as $\ddot{y} + \dot{y} + y^3$. **(06 Marks)**

8 a. Define the following : i) Stability ii) Asymptotic stability iii) Asymptotic stability in the large. **(06 Marks)**

b. Determine whether the following quadratic form is positive definite :

$Q(x_1\, x_2\, x_3) = 10x_1^2 + 4x_2^2 + x_3^2 + 2x_1x_2 - x_2x_3 - 4x_1x_2$. **(06 Marks)**

c. Examine the stability of the system described by the differential equation using Krasovskii's method.

$\dot{x}_1 = x_1$

$\dot{x}_2 = x_1 - x_2 - x_2^3$ **(08 Marks)**

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10EE56

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Linear IC's & Application

Time: 3 hrs. Max. Marks:100

Note: 1. *Answer any FIVE full questions, selecting at least TWO questions from each part.*
2. *Use of resistor and capacitors standard value lists are permitted.*
3. *Missing data may be suitably assumed.*

PART – A

1 a. With a neat circuit diagram, explain the operation of a high input impedance capacitor coupled non-inverting amplifier. Develop the expression for input impedance of the circuit. **(08 Marks)**

b. Briefly discuss the upeer cut off frequency of an op-amp circuit and show how the cut off frequency can be set for inverting amplifier. **(06 Marks)**

c. Using a 741 op-amp, design a high Z_{in} non-inverting amplifier to operate with a +36 V power supply, a voltage gain of 100, an output amplitude of 6 V, a lower cut off frequency of 150 Hz, and a minimum load resistance is 12 KΩ. Use a 741 op-amp with maximum input bias current $I_{B(max)}$= 500 nA. **(06 Marks)**

2 a. Sketch typical gain/frequency response and phase/frequency response graphs for an operational amplifier at the high frequency end of the frequency band. Identify the pole frequecncies and rates of fall of voltage gain. Also state the typical phase shift at each pole frequency. Briefly explain. **(08 Marks)**

b. If the maximum amplitude of a sine wave is 5 V, calculate the slew rate–limited cut-off frequency for a voltage follower using op-amp 741. If the unity gain cut-off frequency is 800 kHz, determine the maximum peak value of the sine wave output.
(For 741S=0.5 V/μsec) **(04 Marks)**

c. List the precautions that should be observed for operational amplifier circuit stability, briefly explain each one. **(08 Marks)**

3 a. Show how a dead zone circuit can be combined with a summing circuit to produce precision limiting on the positive half cycle of the output waveform. Draw the voltage waveforms throughout the circuit and explain its operation. **(10 Marks)**

b. A non-saturating precision half wave rectifier using BIPOLAR op-amp with V_{CC} = ±15V is to produce a 2 V peak output. The input signal has a 0.5 V peak amplitude and a frequency of 1 MHz. Calculate the resistor values and specify the diode reverse recovery time. **(05 Marks)**

c. With a neat circuit diagram, explain the working of a voltage follower type peak detector. **(05 Marks)**

4 a. Sketch the circuit of a capacitor coupled zero crossing detector. Show the waveforms at various points in the circuit and explain its operation. **(06 Marks)**

b. Draw the circuit of an op-amp mono stable multivibrator. Show the voltage waveforms throughout the circuit and explain its operation. **(08 Marks)**

c. Using a 741 op-amp with a supply of ±14V, design a inverting Schmitt trigger circuit to have trigger points of ±2 V. **(06 Marks)**

PART – B

5 a. Draw the circuit of a phase shift oscillator. Sketch the output and feedback voltage waveforms and explain the circuit operation. **(06 Marks)**

b. Name the following circuit, determine whether the circuit shown in the Fig.5 (b) will work as an oscillator or not. If yes, determine the frequency of the oscillation. **(04 Marks)**

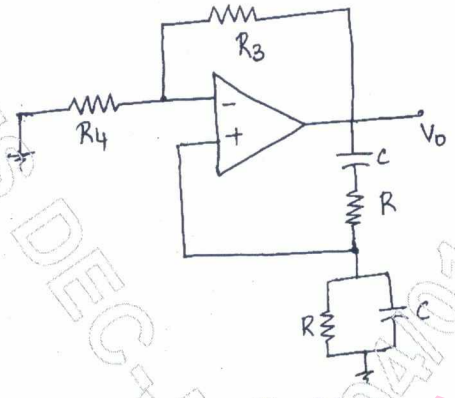

Fig. Q5 (b)

c. With a neat sketch explain a triangular / rectangular waveform generator, explain how to vary frequency and duty cycle of the output. **(10 Marks)**

6 a. Sketch typical frequency responses for Butterworth and chebyshev second-order active high pass filters. Write the equations required for designing a second order Butterworth high pass filter. **(08 Marks)**

b. Using a 741 op-amp, design a first order active low pass filter to have a cut-off frequency of 3 kHz. **(06 Marks)**

c. Show how a band-stop filter circuit can be constructed by the use of low pass and high pass filters. Sketch the expected frequency response, and briefly explain. **(06 Marks)**

7 a. What is dc voltage regulator? Explain the term line regulation, load regulation and ripple rejection for a dc voltage regulator. **(08 Marks)**

b. Sketch the circuit of a precision voltage regulator. Explain its operation and discuss how it differs from voltage follower regulator? **(08 Marks)**

c. Calculate the resistances R_1 and R_2 for the LM217 voltage regulator, to produce an output voltage of 9 V. **(04 Marks)**

8 a. With the block diagram, explain the operation of a PLL. **(06 Marks)**

b. List the advantages of the switched capacitor filter. **(04 Marks)**

c. Write short notes on:
(i) Universal active filter.
(ii) IC power amplifier. **(10 Marks)**

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