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10AL51

Fifth Semester B.E. Degree Examination, June/July 2017
Management and Entrepreneurship

Time: 3 hrs. Max. Marks:100

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

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 – A

1 a. Define Management with list and explain the functions of Management. **(10 Marks)**
b. "Manager plays a vital role in an organization". Justify this statement with reference to Interpersonal, Decision and Informational roles. **(10 Marks)**

2 a. State and explain importance of planning process. **(10 Marks)**
b. Elucidate on steps in Decision making with probable difficulties faced by Manager. **(10 Marks)**

3 a. What are Committees? Explain the principles of committees. **(10 Marks)**
b. Explain techniques of selection in detail. **(10 Marks)**

4 a. Define Motivation. Mention characteristics and anticipated results of motivation. **(10 Marks)**
b. Describe essentials of Sound control system. **(10 Marks)**

PART – B

5 a. Briefly describe Entrepreneurship and list out types of Entrepreneurs. **(10 Marks)**
b. Enumerate on barriers faced by Women Entrepreneurs. **(10 Marks)**

6 a. Describe Small Scale industry, Ancillary industry and Tiny industry. **(10 Marks)**
b. Explain the impact of Liberalization , Privatization and Globalization on small scale industry. **(10 Marks)**

7 a. Describe Single Window concept. **(05 Marks)**
b. Enumerate on functions of SISI. **(05 Marks)**
c. Explain the role of KSFC in setting up industries. **(05 Marks)**
d. Write on objectives of NSIC. **(05 Marks)**

8 a. Explain the process of product identification and project selection. **(10 Marks)**
b. Discuss on essentials of project appraisal. **(10 Marks)**

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Fifth Semester B.E. Degree Examination, June/July 2017
Signals and Systems

Time: 3 hrs. Max. Marks:100

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

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 – A

1 a. Define signals and systems with an example. **(04 Marks)**

b. Check whether the following singles are periodic. **(04 Marks)**
i) $x(t) = \sin^2 \pi t$ ii) $x(n) = \sin(\pi/3\ n)\cos(\pi/3\ n)$.

c. For the signal shown in Fig Q1(c). Find the output $y(t) = x_1(t) * x_2(t)$. **(04 Marks)**

Fig 1 (c)

d. The continuous time signal

$$x(t) = \frac{-2}{3}t + 2\ ; \quad 0 \le t \le 3$$
$$\quad 0 \quad ; \quad \text{elsewhere}$$

Sketch x(t) and find the following signals. i) $y_1(t) = x(2t-2)$ ii) $y_2(t) = x[1/2\,(t-2)]$
iii) $y_3(t)\,[-0.5\,t - 1]$ iv) $x_e(t)$ and $x_o(t)$. **(08 Marks)**

2 a. Check whether of following signals are linear, Time invariant, memory less, causal and stable. i) $y(t) = \log x(t)$ iii) $y(n) = x(-n)$ **(08 Marks)**

b. Determine and sketch the output signal using convolution sum.
Given $x(n) = (1/2)^n u(n-2)$ and $h(n) = u(n)$. **(08 Marks)**

c. Determine the range of 'a' and 'b' for which the LTI system with impulse response
$$h(n) = \begin{cases} a^n\ ; & n \ge 0 \\ b^n\ ; & n < 0 \end{cases} \text{ is stable.}$$ **(04 Marks)**

3 a. Determine the complete response of the system described by the difference equation $y(n) - \frac{1}{9}y(n-2) = x(n-1)$ with $y(-1) = 1$, $y(-2) = 0$ and input $x(n) = u(n)$. **(08 Marks)**

b. Draw the direct form – I and II for the following differential equations
i) $\dot{y} + 5y = 3x$ ii) $\ddot{y} + 5\dot{y} + 4y = \dot{x}$ **(06 Marks)**

c. For the network shown in Fig Q3(c). find natural response of the system with initial conditions $y(0) = 3$ and $\dot{y}(0) = -5$ **(06 Marks)**

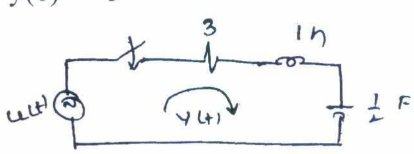

Fig Q3(c)

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4 a. State and prove following properties of continuous time Fourier series (CTFS)
i) Time shift ii) Parasvel's theorem. **(06 Marks)**

b. Find the complex exponential Fourier series and plot magnitude and phase spectrum.

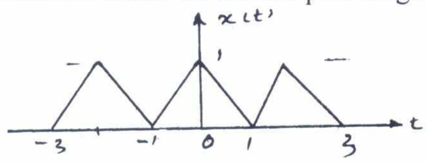

Fig Q4(b)

(08 Marks)

c. Determine the discrete time Fourier series representation for the signal
$x(n) = \cos\left(\frac{\pi}{3}n\right)$ **(06 Marks)**

PART – B

5 a. State and prove following properties of Fourier Transformation.
i) Frequency shift ii) Convolution theorem. **(07 Marks)**

b. Determine Fourier transformation of following signals.
i) $x(t) = e^{-at}u(t)$ ii) $x(t) = \cos t\, w_0 t$. **(06 Marks)**

c. Find the frequency response and the impulse response of the system described by the differential equation.
$$\frac{d^2y}{dt^2} + 5\frac{dy}{dt} + 6y = -\frac{d}{dt}x(t).$$ **(07 Marks)**

6 a. State and explain following DTFT properties
i) Linearity ii) Frequency differentiation. **(06 Marks)**

b. Find the DTFT of following signals i) $(x(n) = \delta\,(n)$ ii) $x(n) = a^n u(n)\ ;\ |a| < 1$ **(06 Marks)**

c. Obtain frequency response and the impulse response of the system described by the difference equation $y(n) - \frac{1}{4}y(n-1) - \frac{1}{8}y(n-2) = 3x(n) - \frac{3}{4}x(n-1)$ **(08 Marks)**

7 a. What is z-transformation? List the properties of ROC. **(06 Marks)**

b. State and prove following properties i) Convolution ii) Time reversal. **(06 Marks)**

c. Find the z-transformation of
i) $x(n) = n\,a^n u(-n)$ ii) $x(n) = n\sin\left(\frac{\pi}{2}n\right)u(-n)$ **(08 Marks)**

8 a. Find the inverse z-transformation of the sequence
$$x(z) = \frac{1}{1 - \frac{3}{2}z^{-1} + \frac{1}{2}z^{-2}}$$ for ROC i) $|z| > 1$ ii) $|z| < ½$ iii) $½ < |z| < 1$ **(08 Marks)**

b. Solve the following difference equation $y(n) + y(n-2) = \delta(n)\ ;\ n \geq 0$ with $y(-2) = 0$ and $y(-1) = 1$. **(06 Marks)**

c. Find the transfer function and impulse response of the system described by the difference equation $y(n) - \frac{1}{4}y(n-1) - \frac{3}{8}y(n-2) = x(n) + 2x(n-1)$. **(06 Marks)**

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Fifth Semester B.E. Degree Examination, June/July 2017

Transmission and Distribution

Time: 3 hrs. Max. Marks:100

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

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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PART – A

1 a. Draw and explain a typical power supply scheme indicating the standard voltages. **(07 Marks)**

b. Explain the advantages of high voltages transmission and state the limitations of increasing transmission voltage levels. **(08 Marks)**

c. What are the difference between feeder and distributer? **(05 Marks)**

2 a. Name the different components of an overhead line. Also explain the purpose for which they are used. **(05 Marks)**

b. Obtain the expression for sag when the supports are at equal level. Explain also the effects of wind and ice coating on sag. **(08 Marks)**

c. An overhead transmission line having a parabolic configuration is supported from two supports of unequal heights 80m and 70m above ground. The horizontal distance between supports is 170m. find the min clearance between the conductor and ground, if the tension in the conductor is 900kg, weight of conductor 0.4kg/m and factor of safety = 2. **(07 Marks)**

3 a. What are the types of insulators used in over head lines? Explain suspension type of insulator. **(06 Marks)**

b. Define string efficiency. Explain the method of static shielding to improve string efficiency. **(07 Marks)**

c. A string of 4 insulators has self capacitance equal to 4times the pin to earth capacitance calculate: i) Voltage distribution across various units as percentage of total voltage across the string ii) String efficiency. **(07 Marks)**

4 a. Explain corona phenomena. Discuss the disadvantages of corona. **(06 Marks)**

b. Derive the expression for minimum and maximum dielectric stress in a single core cable. Hence prove that $\frac{G\max}{g\min} = \frac{D}{d}$.

Where D = sheath diameter d = is the core diameter. **(08 Marks)**

c. A single core cable employing three layers of insulation with dielectric constants $\epsilon_{r1} = 5$, $\epsilon_{r2} = 4$, and $\epsilon_{r3} = 3$ respectively has a conductor of radius 1cm. Assuming that all the three insulating materials are worked at the same maximum potential gradient. Find the safe working voltage of the cable. The inner radius of the sheath is 2.5cm and maximum potential gradient is 40kV/cm. **(06 Marks)**

PART – B

5 a. Derive an equation for inductance of a 3 phase line with unsymmetrical spacing but transposed. **(10 Marks)**

b. A single phase line consists of two circuits in parallel as shown in Fig Q5(b). Conductors a and a' in parallel form one conductor while b and b' in parallel form the return path. Calculate the total inductance of the line per km assuming that current is equally shared by the two parallel conductors. The diameter of each conductor is 20mm. **(06 Marks)**

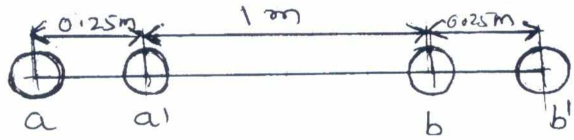

Fig Q5(b)

c. What is skin effect? On what factors it depends? **(04 Marks)**

6 a. Derive an expression for line to neutral capacitance for 3 phase overhead line when conductors are symmetrically placed. **(10 Marks)**

b. A 3 phase 50Hz transmission line is arranged as follows Fig Q6(b). The conductor diameter is 1.2cm. The voltage of the line is 110kV. Find the capacitance to neutral and charging current per km. **(06 Marks)**

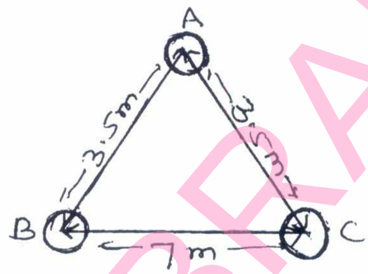

Fig Q6 (b)

c. Write a short note on transposition of transmission lines. **(04 Marks)**

7 a. Obtain expressions for sending end voltage and current in terms of ABCD constants and receiving end voltage and current for a nominal – T model of transmission line. Also draw the phasor diagram. **(10 Marks)**

b. A 3 phase 50Hz transmission line has following: constants R = 25Ω, X_L = 65Ω, Y = 4 × 10^{-4} ℧. If the load at the receiving end is 50 MW at p.f of 0.85 lagging with 132kV between lines. Calculate sending end voltage, current and pf. Use nominal – π method. **(10 Marks)**

8 a. Compare radial and ring main distribution systems. **(05 Marks)**

b. Derive an expression for voltage drop for a uniformly loaded. DC distributer fed at one end. Draw the current loading and voltage drop diagram. **(05 Marks)**

c. A distributor AB is fed from both ends. At feeding point A the voltage is maintained at 235V and at B 236V. The total length of feeder is 200m and loads are as shown in Fig Q8(c). The resistance per 100meters of one conductor is 0.04Ω. Calculate the current in various sections of the feeder and the minimum consumer voltage. **(10 Marks)**

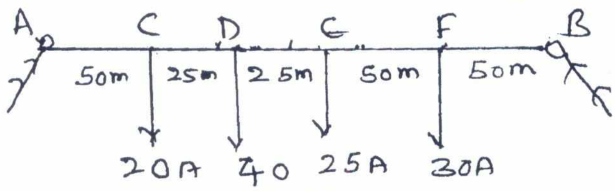

Fig Q8(c)

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10EE54

Fifth Semester B.E. Degree Examination, June/July 2017
DC Machines and Synchronous Machines

Time: 3 hrs. Max. Marks:100

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

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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PART – A

1 a. Explain the process of commutation in a DC machine and explain the methods of improving commutation. **(10 Marks)**

b. The following data refers to a loaded DC generators speed = 600 rpm, Number of commutator segments = 60, brush width = 2 commutator segments, self inductance of an armature coil = 0.15 mH and current per coil = 25 A. Calculate (i) period of commutation (ii) reactance voltage for both linear and sinusoidal commutation. **(10 Marks)**

2 a. With the help of neat diagram, explain the Ward-Leonard method of speed control. **(08 Marks)**

b. Explain the various characteristic curves of DC shunt motor. **(06 Marks)**

c. A 60 kW, 500 V, DC shunt motor has a lap connected armature with 492 conductors, flux/pole is 0.05 wb and full load efficiency is 90%. Its armature resistance is 0.1Ω and shunt field resistance is 250 Ω. Find for full load (i) speed (ii) useful torque if the 6% of the torque is lost in friction. **(06 Marks)**

3 a. List the advantages and disadvantages of permanent magnet motors. **(06 Marks)**

b. What are losses in a DC machine, and derive the expression for condition for maximum efficiency. **(06 Marks)**

c. A 250 V shunt motor has an armature resistance of 0.5 Ω and a field resistance of 250 Ω. When driving at 600 rpm a load, the torque of which is constant, the armature takes 20A. If it is desired to raise the speed to 800 rpm, what resistance must be inserted in the shunt field circuit? **(08 Marks)**

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

b. In Hopkinson's test two shunt machines gave the following results for full load. The supply current was 15 A at 200 V. The generator output current was 85 A. The field currents for motor and generator were 2.5A and 3A respectively. The armature resistance of each machine was 0.05 Ω. Find the efficiency of each machine. **(10 Marks)**

PART – B

5 a. List the advantages of keeping armature stationary in an alternator. **(04 Marks)**

b. Derive an expression for the EMF induced in an alternator. **(08 Marks)**

c. A 3-ϕ, 16-pole, star connected alternator has 192 slots, with 8-conductors per slot and the conductors of each phase are connected in series. The coil span is 150 ele. degrees. Determine the phase and line EMF's if the machine runs at 375 rpm and the flux/pole is 6.4×10^{-2} wb, sinusoidally distributed. **(08 Marks)**

6 a. Define 'Regulation of an Alternator'. Explain the potier reactance method of finding regulation of an alternator. **(10 Marks)**

b. A 3-ϕ star connected 1000 KVA, 11000 V alternator has rated current of 52.5 A, the AC resistance of the winding per phase is 0.45 Ω. The test results are given below:
O.C. test : Field current = 12.5 A
Voltage between lines = 422 V
S.C. test : Field current = 12.5 A
Line current = 52.5 A
Determine the full load voltage regulation of the alternator at (i) 0.8 pF lag (ii) 0.8 pF lead. **(10 Marks)**

7 a. Describe the method of synchronizing a 3-phase synchronous machine, to the infinite bus bars by "Two bright one dark lamp" method, with the relevant circuit diagram. **(10 Marks)**

b. Two 20 MVA alternators operate in parallel to supply a load of 35 MVA at 0.8 pF lag. If the output of one machine is 25 MVA at 0.9 pF lag, what must be the output of the other machine and at what pF it is operating? **(10 Marks)**

8 a. Explain why synchronous motor is not self starting and discuss the methods of starting. **(10 Marks)**

b. Explain V and inverted V curves. **(06 Marks)**

c. Write a short note on hunting in synchronous motor. **(04 Marks)**

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10EE55

Fifth Semester B.E. Degree Examination, June/July 2017
Modern Control Theory

Time: 3 hrs. Max. Marks:100

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

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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PART – A

1 a. With respect to control systems compare modern control theory with classical control theory. **(06 Marks)**

b. Given $\frac{y(s)}{u(s)} = \frac{3}{s^2+3s+2}$ derive the controllable phase variable canonical form of state model and draw the state diagram. **(06 Marks)**

c. Given $\frac{y(s)}{u(s)} = \frac{-[3s^2+4s-7])}{(s+1)^2\ (s+2)}$. derive Jordan canonical Form of state model. **(08 Marks)**

2 a. For the electrical shown in Fig. Q2(a) obtain the state model. Choose i_L and v_c as state variables. **(06 Marks)**

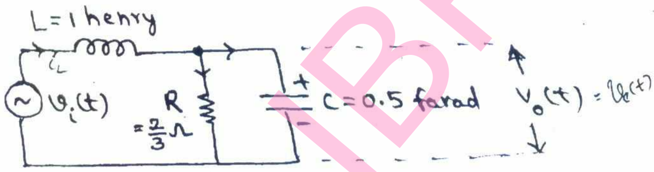

Fig. Q2(a)

b. Obtain the state model of the block diagram shown in Fig Q2(b). **(06 Marks)**

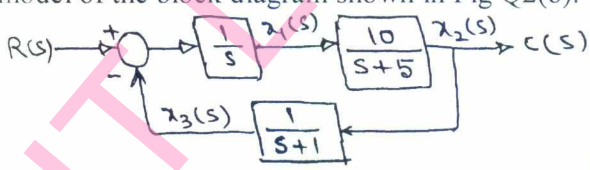

Fig. Q2(b)

c. Derive the state model of an armature controlled d.c motor by selecting $x_1(t) = \theta(t)\ x_2(t) = \dot{\theta}(t)$ and $x_3(t) = i_a(t)$ as state variables. **(08 Marks)**

3 a. Given $\dot{x}(t) = \begin{bmatrix} 0 & -1 \\ 2 & -3 \end{bmatrix} x(t) + \begin{bmatrix} 1 \\ 1 \end{bmatrix} u(s); y(t) = [1 \quad 0]x(t)$

Determine the transfer function y(s)/u(s). **(06 Marks)**

b. Define: state controllability, observability and state transition matrix. **(06 Marks)**

c. Given $\dot{x}(t) = \begin{bmatrix} 0 & 1 \\ -4 & -4 \end{bmatrix} x(t) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t); y(t) = [1 \ \ 0]x(t)$

Determine eigen values, eigen vectors, transformation matrix P and hence transform the given state model in x(t) into an alternate state model in z(t) such that x(t) = Pz(t). **(08 Marks)**

4 a. Given $A = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix}$. Determine e^{At} using Cayley Hamilton method. **(06 Marks)**

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

Determine: state controllability, output controllability and observability using KALHANS TEST. **(06 Marks)**

c. Given $\dot{x}(t)=\begin{bmatrix}8 & -9\\ 4 & -5\end{bmatrix}x(t)$; $x(0)=\begin{bmatrix}1\\0\end{bmatrix}$

Determine the state transition matrix using Laplace transform method and hence obtain x (t). **(08 Marks)**

PART – B

5 a. Explain the concept of stability improvement of regulator by state feedback scheme. **(06 Marks)**

b. Given $\dot{x}(t)=\begin{bmatrix}1 & 1\\ -4 & -3\end{bmatrix}x(t)+\begin{bmatrix}0\\2\end{bmatrix}u(t)$

Determine the state feedback gain matrix K for the desired eigen values of -2 and -6. Use Ackermann's formula. **(06 Marks)**

c. Given $\dot{x}(t)=\begin{bmatrix}0 & 20.6\\ 1 & 0\end{bmatrix}x(t)+\begin{bmatrix}0\\2\end{bmatrix}u(t)$; $y(t)=[0 \ 1]x(t)$.

Desired eigen values for the full order observer are $-1.8\pm 2.4j$. Determine the observer gain matrix K_e using canonical transformation method. Also given observer equation. **(08 Marks)**

6 a. State and prove the necessary condition for state feedback design by arbitrary pole placement scheme. **(06 Marks)**

b. Given $\dot{x}(t)=\begin{bmatrix}0 & 1\\ 0 & 0\end{bmatrix}x(t)+\begin{bmatrix}0\\1\end{bmatrix}u(t)$; $y(t)=[1 \quad 0]x(t)$. design a first order observer for the system with observer pole at $s = -10$. Assume x_1 is measurable. Use direct substitution method. Also give the observer equation of the first order observer. **(06 Marks)**

c. With the help of relevant figures/equations/graphs explain the phenomena of non linearity with respect to the following. Frequency – amplitude dependence, multivariable responses and Jump resonance. **(08 Marks)**

7 a. Give the procedural steps of constructing phase trajectories using isoclines method. **(06 Marks)**

b. Explain Delta method of constructing phase trajectories. **(06 Marks)**

c. Indentify and classify the singularities of the system given by $\ddot{y}(t)+0.5\dot{y}(t)+2y(t)+y^2(t)=0$. **(08 Marks)**

8 a. State Liapunov stability theorems. **(06 Marks)**

b. Give $\dot{x}_1(t)=\begin{bmatrix}0 & 1\\ -2 & -3\end{bmatrix}x(t)$. Determine its stability using Liapunov theorem and hence determine a suitable Liapunov function. Take the matrix $Q=\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$. **(06 Marks)**

c. Examine the stability of the system described by the following equation by Krasovskii's theorem. $\dot{x}_1(t)=-x_1(t), \dot{x}_2(t)=x_1(t)-x_2(t)-x_2^3(t)$. **(08 Marks)**

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10EE56

Fifth Semester B.E. Degree Examination, June/July 2017
Linear IC's and Applications

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, selecting atleast TWO questions from each part.*
2. Use of Resistor and Capacitor standard values tables are permitted.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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PART – A

1 a. With neat circuit diagram explain design and the operation of high input impedance non-inverting amplifier. **(10 Marks)**

b. A capacitor coupled inverting amplifier has the following components:
$R_1 = 2.7\ k\Omega$; $R_2 = 100\ k\Omega$; $R_L = 1.5\ k\Omega$; $C_1 = 3.9\ \mu F$; $C_2 = 0.68\ \mu F$. Determine the circuit voltage gain, input impedance, lower cutoff frequency and impedance of C_1 at f_1. **(10 Marks)**

2 a. What is frequency compensation? Explain phase lag compensation method. **(08 Marks)**

b. Calculate the slew rate limited cutoff frequency, maximum peak value of the sinusoidal output voltage and cutoff frequency rise time, slew rate limit rise time for 741 op-amp. Given : Peak of sine wave output is to be 6V, S = 0.5 V/μS and circuit to operate at 800kHz. **(06 Marks)**

c. Briefly explain :
(i) Loop gain (ii) Phase margin (iii) Unity gain bandwidth **(06 Marks)**

3 a. With a neat circuit diagram explain design and operation of precision fullwave circuit. **(10 Marks)**

b. With a neat circuit diagram and waveform explain the working of sample and hold circuit. **(10 Marks)**

4 a. Sketch the circuit of an op-amp astable multivibrator, show the waveforms at various points in the circuit and explain its operation. **(08 Marks)**

b. Using a 741 op-amp with a ± 18V supply, design an inverting Schmitt trigger circuit to have UTP = 1.5 V and LTP = –3V. **(07 Marks)**

c. With a circuit diagram, explain the working of a capacitor coupled zero crossing detector and give the design steps. **(05 Marks)**

PART – B

5 a. With neat circuit diagram and waveforms, explain the operation of triangular/rectangular generator. **(08 Marks)**

b. Draw the circuit diagram of phase shift oscillator and explain its operation. **(06 Marks)**

c. Using a BIFET op-amp with a supply of ± 12V, design a wein bridge oscillator to have an o/p frequency of 20 kHz. **(06 Marks)**

6 a. Sketch the circuit of a second order active highpass filter. Explain its operation and design procedure with frequency response curve. **(12 Marks)**

b. Design a first order active high-pass filter for cut-off frequencies of 4.5 kHz use 741 op-amp. **(08 Marks)**

7 a. Explain the operation of a switched capacitor filter. List out the advantages of switched capacitor filter. **(10 Marks)**

b. With a block diagram, explain the operation of a phase locked loop. **(10 Marks)**

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

b. With a neat circuit diagram explain the operation 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 = 50 mA. **(08 Marks)**

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