Discrete Electronic circuits 21/11/14.
SE Sem IV (CBGS) K.T.

QP Code : 12410

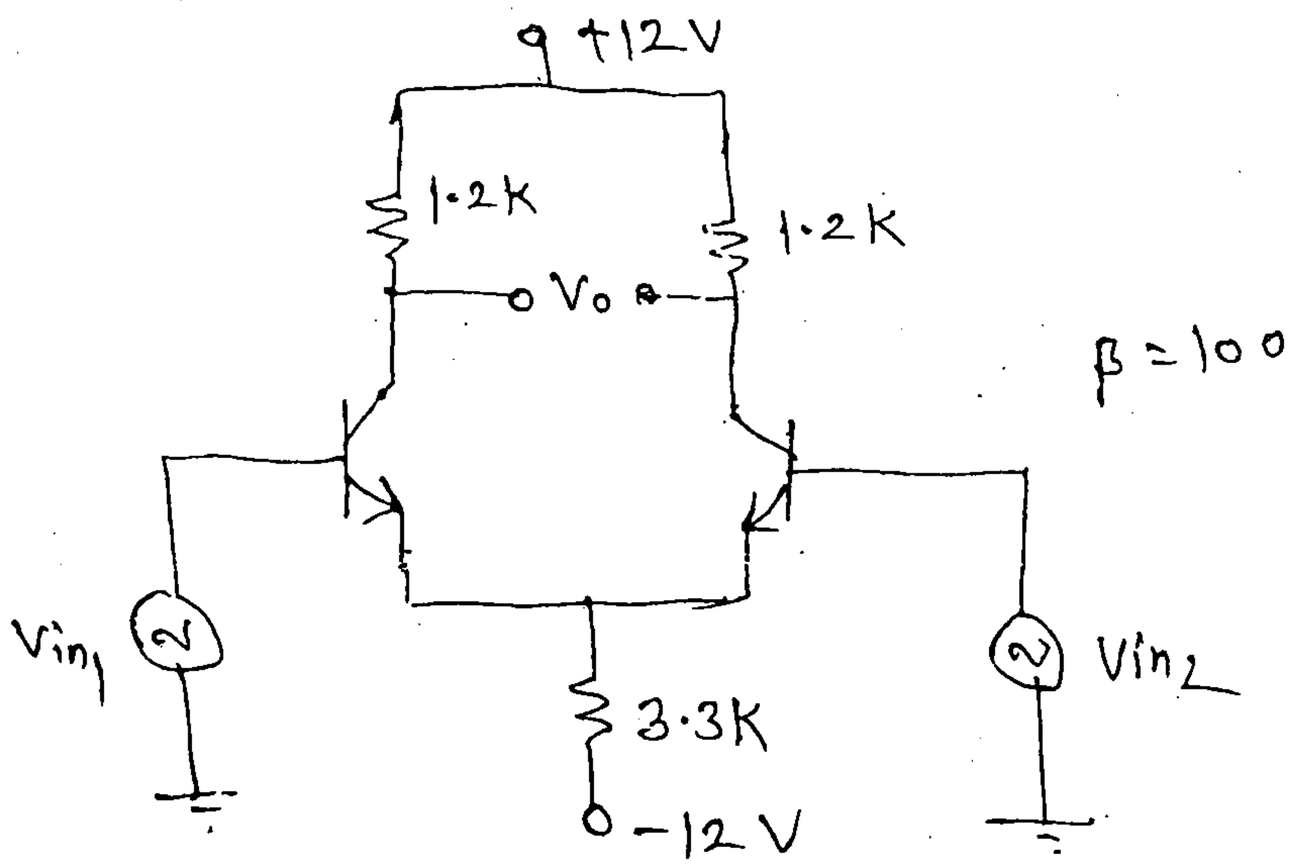
(3 Hours) **[Total Marks : 80**

N.B. : (1) Q.No.**1** compulsory and solve any **three** questions from remaining questions.
(2) Assume suitable **data** if **necessary**.

1. Solve the following questions :–
   (a) Explain the clamper circuit with proper waveforms. **4**
   (b) What are different biasing methods used for common source configuration and hence explain any one in detail. **4**
   (c) Explain why the feedback is required in oscillators. **4**
   (d) Explain need of constant current source in differential amplifier. **4**
   (e) Design self bias circuit using JEET for mid point biasing. Let IDSS = 8mA, Vp = –3V. **4**

2. (a) Design voltage divider biased circuit to give Icq = 5mA, VCEq = 5V and β = 100 **10**
   (b) Explain complete the frquency response of CS amplifier. **10**

3. (a) Explain working of CASCODE Amplifier in detail. **10**
   (b) For the given circuit find ICq, VCEq, Ad, ACM and CMRR **10**



4. (a) Explain working of class A transformer coupled power amplifier and derive equation of power efficiency. **10**
   (b) What are different biasing circuits for E MOSFET explain any one in detail. **10**

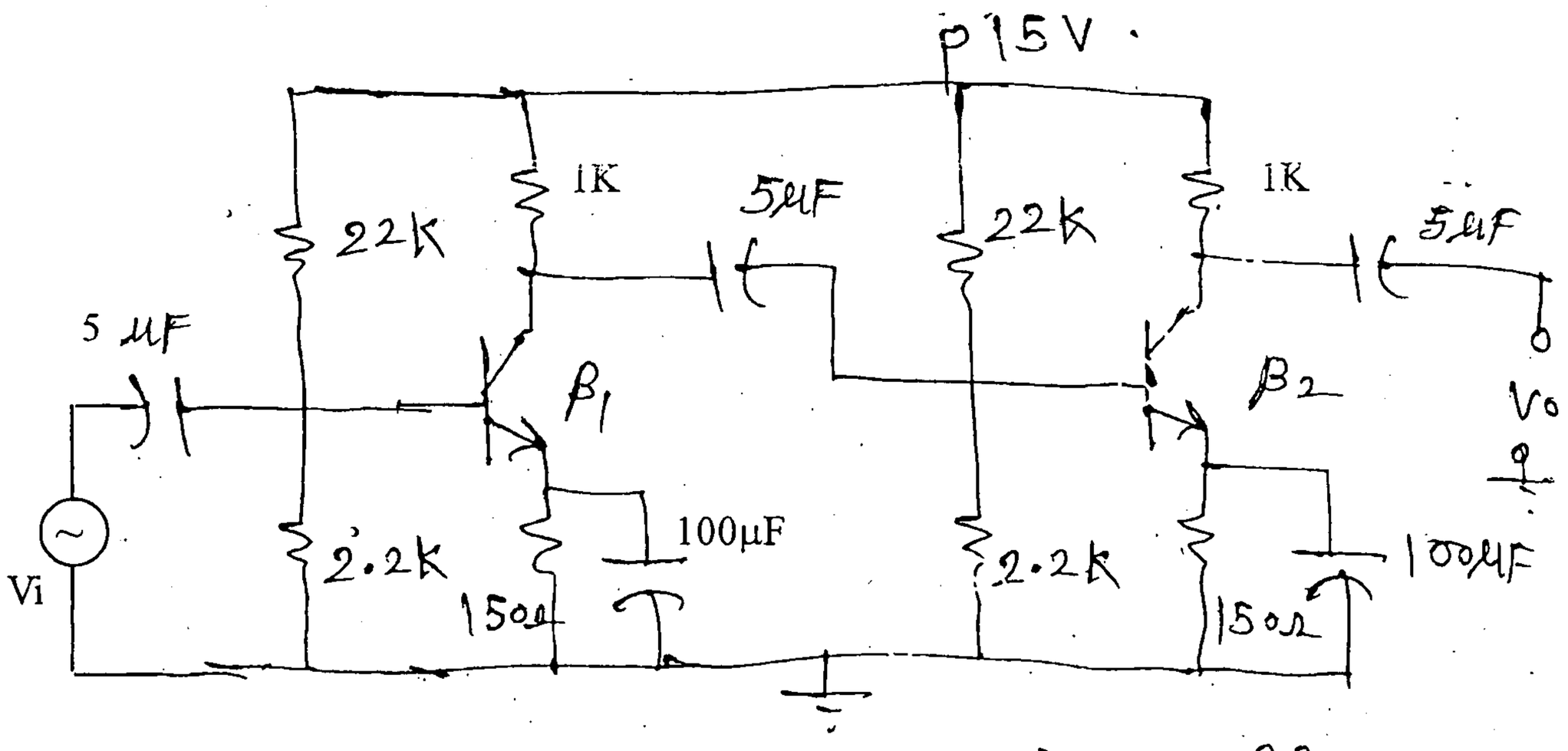
[TURN OVER

GN-Con.:6852-14.

5. (a) Explain working of any one high frequency oscillator circuit and give its applications. 10

(b) Explain current-series feedback amplifer with the help of block diagram and derive expressions for Rif, Rof and Af. 10

6. (a) For the given two stage circuit find Ri, Ro and Voltage gain. 12



(b) Explain MOSFET Wilson current source. 8

SE-SEM IV (CBGS) - FTRX Dec 2014

Electrical machinery

QP Code : 12586

(3 Hours) [Total Marks : 60

N.B. (1) **Question** No-1 is compulsory.
(2) **Solve** any **three** out of remaining five questions.
(3) **Figures** on **right** indicate full marks.
(4) **Assume** suitable data if necessary.

1. **15**
   (a) Explain significance of back emf in DC motor.
   (b) Draw the block diagram and explain v/f control using converter inverter scheme for 3 phase induction motor.
   (c) A 230V D.C. motor has an armature circuit resistance of 0.6 Ω if the full load armature current is 30A and no-load armature current is 4A. Find the change in back emf from no load to full load.

2. (a) Draw and explain 3-point starter of DC shunt motor. **7**
   (b) A 6-pole lap wound shunt motor has 500 conductors. the armature and shunt Filed resistance are .05 Ω and 25 Ω respectively. find the speed of the motor if it takes 120A from a dc supply of 100V. flux per pole is 20 mwb. **8**

3. (a) Explain construction and working principle of 3 phase squirrel cage induction motor. **8**
   (b) Draw and explain torque speed characteristic of 3 phase induction motor. **7**

4. (a) Explain in detail different starting methods of single phase induction motor. **7**
   (b) A 600W, 115V, 60 Hz capacitor start motor draws 13.8 A From the supply at rated load. if the efficiency is 65% and rated speed is 1750rpm, calculate **8**
      (i) Input power at rated load.
      (ii) Power Factor at rated load.
      (iii) Rated motor horse power.

5. (a) Classify the brushless DC motor and explain in detail unipolar brushless DC motor. **7**
   (b) Explain construction, Working and control requirements of switched reluctance motor. **8**

6. Write a short note on:— **15**
   (a) Star-Delta starter of 3 phase induction motor.
   (b) Different speed control methods of DC shunt motor.
   (c) Explain the double field revolving theory in single phase induction motor.

SE - IV (CBGS) ETRX
F. of Comm. Engg

Dec 2014

Q.P. NO : 12549

(3 Hours) **[Total Marks : 80**

N.B. : (1) Question N0.**1** is **compulsory**.
(2) Attempt any **three** questions out of the remaining **five** questions.
(3) Assume suitable **data** if **required**.

1. Answer the following **(Any four):-**
   (a) Compare AM and FM. 05
   (b) In a broadcast superheterodyne receiver having no RF amplifier, the loaded Q of the antenna coupling circuit is 150. If the IF is 455kHz, calculate the image frequency and its rejection ratio at 1400kHz. 05
   (c) Explain noise triangle in FM. 05
   (d) Explain the-following terms :- 05
      (i) Signal-to-noise ratio
      (ii) Noise figure
      (iii) Noise factor
      (iv) Equivalent noise temperature.
   (e) Explain ISB transmission 05

2. (a) Explain Armstrong method of FM generation with the help of a neat block diagram and phasor diagrams. 10
   (b) Draw the block diagram of Delta modulation technique and explain each block. 10

3. (a) State sampling theorem. Explain flat-top sampling. Draw its spectrum and explain aperture effect. 10
   (b) Explain generation and demodulation of PAM, PPM and PWM with waveforms. 10

4. (a) Explain TDM and FDM. 10
   (b) Explain the following with reference to radio receivers : 10
      (i) Selectivity.
      (ii) Fidelity
      (iii) Sensitivity
      (iv) Double spotting

5. (a) Draw the schematic diagram of simplified medium- power transistor AM DSBFC modulator and explain the operation with the help of collector waveforms with no modulating signal and collector waveforms with a modulating signal. 10
   (b) Draw the block diagram of Super heterodyne radio receiver and explain the same. 10

6. Write short notes on.
   (a) ISB transmission 5
   (b) Pre-emphasis and De-emphasis 5
   (c) Companding 5
   (d) [illegible] 5

S.E Sem II (EBCS) ETRX

PCS.

QP Code :12509

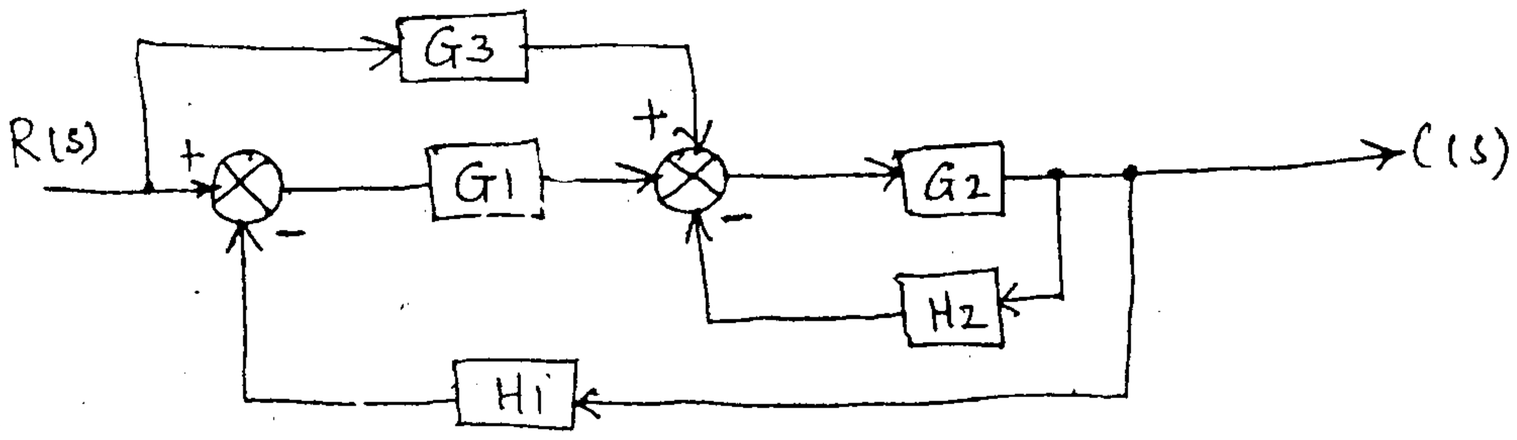
(3 Hours) **Total Marks : 80**

N. B. : (1) **Question No.1 is compulsory.**
(2) Attempt any **three** questions out of remaining **five** questions
(3) Assume **suitable** data, if **necessary.**
(4) Figure to the right indicated **full** marks.

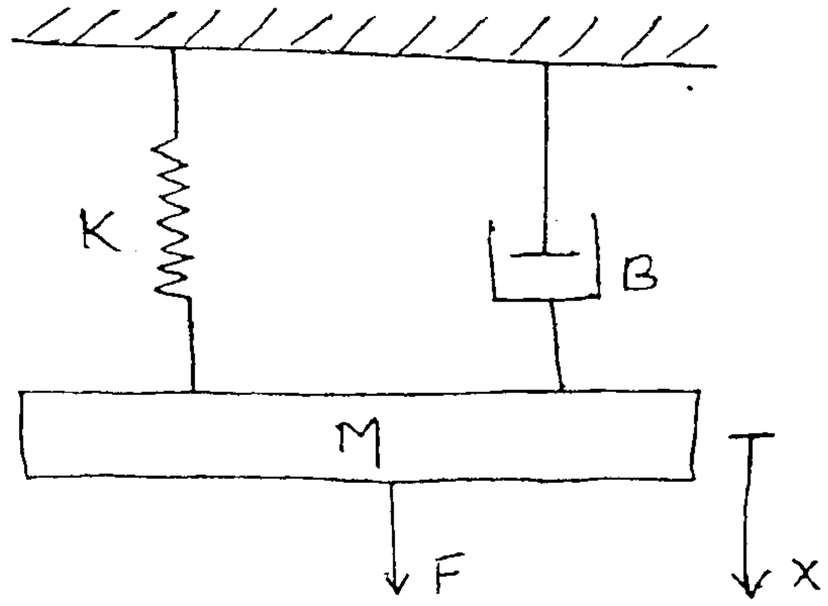
1. Attempt **any five :** **20**
   (a) Differentiate between open loop and closed loop control system.
   (b) Explain the Mason's Gain formula with reference to signal Flow Graph Technique.
   (c) Define and state the condition for controllability and observability for n^{th} order MIMO system.
   (d) The characteristic equation for certain feedback control system is given below. Determine the range of value of K for the system to be stable.
   $$S^3 + 2ks^2 + (k+2)s + 4 = 0$$
   (e) Define gain and phase margin. Draw approximate Bode plot for a stable system showing gain and phase margin.
   (f) Compare between Lead and Lay compensator.

2. (a) Derive the output response for second order underdamped control system subjected to unit step input. **10**

   (b) Find the transfer function $\frac{C(S)}{R(S)}$ using Block diagram reduction Technique. **10**

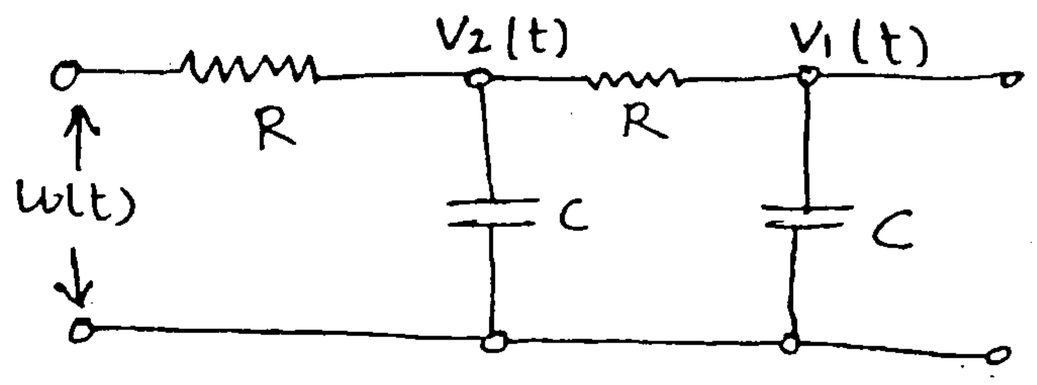


3. (a) Find the Transfer function for the system show below. **4**



(b) What are the properties of state transition matrix? 4

(c) For the system shown below, chose $V_1(t)$ and $V_2(t)$ as state variables and write down the state equations satisfied by them. Bring these equations in the vector-matrix form. 12



4. (a) Examine the observability of the system given below using kalman's test. 8

$$\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\\ \dot{x}_3\end{bmatrix}=\begin{bmatrix}0 & 1 & 0\\ 0 & 0 & 1\\ 0 & -2 & -3\end{bmatrix}\begin{bmatrix}x_1\\ x_2\\ x_3\end{bmatrix}=\begin{bmatrix}0\\ 0\\ 1\end{bmatrix}u = Ax+Bu$$

(b) Derive the expression for Peak resonant of a standard second order control system. 8

(c) Explain the concept of ON/OFF controller. 4

5. (a) For a unit feedback system the open loop transfer function is given by 10

$G(S)=\dfrac{K}{S(S+2)(S^2+6S+25)}$ Sketch the root locus and find the value of K at which the system becomes unstable.

(b) Explain Robust control and Adciptive control system. 10

6. (a) Find polar plot for the transfer function given below $G(S)=\dfrac{1}{(1+S)(1+4S)}$ 5

(b) Write a short note on PID controller. 5

(c) Determine the stability of a system shown by following open loop transfer function using Nyquist criterion - $G(s)H(s)=\dfrac{(4s+1)}{s^2(s+1)(2s+1)}$ 10

S.E-Sem III (CBGS) ETRX.

up & peripherals

3

(Hours) **QP Code :12473** **[Total Marks : 80**

N.B. : 1.Question no. 1 is compulsory
2. Solve any three from the remaining five questions.
3. Assume suitable additional data if necessary.

Q1. a) Explain flag register used in 8085 processor (5marks)
b) Define the Instruction cycle, Machine cycle & T state? (5 marks)
c) What is REP prefix? How it functions for string instructions? (5marks)
d) Explain the difference between a JMP instruction and CALL instruction. (5marks)

Q2. a) Design a 8086 based system with following specifications

- CPU at 10MHz in minimum mode operation
- 32 KB SRAM using 8 KB devices
- 64 KB EPROM using 16 KB devices
- One 8255 PPI for keyboard interface

Design system with absolute decoding. Clearly show memory address map and I/O address map. Draw a neat schematic for chip selection logic. (20 Marks)

Q3. a) Explain the Interrupt structure of 8086 processor? (10marks)
b) Discuss the various addressing modes of 8086. What are displacement, base and index? What is an effective address or offset? (10marks)

Q.4. a) Write program to find out largest number in an array. (10 marks)
b) Write program to find number of times letter 'e' exist in the string 'exercise', Store the count at memory. (10 marks)

Q5. a) Explain the interfacing of 8087 co- processor with 8086 processor? (10marks)
b) Sketch and explain the interface of PPI 8255 to the 8086 microprocessor in minimum mode. Interface four 7 segment LEDs to display as a BCD counter (10 marks)

Q6. Write Short Note on
a) Explain the function of various flags of 8086 microprocessor. (5marks)
b) The function of the pins S2 ,S1 & S0 of 8086. (5marks)
c) Operation modes of 8237 DMA Controller (5marks)
d) Draw and explain the instruction template format of 8086. (5marks)

S.E. ETRX & EXTC Sem IV (CBGS)
App. Maths – IV

27/11/14.

QP Code 12440

(3 Hours) **[Total Marks : 80**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Solve any **three** questions from the **remaining**.

1. (a) Find the value of μ which satisfy the equation. $A^{100} x = \mu X$. where **5**

$$A = \begin{bmatrix} 2 & 1 & -1 \\ 0 & -2 & -2 \\ 1 & 1 & 0 \end{bmatrix}$$

(b) Evaluate $\int_0^{1+i} (x^2 + iy)\, dz$ along **5**

$y = x$ and $y = x^2$.

(c) Find the extermal of the function. **5**

$$\int_{x_1}^{x_2} \left[y^2 - y'^2 - 2y \cosh x \right] dx$$

(d) Verify Cauchy–Schwartz inequality for the vectors. **5**
$u = (-4, 2, 1)$ & $v = (8, -4, -2)$

2. (a) Determine the function that gives the shortest distance between two given points. **6**
(b) Find eigen values and eigen vectors of— **6**

$$A = \begin{bmatrix} 2 & 1 & 1 \\ 2 & 3 & 2 \\ 3 & 3 & 4 \end{bmatrix}$$

(c) Obtain Taylor's and two distinct Laurent's series expansion of $f(z) = \dfrac{z-1}{z^2 - 2z - 3}$ **8**

about $z = 0$ indicating the region of convergence.

3. (a) Verify Caley. Hamilen theorem for 6

$$A = \begin{bmatrix} 1 & 2 & 0 \\ 2 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$ hence find A^{-2}.

(b) Evaluate by using Residue theorem. 6

$$\int_0^{2\pi} \frac{d\theta}{(2+\cos\theta)^2}$$

(c) Solve the boundary value problem. 8

$$I = \int_0^1 \left(2xy - y^2 - y^{1^2} \right) dx$$

given y (0) = y (1) = 0 by Rayleigh–Ritz method.

4. (a) Reduce the following Quadrate form 6

$$Q = 3x_1^2 + 5x_2^2 + 3x_3^2 - 2x_1x_2 - 2x_2x_3 + 2x_3x_1$$

into cunmical form. Hence find its rank, index and signature.

(b) Show that the matrix $A = \begin{bmatrix} 7 & 4 & -1 \\ 4 & 7 & -1 \\ -4 & -4 & 4 \end{bmatrix}$ is derogatory. 6

(c) (i) Show that the set $W = \{(1, x) \mid x \in R\}$ is a subspace of R^2 under operations 4
$[1, x] + [1, y] = [1, x + y]$; $k\,[1, x] = [1, kx]$; k is any scalar.

(ii) Is the set $W = \{ [a, i, 1] \mid a \in R \}$ a subspace of R^3 under the usual addition 4
and scalar multiplication ?

5. (a) Find the plane curve of fixed Perimeter and maximum area. 6

(b) Construct an orthonormal basis of R^2 by applying Gram schmidt orthogonalization 6
to S = { [3, 1], [2, 2] }

(c) Show that the matrix $A = \begin{bmatrix} -9 & 4 & 4 \\ -8 & 3 & 4 \\ -16 & 8 & 7 \end{bmatrix}$ is diagonable. Also find diagonal form 8

and diagonalising matrix.

6. (a) Evaluate $\int_{-\infty}^{\infty} \frac{\cos 3x}{(x^2+1)(x^2+4)}\,dx$ using Cauchy Residue Theorem. **6**

(b) If $\phi(\alpha) = \oint_c \frac{ze^z}{z-\alpha}\,dz$ where c is $|z - 2i| = 3$ **6**

find $\phi(1), \phi'(2), \phi(3), \phi'(4)$

(c) Show that the set V of positive real numbers with operations. **8**

Addition : $x + y = xy$

Scalar multiplication : $kx = x^k$.

is a vector space

where x, y are any two real numbers and k is any scalar.
