ETRX / Paper / Subject Code: 39302 / APPLIED MATHEMATICS - IV / NOV-2018

Sem - IV - CBSGS

Q. P. Code: 24492

Duration: 3 Hours

Total Marks: 80

N.B. : 1) Q.1 is compulsory.

2) Attempt any three from the remaining.

Q.1 a) Show that the set $\{e^x, xe^x, x^2e^x\}$ is linearly independent in $C^2(-\infty, \infty)$. (5)

b) Show that $\int_C \log z dz = 2\pi i$, where C is the unit circle in the z-plane. (5)

c) Find the projection of u=(3,1,3) along and perpendicular to v=(4,-2,2) (5)

d) Find the extremal of $\int_{x_1}^{x_2} (y^2 + y'^2 + 2ye^x) dx$ (5)

Q.2 a) If $A = \begin{bmatrix} 3/2 & 1/2 \\ 1/2 & 3/2 \end{bmatrix}$, find e^A (6)

b) Evaluate $\int_0^{\pi} \frac{d\theta}{3 + 2\cos\theta}$ (6)

c) Find the singular value decomposition of $\begin{bmatrix} 1 & 2 \\ 1 & 2 \end{bmatrix}$ (8)

Q.3 a) Find the extremal of $\int_0^{\pi} (y'^2 - y^2) dx$ given $y(0) = 0, y(\pi) = 0$ (6)

b) Verify Cayley Hamilton theorem for $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & -1 & 4 \\ 3 & 1 & -1 \end{bmatrix}$ and hence find A^{-1} & A^4 (6)

c) Expand $f(x) = \frac{1}{(z-1)(z-2)}$ in the regions (i) $1 < |z-1| < 2$ (ii) $|z| < 1$ (8)

Q.4 a) Construct an orthonormal basis of R^3 using Gram Schmidt process to S = {(3,1),(2,3)} (6)

b) Find the extremum of $\int_{x_0}^{x_1} (2xy + y''^2) dx$. (6)

c) Reduce the quadratic form $6x^2 + 3y^2 + 3z^2 - 4xy + 4xz - 2zy$ to canonical form and hence, find its rank, index and signature and value class. (8)

Q.5. a) Using Residue theorem evaluate $\int_C \frac{z^2}{(z-1)^2(z+1)}dz$ where C is |z|=2. (6)

b) Find the linear transformation Y=AX which carries $X_1 = (1,0,1)', X_2 = (1,-1,1)', X_3 = (1,2,-1)'$ onto $Y_1 = (2,3,-1)', Y_2 = (3,0,-2)', Y_3 = (-2,7,1)'$ (6)

c) Check whether $V = \mathbb{R}^2$ is a vector space with respect to the operations

$(x_1,0)+(x_2,0) = (x_1+x_2,0); k(x_1,0) = (kx_1,0)$ (8)

Q.6.a) Obtain Taylor's series expansion for $f(x) = \frac{2z^3+1}{z(z+1)}$ about $z = i$ (6)

b) Let $W = span\left\{(0,1,0),\left(\frac{-4}{5},0,\frac{3}{5}\right)\right\}$, Express w =(1,2,3) in the form of $w = w_1 + w_2$ where

$w_1 \in W$ & $w_2 \in W^{\perp}$ (6)

c) Using Rayleigh- Ritz method, solve the boundary value problem $I = \int_0^1 (2xy - y^2 - y'^2)dx$;

given $y(0) = y(1) = 0$ (8)

****

SE | Electronic | IV-CBSGS | Nov. 2018

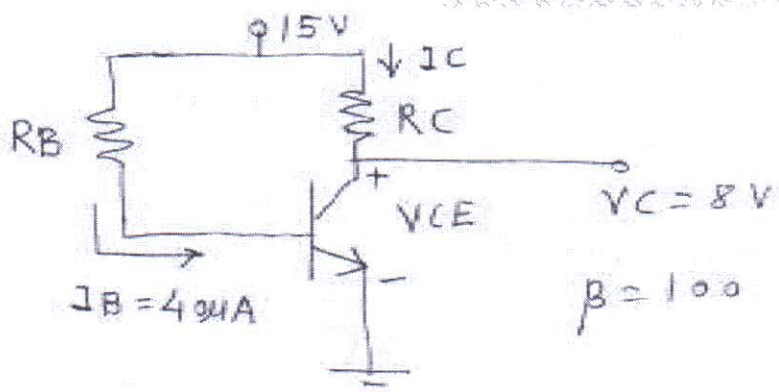
QP Code : 22763

[3 Hours] [Total Marks : 80]

N.B : 1. Question No. 1 is **compulsory** and solve any three questions from remaining questions.
2. Assume suitable data if it is required.

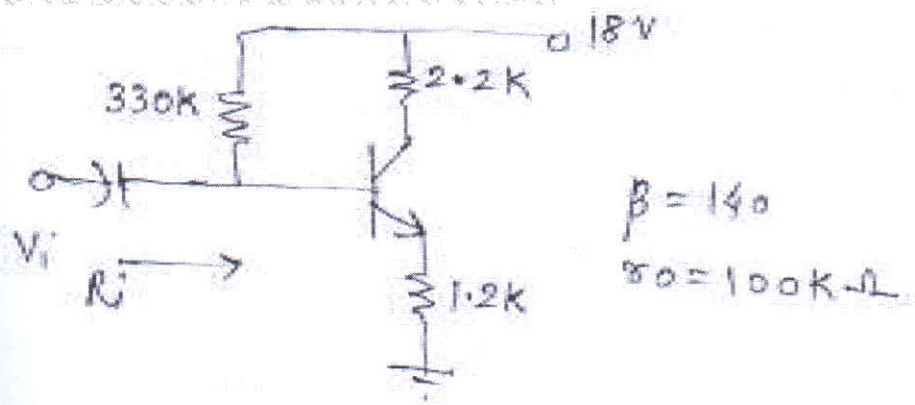
1. Solve all. 20

(a) For the given circuit find 1C, RC, RB and VCE



(b) Draw small signal model of E-MOSFET.
(c) Draw circuit diagram of Darlington Pair and hence derive equation of its input resistance.
(d) State the characteristics of negative feedback amplifier.
(e) Justify, differential amplifier rejects common mode signal and hence give different types of differential ampifier.

2. (a) Determine AV, AI, Ri and Ro for the given circuit. 10

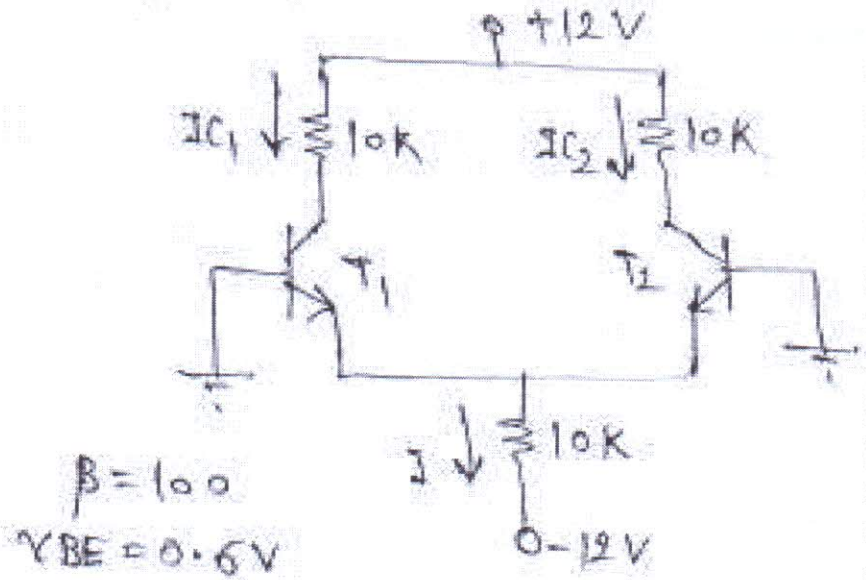


(b) Derive equation of ID_Q and VDS_Q for voltage divider baised JFET circuit. 10

3. (a) Derive equation of upper cut off frequency for CS D MOSFET amplifier. 10
(b) Draw circuit diagram of colpitt oscillator and explain its working. 10

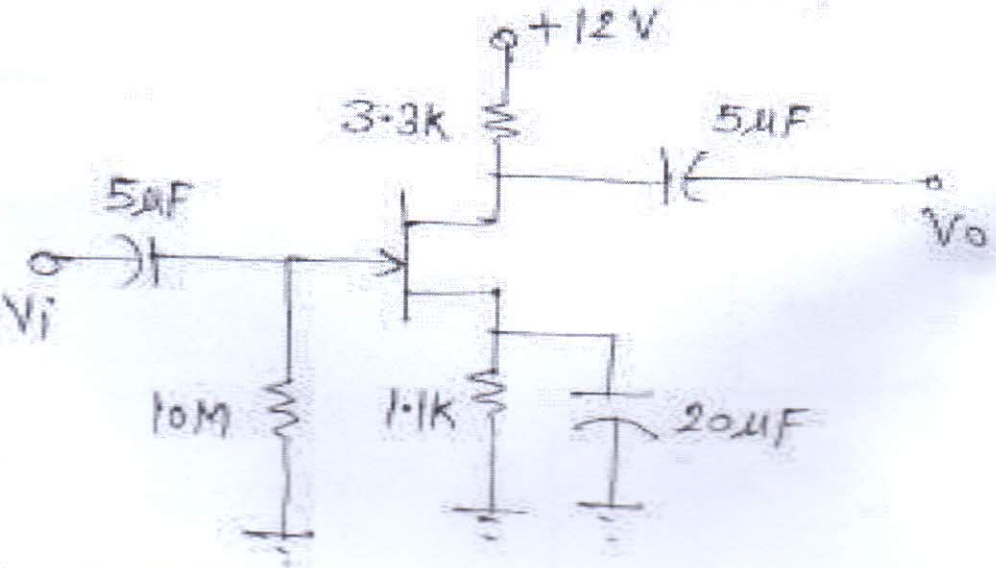
[TURN OVER

4. (a) For the circuit shown find IC1, IC2, I, VCE and VC. **10**



(b) Explain the procedure to find lower cutoff frequency for the CS JFET amplifier. **10**

5. (a) Explain series fed class A power amplifier and derive its power efficiency. **10**
(b) Determine Zi, Zo and Av for the given circuit. **10**



Given : g_m = 3000 μs and rd = 20 kΩ.

6. Write short notes on :— **20**
(a) Voltage series negative feedback amplifier
(b) Wilson current source
(c) Cross over distortion in class B power amplifier
(d) Clipping circuit.

Sem- IV - CBSGS.

Q. P. Code: 36260

(3 Hours) Total Marks: 80

Note: 1. Question No. 1 is compulsory.

2. Solve any three from the remaining five questions.

3. All questions carry equal marks.

1.a. Explain the Clock, Ready and Reset signals generated by the 8284 Clock Generator. (05)

b. Explain the register set of the 8086 along with their functions. (05)

c. What are the advantages of Memory Segmentation in the 8086? (05)

d. Explain with examples the instances when the pipeline stalls in the 8086. (05)

2.a. Write a 8086 assembly language program to check whether a string is Palindrome or not. (10)

b. Interface 8KB of ROM and 8KB of RAM to the 8086. Show the memory map and address decoding. (10)

3. a. Explain the ASCII instructions (AAA, AAS, AAM and AAD) of the 8086 with examples. (10)

b. Explain the 8086-8087 interface with a neat diagram. Describe the function of each signal. (10)

4. a. Write a program to read a byte of data from Port A of the 8255 using Mode 1 operation (with handshaking). Explain the control word used and draw a neat interfacing diagram. (10)

b. Explain the cascaded mode of operation for the 8259 PIC with a neat diagram (10)

5.a. What is Direct Memory Access (DMA)? Explain the modes of transfers in the 8237 DMAC. (10)

b. Explain in detail the role of the bus arbiter like 8289 in a loosely coupled multiprocessor system. (10)

6. Write short notes on: (Any two) (20)

a. Display interfacing to 8086

b. 8288 Bus Controller

c. Assembler Directives in the 8086

3543B08B25649D0960B0CD7F26184976

Paper / Subject Code: 39304 / PRINCIPLES OF CONTROL SYSTEMS / NOV-2018

Sem- IV - CBSGS.

Time : 3 Hour

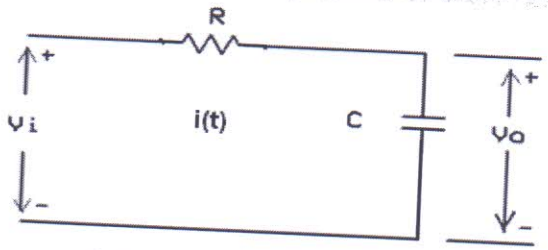
Marks: 80

Note: Question No. 1 Compulsory.

Q.1 Attempt any four questions:-

a) Define open loop system and explain with one example. (20)

b) Find the Transfer functions of Electrical networks shown in figure (5)

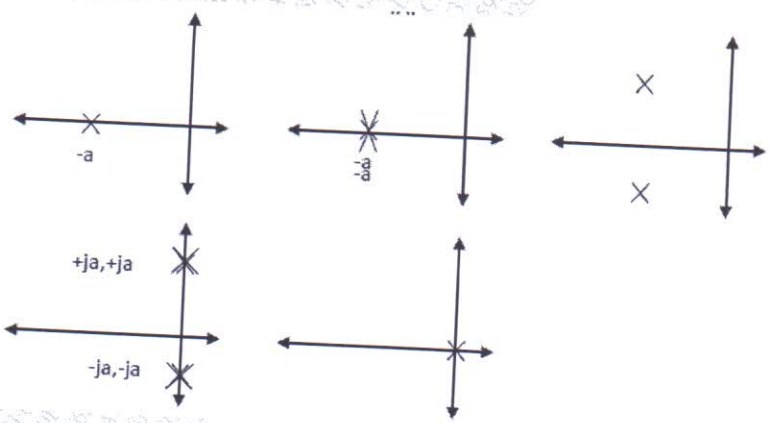


(5)

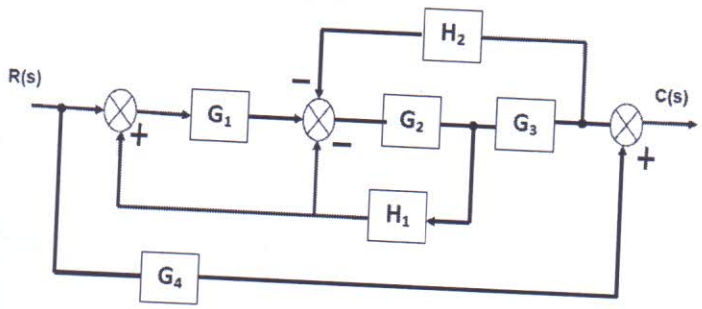
c) Explain Mason's gain formula

d) Explain Controllability and Observability with its necessity condition for stability. (5)

e) Draw the time response for following pole locations. (5)



Q.2 a) Obtain C(s)/R(s) using block diagram reduction rules.



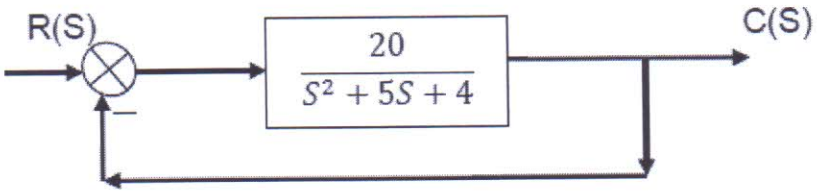
(10)

b) Sketch the root locus for $G(s)H(s)= K / S(S+4)(S^2+4S+10)$ (10)

Q.3 a) Draw Bode plot and find gain margin and phase margin for (10)

$$G(s)H(s) = \frac{64(S+2)}{S(S+0.5)(S^2+3.2S+64)}$$

b) For a system shown in fig. with unity feedback, find time domain specifications when a step input is applied (10)



Q4 a) Find Transfer function of (10)

$$\begin{vmatrix} \dot{x}_1 \\ \dot{x}_2 \end{vmatrix} = \begin{bmatrix} -5 & -1 \\ 3 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 2 \\ 5 \end{bmatrix} r(t) \; ; \quad y = [1, 2] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

b) Obtain the state model for the system with transfer function (10)

$$\frac{Y(s)}{U(s)} = \frac{3s+4}{s^2+5s+6}$$

Q5 a) The open loop transfer function of a unity feedback system is given by G(s)= 1/[S(S+1)(2S+1)]. Sketch the polar plot and determine the gain margin and phase margin. (10)

Draw the Nyquist plot of the given system and comment on the stability.

b) $G(s) = \frac{1}{s(s+4)(s+8)}$; $H(s) = 1$ (10)

Q6 Attempt any two from the following (20)

a) Write a short note on Robust control system (10)

b) Explain the correlations between time and frequency domain specifications of the system (10)

c) Derive an expression for output response of a second order under damped control system. Assume the input to be unit step signal. (10)

9D52F0F6A8FDAEC3592C92691290C7B7

Sem-IV - eBSUS.

Q.P. Code :26507

[Time: 3 Hours] **[Marks:80]**

Please check whether you have got the right question paper.

N.B: 1) Question 1 is compulsory and Solve any three from the remaining five questions
2) Assume suitable data if necessary.
3) Figures to the right indicate full marks.

Q1 Answer any **four questions** from the following: 20

a) Explain the advantages of superhetrodyne receiver.
b) What is phase modulation?
c) Discuss the need for modulation in wireless communication system.
d) Explain electromagnetic frequency spectrum.
e) Compare FDM and TDM.

Q2 a) With a neat circuit diagram and waveforms, explain the working of Double side band full carrier AM. 10

b) A sinusoidal carrier has amplitude of 10v and frequency 30 KHz is amplitude modulated by a sinusoidal voltage of amplitude 3v and frequency I KHz. Modulated voltage is developed across a 50Ω resistance. **i)** Write the equation for modulated wave and draw the modulated wave indicating Vmax, Vmin **ii)** Determine modulation Index. And calculate total power in the modulated wave **iv)** Draw the spectrum of modulated wave. 10

Q3 a) With the help of a neat circuit diagram, explain the working of Frequency discriminator. 10

b) With a neat block diagram ,discuss the working of Linear Delta modulation, its advantages and disadvantages 10

Q4 a) Explain the different characteristics of radio receiver. 10

b) State Sampling theorem. Explain the two sampling techniques. What is aliasing error? How is it overcome? 10

Q5 a) Explain Pulse Code Modulation & comment on PCM bandwidth. 10

b) Discuss the generation and demodulation of PWM signal. For a sinusoidal modulating signal, draw PPM, and PWM pulses. 10

Q6 Write short notes on any **four:** 20

a) FM wave generation using Armstrong method
b) ISB Transmission
c) Pre emphasis and De emphasis circuits with waveforms
d) AGC in superhetrodyne receiver.
e) Noise triangle

****

E076FB8825DF20E7789714A9E659BC8D

nd / Electronic / Paper / Subject Code: 39306 / ELECTRICAL MACHINES 1 Nov. 2018.
Sem IV - (CBSGS)

(3 Hours) **Marks: 60**

N.B

1. Question 1 is compulsory
2. Solve any **THREE** out of the remaining 5 questions
3. Figures on the right indicate full marks
4. Assume suitable data if necessary

Q1. Solve any **THREE** **(15)**

a) Explain the significance of back emf of a DC Motor
b) Name the different starting methods of single phase induction motor & explain the working of split phase motor
c) State the important applications of brushless DC motor
d) Explain v/f method of speed control of 3 phase induction motor

Q2. a) Explain double field revolving theory in a single phase induction motor **(7)**

b) Explain the construction & working of 3-phase squirrel cage induction motor. **(8)**

Q3. a) Describe the construction and working principle of a switched reluctance motor **(8)**

b) Explain different speed control methods of a DC shunt motor **(7)**

Q4. a) Name different types of unipolar brushless DC motor& describe any one type in detail. **(7)**

b) With neat diagram, explain the working of star-delta starter in a 3-phase induction motor. **(8)**

Q5. a) Explain the construction and working of a permanent magnet synchronous motor. **(7)**

b) Describe torque-slip characteristics of a three phase induction motor in 4 modes. **(8)**

Q6. Write short notes on **(15)**

a) 3 point starter of a DC motor
b) Variable reluctance stepper motor
c) Equivalent circuit of a three phase induction motor

59177

0FFEED686C8F563E3752B909C277A094