1/06117

Q.P. Code :16469

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

Please check whether you have got the right question paper.

N.B:
1. Question No 1 is **compulsory**.
2. Attempt any **three** questions from remaining **five** questions.
3. Assume suitable data if required.
4. Figure to the right indicates full marks.

Q.1 Attempt **any four** from the following 20

a) What are the properties of sate transition matrix?
b) How to find gain margin and phase margin from bode plot?
c) Explain any five rules of root locus plot.
d) Differentiate between open loop and close loop system.
e) Draw the step response of a second order undamped, under damped and critically damped system.

Q.2 a) Find transfer function of the block diagram shown in figure 1 by using block diagram reduction method 10

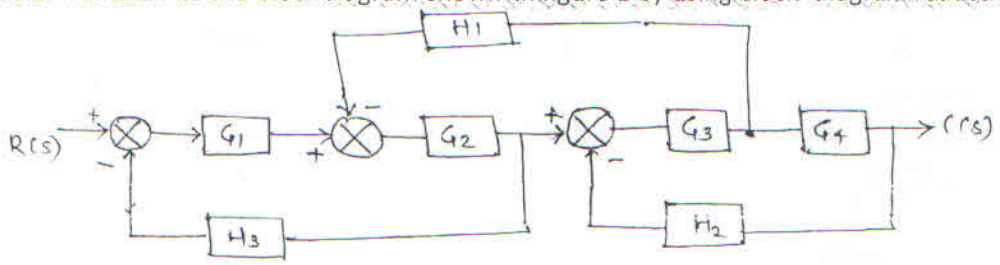

Figure 1

b) Find the value of C(s). 10

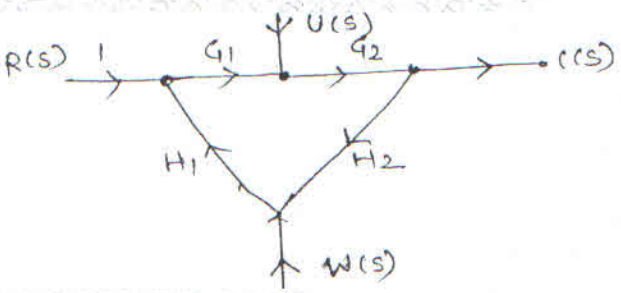

Figure 2

Q.P. Code :16469

Q.3 a) For the unity feedback system having 10

$G(s) = \frac{10(s+1)}{s^2(s+2)(s+10)}$

Determine

i. Type of system

ii. Error coefficients and

iii. Steady state error for i/p as $1 + 4t + \frac{t^2}{2}$

b) For the system shown below choose $V_1(t)$ and $V_2(t)$ as state variables and write down the state equations satisfied by them. 10

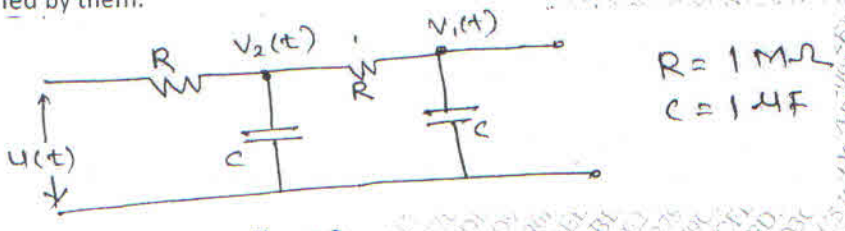

Figure 3

Q.4 a) Sketch the root locus for an open loop transfer function of a control system. 10

$G(s)H(s) = \frac{k}{s(s+4)(s^2+4s+10)}$

b) Sketch the bode plot and determine GM and PM for the transfer function 10

$G(s)H(s) = \frac{8(s+1)}{s(s^2+4s+5)}$

Q.5 a) Draw Nyquist plot for & 10

$G(s)H(s) = \frac{k(s+3)}{s(s-1)}$ and hence comment on stability

b) Determine stability 10

i. $s^6+2s^5+8s^4+12s^3+20s^2+16s+18$

ii. $s^7 + 2s^6 + s^5 + 2s^4 - s^3 - 2s^2 - s - 2 = 0$

Q.6 Write short note on **any two** from the following 20

a) Co –relation between time domain and frequency domain specification.

b) Explain the effect of addition of poles and zeros to the system.

c) Different continuous composite controllers.

S·E - Sem - IV - ETRX (CBSGS) Dt: 13/6/17

(83)

Q.P. Code :09484

[Time: 3 Hours] **[Marks:60]**

Please check whether you have got the right question paper.

N.B:
1. Question 1is compulsory
2. Attempt any Three question form remaining 5 Questions
3. Figures on the right indicate full marks
4. Assume suitable data if any.

Q.1 Attempt the following (Any Three) **15**

a) State important features and applications of Brushless DC Motors
b) Is Single phase Induction Motor self-starting? Justify the answer.
c) Compare the different Starting methods of three phase Induction Motor
d) State the significance of commutator and brushes in DC machine.

Q.2 a) Obtain the expression for full load torque of 3- ph induction motor. Also obtain the conduction for maximum torque under running condition at starting. **07**

b) Briefly describe the construction, working and control requirements of switches reluctance motor **08**

Q.3 a) A 4-pole, 500 V DC shunt motor has 720 wave connected conductor in the armature. The full load armature current is 60 A and flux per pole is 0.03 wb. The armature resistance is 0.2Ω and the contact drop is 1 V per brush. Calculate the full load speed of the motor **07**

b) Explain the construction and working of permanent magnet synchronous motor **08**

Q.4 a) The power input to 6 pole, 3-ph, 50 Hz induction motor is 42 KW, the speed is 970 r.p.m., the stator losses are 1.2 KW and friction and windage losses are 1.8 KW. Find **08**

i) Slip
ii) The rotor copper loss
iii) The b.h.p.
iv) The efficiency.

b) Explain the construction and operation of variable reluctance stepper motor. **07**

Q.5 a) Discuss briefly, with the neat sketches, armature reaction in DC machine **08**

b) Explain the blocked rotor test for single phase induction motor **07**

Q.6 Write short note on any three: **15**

a) Squirrel cage induction motor
b) DC series motor starter
c) Speed control of Brushless DC Motors
d) Drive circuits of Stepper Motors

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SE (ETRX) IV CBGS

Q.P. Code : 18453

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

Please check whether you have got the right question paper.

N.B: 1) Questions No.1 is compulsory.
2) Attempt any three questions from the remaining five questions.
3) Assume suitable data if required

Q. 1 Answer **any four** questions from the following. **(20)**

a) Would it be possible to transmit one intelligent signal in the upper sideband and a different intelligent signal in the lower sideband of an AM or DSB signal? Explain.
b) List several sources of external noise and give a brief description of each
c) Why is PCM more resistant to noise?
d) For faithful recovery of signal comment on sampling Theorem
e) Comment on granular noise

Q. 2 a) Draw the complete block diagram of the Armstrong frequency modulation system and Explain the functions of the mixers and multipliers shown. **(10)**

b) Why is AGC needed in superhetrodyne receiver? Briefly explain the function of each of the blocks in the superhetrodyne receiver. **(10)**

Q. 3 a) Prove that the balanced modulator produces an output consisting of sidebands only with the carrier removed **(10)**

b) Calculate the percentage power saving when the carrier and one of the sideband is suppressed in an AM wave modulated to depth of a) 50% and b) 100% **(05)**

c) Describe Fedility and double spotting of Radio receiver. **(05)**

Q. 4 a) Define the following propagation terms:- **(10)**
i) Critical frequency and Critical Angle ii) Virtual Height iii) MUF iv) Skip Distance and skip zone
v) Free space path loss.

b) Describe frequency discriminator. **(10)**

Q. 5 a) Compare Analog transmission with Digital transmission and comment on Quantization process, **(10)**

b) What is delta modulation? Explain in detail why adaptive delta modulation is required. **(10)**

Q. 6 Write short notes on **any three.** **(20)**

a) TDM and its application.
b) Noise triangle
c) Electromagnetic frequency spectrum.
d) Pre-emphasis and De-emphasis

S.E-Sem-IV (CBSGS) ETRX Dt 25/5/19

(87)

Q. P. Code: 13591

Total Marks: 80 (3 Hours)

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 register set of the 8086. (05)

b. Write a brief note on the dedicated interrupts of the 8086. (05)

c. Explain the clock and reset circuits of the 8086 system. (05)

d. Explain the usage of the following instructions: i. AAA (05)

ii. LEA SI, label

2. a. Explain the bus arbitration techniques used in loosely coupled systems. Also, highlight advantages and disadvantages of each. (10)

b. Write an assembly language program for the 8086 to convert a Hexadecimal number to its ASCII equivalent. (10)

3.a. Design and explain the following system comprising of: (10)

8086 working at 8 MHz

16 KB of EPROM using 8KB devices

16 KB of RAM using 8 KB devices

1 input port (8 Bit)

Show the Memory, I/O map and relevant address decoding.

b. Explain Memory Segmentation in the 8086. State its advantages. (10)

4.a. Explain the cascaded mode of operation of the 8259 PIC. Clearly explain the sequence of operation. (10)

b. Explain the 8086-8087 interface with a neat diagram. Describe the role of the 8288 Bus controller in this system. (10)

5.a. Explain with the help of neat timing diagrams Mode 1 operation in the 8255 PPI. Assume Port A as input port and Port B as output port. (10)

b. Interface a 4*4 matrix keypad to the 8086 . Also, write an algorithm to scan the keypad. (Assembly language program not expected) (10)

Q. P. Code: 13591

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

a. 8237 DMA controller

b. 8085 Architecture

c. String instructions of the 8086

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S.E. Sem IV (CBGS) Discrete Electronic Circuits

ETRX 15 May 2017

Q.P. Code :10648 C86

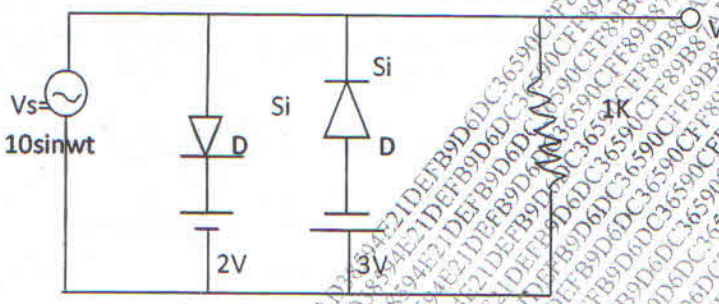
[Time: 3 Hours] **[Marks:80]**

Please check whether you have got the right question paper.

N.B:
1. Question no1 is compulsory and solve any three questions from remaining.
2. Draw neat and labeled diagrams.
3. Assume suitable data if it is required.

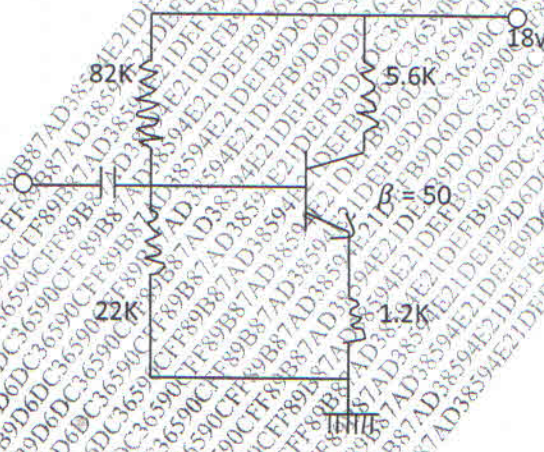
Q.1 Solve all: **20**

1) Draw the output voltage waveform for a shown circuit.



2) Explain self bias circuit of D-MOSFET.
3) Draw high frequency ac equivalent circuit for CS JFET amplifier.
4) State the characteristics of negative feedback amplifier.
5) Explain any one method to improve CMRR of differentiate amplifier.

Q.2 a) Determine operating point, V_B & V_E of given circuit. **10**



b) Derive the expression of voltage gain, input impedance & output impedance for CS self biased JFET amplifier. **10**

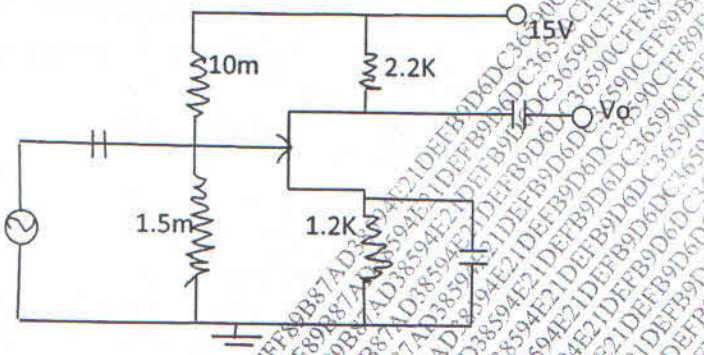
Q.3 a) What is a need of multistage amplifier, derive the equation of overall voltage gain, Input resistance & output resistance. **12**

b) Explain the Hartley oscillator with proper circuit diagram. **08**

Q.4 a) Derive an expression for Ad, Ac & CMRR for dual input balanced output differential amplifier. **10**

[P.T.O]

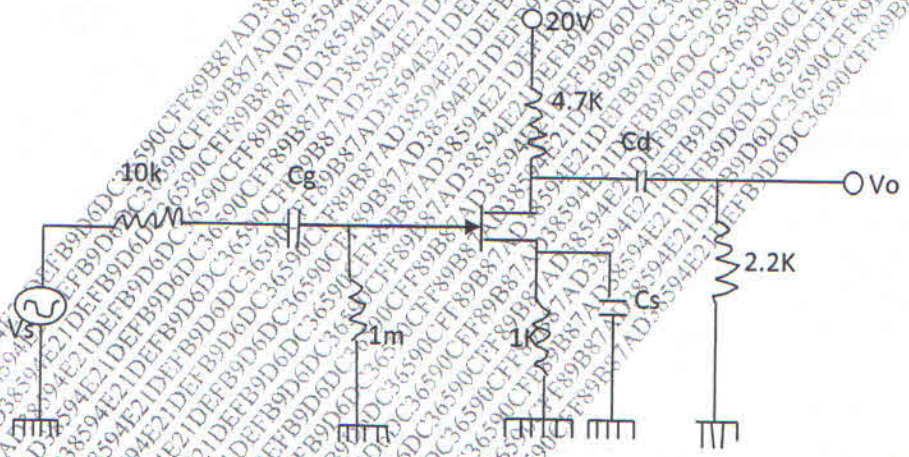
b) Determine Av, Zi & Zo for given circuit 10



I_{DSS}=8mA
Vp=3V
Rd=50k

Q.5 a) Draw the circuit diagram of Class AB push-pull amplifier & explain the working principle. 10

b) Determine higher cut off frequency for a given circuit 10



I_{DSS}=8mA, Vp=-4V, r_d=∞Ω
C_{gd}=2PF, C_{gs}=4PF, C_{ds}=0.5PF, cwi=5PF, cwo=6PF
cwi & cwo are wiring capacitance (Input & Output respectively)

Q.6 Write short notes (any four) 20

1) Comparison of CB, CE & CC amplifier
2) Voltage shunt negative feedback amplifier
3) Wilson current source
4) Cascode amplifier
5) Cross over distortion in class B power amplifier

S.E. Sem-IV ETRX (CBGS)/EXTC 19/5/17

App. Maths - IV.

(85+90 = 175)

Q.P. Code : 11837

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

Please check whether you have got the right question paper.

N.B: 1. Question.No.1 is compulsory.
2. Attempt any three from the remaining.

Q.1. a) Find the extremal of $\int_{x_0}^{x_1} \frac{1+y^2}{y'^2} dx$ **(5)**

b) Is $(6,7,-4)$ a linear combination of $v_1 = (1,2,2), v_2 = (3,4,6)$ **(5)**

c) Check whether $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 3 & 4 & 5 \end{bmatrix}$ is derogatory or not. **(5)**

d) Evaluate $\int_0^{1+i} z^2 dz$, along the parabola $x = y^2$ **(5)**

Q.2. a) Show that the functional $\int_0^{\pi/2} \left\{ 2xy + \left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2 \right\} dt$, such that $x(0) = 0, x\left(\frac{\pi}{2}\right) = -1$, $y(0) = 0, y\left(\frac{\pi}{2}\right) = 1$ is stationary if x=-sint, y=sint. **(6)**

b) Evaluate $\int_{-\infty}^{\infty} \frac{x^2}{(x^2+a^2)(x^2+b^2)} dx, a > 0, b > 0$ **(6)**

c) Reduce the quadratic form $x^2 - 2y^2 + 10z^2 - 10xy + 4xz - 2zy$ to canonical form and hence, find its rank, index and signature and value class. **(8)**

Q.3. a) Verify Cayley Hamilton theorem for $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ and hence find A^{-1} & A^4 **(6)**

b) Using Residue theorem evaluate $\int_C \frac{e^z}{z^2+\pi^2} dz$ where C is $|z|=4$. **(6)**

c) Find the singular value decomposition of $\begin{bmatrix} 2 & 3 \\ 0 & 2 \end{bmatrix}$ **(8)**

Q.4. a) If $A = \begin{bmatrix} -1 & 4 \\ 2 & 1 \end{bmatrix}$, prove that 3tanA=Atan3 **(6)**

b) Find the sum of the residues at singular points of $f(z) = \frac{z-4}{z(z-1)(z-2)}$ **(6)**

c) Check whether the set of real numbers (x,0) with operation $(x_1,0)+(x_2,0)=(x_1+x_2,0)$, and $k(x_1,0)=(kx_1,0)$ is a vector space. (8)

Q.5. a) Find the extremum of $\int_{x_0}^{x_1}(2xy-y'^2)dx$. (6)

b) Construct an orthonormal basis of R^3 using Gram Schmidt process to S = {(3,0,4),(-1,0,7),(2,9,11)} (6)

c) Find all possible Laurent's expansions of $\frac{2z-3}{z^2-4z+3}$ about $z=4$. (8)

Q.6. a) Find the linear transformation Y=AX which carries $X_1=(1,1,1)', X_2=(1,-1,1), X_3=(-1,1,1)'$ onto $Y_1=(2,1,3)', Y_2=(2,3,1)', Y_3=(4,1,3)'$ (6)

b) Show that the vectors $v_1=(1,2,4), v_2=(2,-1,3), v_3=(0,1,2)$ are linearly independent. Express $v_4=(-3,7,2)$ in terms of v_1, v_2, v_3. (6)

c) If C is circle |z|=1, using the integral $\int_C \frac{e^{kz}}{z}dz$ where k is real, show that

$$\int_0^{\pi} e^{k\cos\theta}\cos(k\sin\theta)d\theta=\pi$$ (8)
