2007

ELECTRONICS

PAPER-XII

Full Marks : 75

Time : 3 hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in *their own words as far* as *practicable.*

Illustrate the answers wherever necessary.

Write the answers *questions of each Group in separate* books.

Answer Q. *No. 1* and *any three* from the rest in each group.

Group - A

(Marks : 40)

1. Answer the 'following questions 2x5

   (a) Calculate the steady state error for the ramp input for 2nd order closed loop control system whose transfer function is given by

$$\frac{C(s)}{R(s)} = \frac{16}{s^2 + 1.6s + 16}$$

   (b) Distinguish between the continuous and discrete control systems.

   (c) What is the function of `Astigmatism' in CRO ?

   (d) What **is the difference between millimeter wave signal generator and microwave signal generator?**

   (e) What do you mean by PID Controller? 2x5

2. (a) A system is described by a set of algebraic equations :

$X2 = a12X1 + a32X3 + a42X4 + a52X5$

X3 =	**a23X2**	
X4 =	a34X3	+ a44X4
x5 =	**a35X3**	**+ a45X4**

where, **X1 is the input variable and** X. is the output **variable.**

Draw the complete signal flow graph showing each **step.** **5**

(b) For the network **as shown in Fig**. Q.2(b), obtain the **transfer** function : 5

$$\mathbf{Zt\ (s) = li(s)}$$

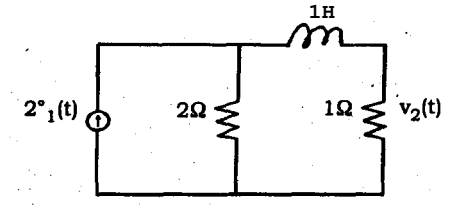

Fig Q. 2(b)

3. (a) Sketch the Bode-plot of the system function given by

$$\mathbf{H(s) = \frac{s+1}{(s+2)(s+4)}}$$

(b) .A fourth order system has the characteristics equation given by

$$\mathbf{q(s) = s4 + 8s3 +}\ 18s2 + 16x + 5$$

p

Test whether the system is stable or not using Hurwitz stability criteria. 4

4. (a) Draw the block diagram model of an audio signal generator. Mention its two uses. 6

(b) On the basis of construction and operational point of view, write down the difference between Dual-trace oscilloscope and Dual-beam oscilloscope. 4

5. (a) Draw a schematic diagram of a noise measurement system using differential amplifier. Explain how it can be used to reduce noise signal. 6

(b) A balanced output source provides a signal of 30 mV from each terminal to ground. This provides a difference signal of 60 mV for a difference amplifier. The noise signal common to both terminals is 600 mV. The difference gain of the amplifier is 150, while the common mode gain is 0.04.

What is the ratio of signal to noise ratio ? Find the % reduction of the noise signal. 4

6. (a) Draw the block diagram of a function generator and explain its operation. 6

(b) Draw the block diagram of a CRO. 4

Group.- B

(Marks : 35)

(a) State the principal difference between a hub and a switch.

(b) Twisted pair is not suitable for cable T.V. distribution. Why?

(c) State Shanon's theory for a noisy channel.

(d) . What is the purpose of a quantiser ?

(e) Draw the Manchester coded waveform of binary data 101011001. 1x5

2. (a) Compare between the OSI and TCP / IP protocols in reference to their criticisms. 5

(b) What do you mean by Bit rate and Band rate ? 2

(c) What are the advantages of digital transmission over analog transmission? 3

3. (a) Sketch the Manchester and differential Manchester encoding for the bit stream 0001110101 assuming the line is initially in the low state. 2

(b) What do you mean by ARQ ? Briefly explain all of them and clearly mention the advantages and disadvantages of each scheme. 8

4. (a) What are the advantages of using UDP over TCP ? 3

(b) What is the purpose of use of subnetting ? 2

(c) Find the netid and hostid for each address and find the class of address of following IP address : 5

(i) 4.23.145.90
(ii) 227.34.78.7
(iii). 246.7.3.8
(iv) 129.6.8.4
(v) **198**.76.9.23.

5. (a) A network has n devices . Determine the no . of cable links required for a mesh , ring, bus and star topology.

(b) Explain the role of a remote concentrator unit in the access of network of a PSTN. How is a remote switching unit is different from a remote concentrator unit. 4+(3+3)

6. Write short notes on any *two* of the following topics : 2X5

(a) ISDN.

(b) FDDL .

(c) Fast Ethernet.

(d) Modems used in PSTN networks.