

(3 Hours)

[Total Marks:80]

N.B

1. Question No.1 is compulsory
2. Attempt any three question from remaining five questions
3. Assume suitable data wherever required but justify them
4. Draw appropriate waveforms wherever required

1. Solve any four

[20]

- (a) Explain Zener breakdown mechanism in Zener diode with VI characteristics.
- (b) Calculate the stability factor S for the fixed bias circuit with  $R_B=100K\Omega$ ,  $R_C = 1 K\Omega$ ,  $V_{BE}=0.7 V$  and  $V_{CE}=6 V$ .
- (c) What are the important features of a differential amplifier?
- (d) State De Morgan's Theorem and implement EX-OR gate using NAND gates only.
- (e) Convert T FF to D FF.

2. (a) Explain the working of Astable multivibrator using IC 555 with suitable waveforms. [10]
- (b) Design and implement one digit BCD adder using IC 7483. [10]

3. (a) Design a MOD-12 Asynchronous down counter. [10]
- (b) Define  $r_d$ ,  $g_m$  and  $\mu$  for JFET and explain how to obtain them from characteristics. [10]

4. (a) Make subtraction using two's complement method  $(52)_{10} - (65)_{10}$  [5]

- (b) Simplify  $Y=ABC + BC'D + A'BC$  and realize using basic gates. [5]

- (c) Explain how OPAMP can be used as summing, scaling and averaging amplifier in inverting configuration with derivation of output voltage equation. [10]

5. (a) Explain the working of LCD. [5]

- (b) Define load regulation and Line regulation of power Supply. [5]

- (c) Write in short about ENTITY declarations in VHDL. Write VHDL program for full adder. [10]

6. (a) Compare schottky barrier diode and PN junction diode. [5]

- (b) Draw circuit diagram of voltage divider bias using CE configuration and explain how it stabilizes Operating point. [5]

- (c) Implement the following Boolean function using only one 8:1 Mux and few gates  
 $F=\sum m(0,1,3,4,5,7,9,10,12,13,15)$  [5]

- (d) Convert  $(101101.1101)_2$  to decimal, hexadecimal and octal form. [5]

May - 2017

Q.P. Code : 552202

(3 Hours)

[ Total Marks : 80]

- Note: 1) Question No.1 is compulsory.  
2) Out of remaining attempt any three.  
3) Assume & mention suitable data wherever required.  
4) Figures to right indicates full marks.

1. Solve any four

20

- Compare analog and digital communication system.
- Define modulation. Explain and justify any two need of modulation.
- Explain in brief Pre-emphasis and De-emphasis in FM.
- Explain in brief the process of quantization.
- What is line coding. Draw the NRZ and Manchester signal for the following binary signal 10111010.

2. a) Explain the term thermal noise. Prove that the noise voltage  $V_n = \sqrt{4kTB R}$  For 10 electronic device operating at a temperature of  $17^\circ\text{C}$  with a bandwidth of 10 KHz, determine

1. Thermal noise power in dBm. 2. RMS noise voltage for a  $100\ \Omega$  internal resistance and a  $100\ \Omega$  load resistance.

b) State and prove time scaling property of Fourier transform. Determine the Fourier transform for a rectangular pulse of amplitude 'A' and time period 'T' is from  $-T/2$  to  $+T/2$  10

3. a) An AM signal appears across a  $50\ \Omega$  load and has the following equation 10  
 $v(t) = 12(1 + \sin 12.566 \times 10^3 t) \sin 18.85 \times 10^6 t$  volts

- Sketch the envelope of this signal in time domain.
- Calculate modulation index, sideband frequencies, total power and bandwidth.

b) What are the limitations of TRF receiver. Explain how these limitations are avoided using super heterodyne receiver. 10

4. a) With the help of neat circuit diagram explain the working of Ratio detector. 10  
b) What is multiplexing in communication system. Draw and explain in brief the transmitter and receiver of FDM. 10

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5. a) State and prove sampling theorem for low pass band limited signal .Explain 10  
aliasing error.
- b) What are the various pulse modulation techniques? Explain how PPM is 10  
obtained from PWM.
6. a) Explain in brief the generation and detection of Delta modulation. 10
- b) Explain the generation and detection of ASK signal with block diagram and 10  
waveforms.
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