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AC-1586

M. Sc. (Sem. IV) Examination

April / May – 2015

Electronics : CEL - 543

(Analog & Digital Circuits)

Time : **3** Hours] [Total Marks : **70**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી. **Fillup strictly the details of ☛ signs on your answer book.** Name of the Examination : ☛ **M. SC. (SEM. 4)** Name of the Subject : ☛ **ELECTRONICS : CEL - 543** ☛Subject Code No. : **1 5 8 6** ☛Section No. (1, 2,.....) : **Nil**	Seat No. : Student's Signature

(2) Figures to the right hand side indicate full marks.

(3) Assume data if required.

(4) Symbols have their usual meaning.

(5) Simple calculator is allowed to use.

1 Attempt any two:

(a) Sketch the diagram of MOSFET and explain its working in the enhancement mode. Also derive the equation for its volt-ampere characteristics. **7**

(b) Describe the working and application of CMOS devices with the help of suitable example. **7**

(c) What are dynamic MOS Shift registers? Explain the working of NMOS dynamic shift register with the help of a suitable block diagram and truth table mention the applications of these registers. **7**

2 Attempt any two :

(a) Describe the use of VLSI planner process to prepare and integrate a FET on a silicon chip. **7**

(b) Describe how will you prepare the following components **7**

(i) IC resistors

(ii) IC capacitors

(c) (i) Write a note on integrated circuit packaging. **3**

(ii) What is the total length required to fabricate 25 k.ohm register whose width is 25 μm. If Rs=200 ohm/square. **4**

3 Attempt any two:

(a) Explain why the quiescent collector current must be essentially independent of variations in BF to achieve bias stabilization. Derive the formula for IC dependence on B_F, V_{BE} and I_{CO}. **7**

(b) (i) What is meant by zero frequency resistance R_{ii}^{o} ? **3**

(ii) Explain pole-zero method for amplifier having two poles in detail. **4**

(c) (i) Explain dominant pole method explain its significance for high frequency response. **3**

(ii) (a) For the Widlar circuit, determine R so that $I_C = 1$ mA. The transistor parameters are VBE=0.7 V, BF=100 and an infinite Early voltage is assumed. The supply voltage is 15V. **3**

(b) For R obtained in part (a), determine the present change in I_C for $B_F = 200$. **4**

4 Attempt any two:

(a) Explain the following terms: **7**

(i) Multiloop feedback amplifier.

(ii) Stability

(iii) open loop poles.

(b) Explain test for stability with Nyquist's criterion. Comment on your result. **7**

(c) What is 't' model, Derive equations for t parameters in terms of xi, $\hat{x}i$,xs and xo. **7**

5 Attempt any two :

(a) Draw an ideal characteristic of an Inverter. How such characteristics are possible in NMOS technology. Explain such circuit in detail. **7**

(b) List the limitations of PROM. Explain their operation with detail architecture. **7**

(c) (i) Explain PLA or PAL. **3**

(ii) Consider a 4kb ROM with 4 output bits. If the encoder is square, how many bits are needed for x address. **4**