



UF-8087

B. E. - II (Sem. III) (Electrical) Examination
May / June - 2012
Analog & Digital Electronics
(New Course)

Time : 3 Hours]

[Total Marks : 100

Instructions :

નીચે દર્શાવેલ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of signs on your answer book.

Name of the Examination :
B. E. - 2 (SEM. 3) (ELECTRICAL)

Name of the Subject :
ANALOG & DIGITAL ELECTRONICS (NEW)

Subject Code No. : 8 0 8 7 Section No. (1, 2,.....): NIL

Seat No. :

Student's Signature

- (2) All questions are compulsory.
(3) Figures to the right indicate full marks.
(4) Assume necessary data if required.
- 1 (a) Answer following questions : 10
(i) Find the decimal equivalent of $(231.23)_4$.
(ii) Perform $(46)_{10} - (82)_{10}$ using 9's complement.
(iii) Prove : $A \cdot (\bar{A} + B) = AB$
(iv) Draw logic diagram of a half adder.
(v) Define : Fan-out and Fan-in.
- (b) (i) Reduce the following function using K-map 5
technique.
$$f(A,B,C) = \sum m (0,1,3,7) + \sum d (2,5)$$

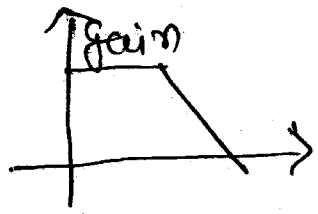
(ii) Implement boolean expression. 5
$$Y = \left(\overline{(A+B)C} \right) D$$
 using NAND gates.
- 2 (a) Explain RS flip-flop with necessary diagrams. 8
(b) Design down counter, counting states from 1101 to 7
0011 using 4-bit synchronous counter IC 74LS191.

OR

- 2 (a) Explain D flip-flop with necessary diagrams. 8
 (b) Design a MOD-5 synchronous counter using JK flip-flops and implement it. 7
 Also construct a timing diagram.

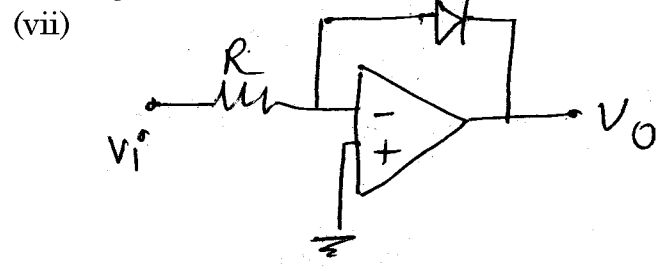
- 3 Write short note on any three : 15
 (i) 4-bit universal shift register.
 (ii) Full subtractor.
 (iii) 4-bit magnitude comparator.
 (iv) Universal gates.
 (v) De-multiplexer

- 4 (a) Attempt the following : 10
 (i) What is the gain equation for inverting amplifier ?
 (ii) Define : CMRR
 (iii)



This is the graph for freq. _____ filter.

- (iv) How many stable states are in astable multivibrator ?
 (v) Define : Offset voltage.
 (vi) If $A_d = 10^4$, $V_{in1} = 3\text{mV}$, $V_{in2} = 2.99\text{ mV}$ than $V_c = ?$



This is the circuit for _____ Amplifier.

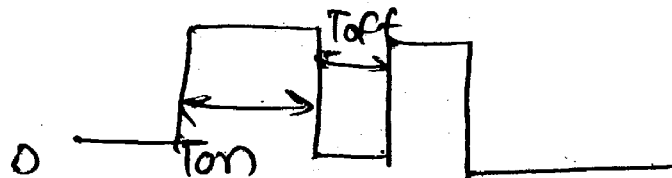
- (viii) IC 741 is _____ pin IC.
 (ix) What is the T_{on} equation for monostable multivibrator ?
 (x) True / False : For summing inverting amplifier OP-AMP can be use in open loop mode.

- (b) Attempt any two : 10
- (i) Explain OP-AMP can be use as a difference amplifier.
 - (ii) Explain basic antilog amplifier.
 - (iii) Explain the block diagram of PLL.

- 5 (a) Attempt any two : 10
- (i) Explain in detail : Inverting comparator.
 - (ii) Explain in detail : Wide band-pass filter.
 - (iii) Compare : Bistable, Astable and Monostable multivibrator.

- (b) Attempt any one : 5
- (i) Explain negative peak detector.
 - (ii) Explain : Inverting precision full wave rectifier.

- (c) In an astable circuit $R_A = 20 \text{ K}\Omega$, $R_B = 33 \text{ K}\Omega$, and $C = 0.1 \mu\text{F}$. Calculate the ON and OFF lines of the load voltage wave form shown in figure. 5



- 6 Attempt any two : 10
- (i) Design a circuit with OP-AMP to produce the output V_o given by

$$V_o = (VS_1 + VS_3) - (VS_2 + VS_4)$$
 - (ii) If $\text{CMRR} = 80 \text{ dB}$, $A_d = 10^5$, $V_{in_1} = 3\text{mV}$, $V_{in_2} = 2.99 \text{ mV}$. Find the output voltage of OP-AMP. Assume V_{in_1} is inverting 11P and V_{in_2} is non-inverting input.
 - (iii) For a first order butter worth high pass filter. Calculate the value of R if $C = 0.0047 \mu\text{F}$ and $F_c = 10 \text{ KHz}$.