



**KC-8087**

**B. E. II (Electrical) (Sem. III) Examination**  
**November / December – 2012**  
**Analog & Digital Electronics (ELE)**  
*(New Course)*

Time : Hours]

[Total Marks : 100

**Instructions :**

(1)

नीचे दर्शाविए निशानीवाणी विगतो उत्तरवही पर अवश्य लખवी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
<input type="text" value="B. E. 2 (Electrical) (Sem. 3)"/>	<input type="text"/>
Name of the Subject :	<input type="text"/>
<input type="text" value="Analog &amp; Digital Electronics (ELE) (New)"/>	<input type="text"/>
Subject Code No. : <input type="text" value="8"/> <input type="text" value="0"/> <input type="text" value="8"/> <input type="text" value="7"/>	Section No. (1, 2,.....) : <input type="text" value="Nil"/>
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

- (1) Convert  $(3FD)_{16}$  to binary.
- (2) Perform  $(46)_{10} - (22)_{10}$  in BCD using 10's complement.
- (3) Prove :  $A + \bar{A}B = A + B$
- (4) Draw logic diagram of a half subtracter.
- (5) Define : Fan-out and Fan-in.

(b) (1) Reduce the following function using K-map 5  
technique.

$$F(W, X, Y, Z) = \sum m(0, 7, 8, 9, 10, 12) + \sum d(2, 5, 13)$$

(2) Implement boolean expression 5

$$y = \left( \frac{1}{(A+B)C} \right)^D \text{ using NOR gates.}$$

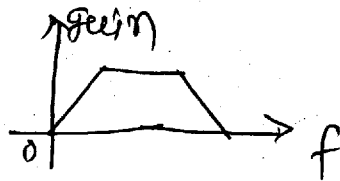
- 2 (a) Explain JK flip flop with necessary diagrams. 8  
 (b) Design divide by 6 counter using T flip-flop. Write state table and reduce the expression using k-map. 7

OR

- 2 (a) Explain D flip flop with necessary diagrams. 8  
 (b) Design down counter, counting states from 1101 to 0011 using 4-bit synchronous counter IC 74LS191. 7

- 3 Write short note on any **three** : 15  
 (1) 4-bit bidirectional shift register  
 (2) BCD-to-seven segment decoder  
 (3) Universal gates  
 (4) Multiplexer  
 (5) Full adder

- 4 (a) Attempt the following : 10  
 (1) Define : Slew rate  
 (2) What is the gain equation for non-inverting amplifier ?  
 (3) Define : CMRR  
 (4) Define : Input offset voltage  
 (5) Application of schmitt trigger, is ?  
 (6)



This is the graph for \_\_\_\_\_ filter.

- (7) What is the equation for astable multivibrator in, on time period ? (ie.  $t_{on} = ?$ )  
 (8) How many stable states are in bistable multivibrator ?  
 (9) True / false : for linear operation op-amp can be use in open loop mode.  
 (10) If  $A_d = 10^5$ ,  $v_{i1} = 3$  mv,  $v_{i2} = 2.99$  mv than  $V_d = ?$

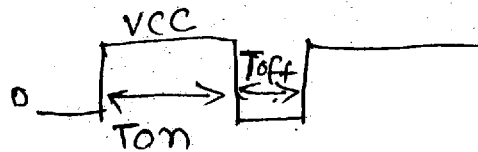
- (b) Attempt any two : 10
- (1) Explain Op-Amp in used as a summing amplifier in inverting mode.
  - (2) Explain zero crossing detector.
  - (3) Compare : Comparator and Schmitt trigger.

- 5 (a) Attempt any two : 10
- (1) Explain in detail : Basic log amplifier.
  - (2) Explain in detail : Basic Integrator Circuit.
  - (3) Design a circuit with OP-AMP to produce the output  $V_o$  given by  

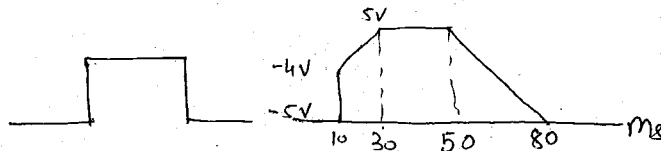
$$V_o = (V_{S1} + V_{S3}) - (V_{S2} + V_{S1}).$$

- (b) Attempt any one : 5
- (1) Explain the block diagram of an instrumentation amplifier.
  - (2) Explain positive peak defector.

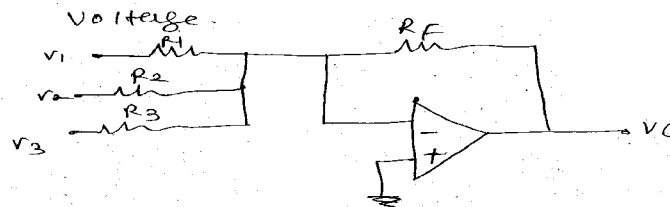
- (c) In an astable circuit  $R_A = 25 \text{ K}\Omega$ ,  $R_B = 33 \text{ K}\Omega$  and  $C = 0.5 \mu\text{F}$ . Calculate the on and off times of the load voltage waveform shown in fig. 5



- 6 Attempt any two : 10
- (1) The input and output waveform of a voltage follower are as shown in figure. Determine the slew rate.



- (2) In figure, if  $V_1 = +1V$ ,  $V_2 = +3V$ , and  $V_3 = +2V$ , with  $R_1 = R_2 = R_3 = 2 \text{ K}\Omega$  and  $R_F = 3 \text{ K}\Omega$  determine the output voltage.



- (3) Explain : Non - inverting type HWR.