



Name :

Roll No. :

Invigilator's Signature :

CS/B.TECH (CSE)(N)/(IT)(N)/SEM-3/CS-301/2012-13

2012

ANALOG & DIGITAL ELECTRONICS

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

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

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

- i) A 2-transistor class *B* power amplifier is commonly called
 - a) push-pull
 - b) dual
 - c) differential
 - d) none of these.
- ii) A stable multivibrator has
 - a) no stable state
 - b) one stable state
 - c) two stable states
 - d) none of these.
- iii) Schmitt trigger circuit generates
 - a) triangular wave
 - b) square wave
 - c) saw tooth wave
 - d) none of these.
- iv) A Wien-bridge oscillator has a frequency
 - a) $\frac{1}{2\pi\sqrt{RC}}$
 - b) $\frac{1}{\sqrt{RC}}$
 - c) $\frac{1}{2\pi RC}$
 - d) none of these.

3152(N)

[Turn over

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- v) Which of the following oscillators is used at audio frequency ?
- Crystal oscillator
 - Hartley oscillator
 - RC phase-shift oscillator
 - Colpitts oscillator.
- vi) $A + A'B + B'$ is equal to
- A
 - B'
 - 1
 - 0.
- vii) Negative feedback in an amplifier is
- reduced gain
 - increased noise
 - increased frequency & phase
 - reduced bandwidth.
- viii) How many minimum NOR gates is required to implement NAND gate ?
- 3
 - 4
 - 5
 - 2.
- ix) The digital logic family which has minimum power dissipation is
- TTL
 - RTL
 - DTL
 - CMOS.
- x) If the input to T-flip-flop is 100 Hz signal, the final output of the three T-flip-flops is cascade is
- 1000 Hz
 - 500 Hz
 - 300 Hz
 - 12.5 Hz.
- xi) Which one is the sequential circuit ?
- Multiplexer
 - Decoder
 - Encoder
 - Counter.

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xii) 8421 is a

- a) weighted code b) non-weighted code
c) complementary code d) none of these.

GROUP – B**(Short Answer Type Questions)**Answer any *three* of the following $3 \times 5 = 15$

2. Implement Full-adder circuit using two Half-adders. Write the truth table of Half-subtractor. $3 + 2$
3. What is Multiplexer ? Why is it called 'data selector' ? Write the important characteristics of digital IC. $2 + 1 + 2$
4. Implement the function $F(A, B, C) = \sum m(1, 3, 5, 6)$ using decoder. What is the difference between combinational circuit and sequential circuit ? $3 + 2$
5. Draw and explain the operation of Monostable multivibrator using 555 Timer.
6. Draw and explain the Schmitt trigger circuit.

GROUP – C**(Long Answer Type Questions)**Answer any *three* of the following. $3 \times 15 = 45$

7. a) Write truth table, circuit diagram and timing diagram of SR flip-flop using NOR gate. $8 + 7$
b) Convert D flip-flop to JK flip-flop.
8. a) Design a 2-bit Asynchronous up counter using negative edge trigger JK flip-flop and draw timing diagram. $6 + 9$
b) Design a MOD-6 Synchronous counter using JK flip-flop.
9. Write short notes on any *three* of the following : 3×5
 - a) Johnson counter
 - b) TTL family
 - c) Serial input parallel output shift register
 - d) BCD adder
 - e) 8 : 3 encoder.

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10. a) What are the advantages of negative feedback ?
 b) Explain the operation of a phase shift oscillator with circuit diagram.
 c) Derive an expression for its frequency of oscillation.

3 + 6 + 6

11. a) Explain the working of a R-2R Ladder type DAC with a neat circuit diagram.
 b) Explain the working of a successive approximation register (SAR) type ADC.

7 + 8

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