



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.



- v) Which of the following oscillators is used at audio frequency ?
- a) Crystal oscillator
 - b) Hartley oscillator
 - c) RC phase-shift oscillator
 - d) Colpitts oscillator.
- vi) $A + A'B + B'$ is equal to
- a) A
 - b) B'
 - c) 1
 - d) 0.
- vii) Negative feedback in an amplifier is
- a) reduced gain
 - b) increased noise
 - c) increased frequency & phase
 - d) reduced bandwidth.
- viii) How many minimum NOR gates is required to implement NAND gate ?
- a) 3
 - b) 4
 - c) 5
 - d) 2.
- ix) The digital logic family which has minimum power dissipation is
- a) TTL
 - b) RTL
 - c) DTL
 - d) 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
- a) 1000 Hz
 - b) 500 Hz
 - c) 300 Hz
 - d) 12.5 Hz.
- xi) Which one is the sequential circuit ?
- a) Multiplexer
 - b) Decoder
 - c) Encoder
 - d) Counter.



- 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 × 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 × 15 = 45

7. a) Write truth table, circuit diagram and timing diagram of SR flip-flop using NOR gate.
- b) Convert D flip-flop to JK flip-flop. 8 + 7
8. a) Design a 2-bit Asynchronous up counter using negative edge trigger JK flip-flop and draw timing diagram.
- b) Design a MOD-6 Synchronous counter using JK flip-flop. 6 + 9
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.



- 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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