

CS/B.TECH(CSE)(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 Question)

1. Choose the correct alternatives for the following: 10 x 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) Schmit trigger circuit generates
 - a) triangular wave
 - b) square wave
 - c) sawtooth 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.

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 Schmitt trigger circuit.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 x 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 x 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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