

E 8557

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Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, OCTOBER 2014

Fifth Semester

Core Course—DIGITAL ELECTRONICS

(Common for Model I and Model II B.Sc. Physics and B.Sc. Physics-EEM)

Time : Three Hours

Maximum Weight : 25

Part A

Answer **all** questions.

Objective type questions-weight 1 for each bunch.

BUNCH I

Choose the correct answer:

1. The chief reason why digital computers use complemental subtraction is that :

- (a) It simplifies their circuitry.
- (b) It is a very simple process
- (c) It can handle negative numbers easily.
- (d) It avoids direct subtraction.

2. Boolean algebra is essentially based on :

- (a) Symbols.
- (b) Logic.
- (c) Truth.
- (d) Numbers.

3. When we demorganize \overline{AB} , we get :

- (a) \overline{AB} .
- (b) $\overline{A + B}$.
- (c) $\overline{A + B}$.
- (d) AB .

4. Noise margin is expressed in :

- (a) Decibel.
- (b) Watt.
- (c) Volt.
- (d) Phon.

BUNCH II

Choose the correct answer :

5. A flip-flop is known more formally as :

- (a) Monostable Multivibrator.
- (b) Bistable Multivibrator.
- (c) Astable Multivibrator.
- (d) None of these.

Turn over

6. The registers which are used to simply store the data are called :
- (a) Buffer Registers. (b) Static Shift Registers.
(c) Dynamic Shift Registers. (d) None of these.
7. The LSB of any counter is the bit that :
- (a) Does not change. (b) Changes most often.
(c) Changes most rarely. (d) None of these.
8. The resolution of a 6-bit digital-to-analog converter is :
- (a) 2.5%. (b) 1.25%.
(c) 1.587%. (d) 6.935%.

BUNCH III

Choose the correct answer:

9. A mod-16 counter uses four flip flops with $t_{pd} = 50$ ns. Thus f_{max} for the ripple counter is :
- (a) 2MHz. (b) 3MHz.
(c) 4MHz. (d) 5MHz.
10. What is the other name of the counter type ADC ?
- (a) Dual-slope. (b) Flash type.
(c) Digital ramp. (d) None of these.
11. $1011.101_2 \times 101.01_2 =$ _____.
- (a) 111101.00001_2 . (b) 111010.10001_2 .
(c) 101101.11001_2 . (d) 111101.10001_2 .
12. When more than two bits are to be added, which of the following is recommended ?
- (a) Parallel binary adder. (b) Half adder.
(c) Full adder. (d) None of these.

BUNCH IV

Fill in the blanks with most appropriate words:

13. _____ is also called all-or-nothing gate.
14. For adding 4-bit numbers we need _____ full adders connected in parallel.
15. A full subtractor contains two half subtractors and one _____ gate.
16. Double precision notation requires _____ storage locations.

(4 × 1 = 4)

Part B

*Answer any five questions.
Short answer questions. Weight 1 each.*

17. What do you mean by 'base' and 'radix' of a number system ?
18. State and prove De Morgan's theorem.
19. Show that both NAND gate and NOR gate are universal gates.
20. What is meant by a positional weighted system ?
21. Describe the operation of half-adder.
22. Why is a flip-flop called a single bit register ?
23. Describe some applications of counters.
24. What are multiplexers ?

(5 × 1 = 5)

Part C

*Answer any four questions.
Short Essay / Problems. Weight 2 each.*

25. What are the advantages of digital systems over the analog systems ? What is the chief limitation to the use of digital techniques ?
26. What are the characteristics of the 2's complement method ?
27. What is a master-slave flip-flop ? Discuss its working.
28. What do you mean by a K-map ? Name its advantages and disadvantages.
29. What are buffer registers ?
30. What do you mean by BCD counter ?

(4 × 2 = 8)

Part D

*Answer any two questions.
Essay questions. Weight 4 each questions.*

31. What are shift registers ? Discuss different types of shift registers and their applications.
32. Define decoders and demultiplexers. With a neat diagram show how to convert a decoder into a demultiplexer.
33. With the help of a circuit diagram and necessary waveforms explain the working of a 4-bit ripple counter.

(2 × 4 = 8)