D 92932 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER (CBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2020

Electronics

ELE 3C 05—DIGITAL ELECTRONICS

Time : Two Hours Maximum : 60 Marks

Section A

Answer at least **eight** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall Ceiling 24.

1. What do you mean by a bit and byte ?
2. How are negative numbers represented ?
3. What are the universal gates ? Why are they called so ?
4. What is a minterm ?
5. What is a half-adder ?
6. Why is a multiplexer called a data selector ?
7. What are the two types of flip-flops ?
8. What is the other name of asynchronous counter ? Why is that name ?
9. What are shift registers ?
10. What is a PROM ? Is it volatile ?
11. Explain the programming of ROM.
12. What are the two major disadvantages of EEPROM ?

(8 × 3 = 24 marks)

Turn over

Section B

Answer at least **five** *questions.*
Each question carries 5 *marks.*
All questions can be attended.
Overall Ceiling 25.

13. Discuss octal number system.

14. Prove that $AB + \bar{A}C + BC = AB + \bar{A}C$.

15. Realize a full subtractor.

16. Realize the logic expression using NAND gates only : $F_1 = \sum m\,(1, 3, 5, 8, 11, 12, 14, 15)$.

17. With neat diagrams, explain the working of a serial in, serial out shift register.

18. With neat diagrams, explain the operation of positive edge triggered JK flip-flop.

19. Explain in detail the different types of RAMs.

(5 × 5 = 25 marks)

Section C

Answer any **one** *question.*
The question carries 11 *marks.*

20. State and prove Boolean Algebra Laws.

21. Explain in detail a 4 bit asynchronous up counter.

(1 × 11 = 11 marks)

D 92931 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER (CBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2020

Electronics

ELE 3B 05—DIGITAL ELECTRONICS

Time : Two Hours Maximum : 60 Marks

Section A

Answer atleast **eight** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall Ceiling 24.

1. What are the basic gates ? Why are they called so ?
2. Convert the following numbers to decimal :
   (a) $(2EB7)_{16}$. (b) $(1247)_8$.
   (c) $(11001110011)_2$. (c) $(110110111.0111)_2$.
3. State and prove De-Morgan's Theorem.
4. Which logic is preferred for superfast computers ? What are their merits ?
5. What is a comparator ? Which logic gate is a basic comparator ?
6. What is a decoder ? Why a binary-to-octal decoder is called a 1-to-8 decoder ?
7. Distinguish between a multiplexer and de-multiplexer.
8. What is meant by race-around condition in JK flip-flops ?
9. Explain the different types of loading the shift registers.
10. Compare asynchronous counters and synchronous counters.
11. What is the advantage of the R-2R ladder type DAC aver the weighted resistor type DAC ?
12. Define an :
    (a) up counter.
    (b) down counter.
    (c) up-down counter.

(8 × 3 = 24 marks)

Turn over

Section B

Answer atleast **five** *questions.*
Each question carries 5 *marks.*
All questions can be attended.
Overall Ceiling 25.

13. Obtain the minimal SOP expression for $\sum m$ (2, 3, 5, 7, 9, 11, 13, 14, 15) and implement it in NAND logic.
14. Realize full adder circuit using NAND gates only.
15. Explain a binary to Gray code convertor.
16. With circuit diagrams, explain an RS latch.
17. Realize a 4 bit ring counter and explain its operation with timing diagrams.
18. With necessary diagrams, explain a 2 - bit ripple up counter.
19. Explain the working of successive approximation ADC.

(5 × 5 = 25 marks)

Section C

Answer any **one** *question.*
The question carries 11 *marks.*

20. With neat diagrams, explain a TTL NAND gate.
21. Explain the two types of DACs.

(1 × 11 = 11 marks)

D 92930 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER (CBCSS—UG) DEGREE EXAMINATION, NOVEMBER 2020

Electronics

ELE 3A 12—GENERAL COURSE II : SENSORS AND TRANSDUCERS

Time : Two Hours and a Half Maximum : 80 Marks

Section A (Short Answer Questions)

Answer at least **ten** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall Ceiling 30.

1. What is a transducer ? Give an example.
2. What is the difference between sensors and transducers ?
3. Define the sensitivity of a transducer.
4. What are the static characteristics of a transducer ?
5. What is the difference between primary and secondary transducer ?
6. Explain the loading effect of a potentiometer.
7. What is an IR sensor ? What are the applications of IR radiation sensors ?
8. What is the effect of the temperature coefficient of resistance in strain gauge measurement ?
9. Write short notes on Photovoltaic cells.
10. RTDs are commonly made of doped platinum. Why ?
11. What is a sound level meter ? What are its different parts ?
12. What is the basic principle of working of Hall Effect transducers ?
13. How does an orifice plate flow meter work ?
14. What is meant by transduction ? Explain.
15. Write a note on the application-based classification of sensors.

(10 × 3 = 30 marks)

Section B (Short Essay Quetions)

Answer at least **five** *questions.*
Each question carries 6 *marks.*
All questions can be attended.
Overall Ceiling 30.

16. Distinguish between active and passive transducers with example.
17. With a neat diagram, explain the working of capacitive transducers based on the change in distance between the plates.

Turn over

18. Explain the working of an unbonded strain gauge.
19. Explain capacitive level gauge for discrete level measurement.
20. Explain Bernoulli's principle and continuity equation.
21. How does a rotameter measure a flow ?
22. Explain the working of photodiodes in sensors.
23. Explain any two dynamic characteristics of a transducer.

(5 × 6 = 30 marks)

Section C (Long Essay Quetions)

Answer any **two** *questions.*
Each question carries 10 *marks.*

24. With a Schematic diagram explain the construction and working of LVDT.
25. Explain the construction of the venturi meter and its working.
26. Explain the principle and working of the thermistor. What are the different types of thermistors ? What are its applications ?
27. With suitable diagrams explain the working of any one type of manometer.

(2 × 10 = 20 marks)

D 91736 (Pages : 3) Name.....

Reg. No.....

THIRD SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION NOVEMBER 2020

Electronics

ELE 3C 03—DIGITAL ELECTRONICS

Time : Three Hours Maximum : 64 Marks

Section A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. Identify the type of gate used, from the equation $x = \bar{A}B + A\bar{B}$.
2. The decimal equivalent of the binary number 10101_2 is ?
3. What is a Nibble ?
4. Give an example of standard SOP expression.
5. What is a Karnaugh map ?
6. How many flip-flops are required to make a MOD-32 binary counter ?
7. Define an up-counter ?
8. What do you mean by serial data ?
9. The abbreviation EEPROM stands for _____ ?
10. What do you mean by reading memory ?

(10 × 1 = 10 marks)

Section B

Answer **all** *questions.*
Each question carries 2 *mark.*

11. Draw the logic circuit for the Boolean Expression $Y = A(B + CD)$.
12. Simplify the Boolean expression $AB + A(B + C) + B(B + C)$.
13. What is a Decoder ? Give one example of it.

Turn over

14. Convert the Boolean expression $A\bar{B}C + \bar{A}\bar{B} + AB\bar{C}D$ into the standard SOP form.

15. What are the applications of shift registers?

16. Explain the operation of SR flip-flop.

17. Distinguish between SRAM and DRAM?

(7 × 2 = 14 marks)

Section C

Answer any **five** *questions.*
Each question carries 4 *marks.*

18. Discuss the various types of Shift registers. Illustrate the process of data shifting?

19. Explain the concept of 4 bit Ring counter.

20. Draw and explain the working of T flip-flop.

21. State and prove the Commutative, Associative and distributive laws associated with Boolean algebra.

22. Explain the concept of 4 × 1 multiplexer.

23. Using Boolean algebra techniques, Simplify the expression $\overline{AB + AC} + \bar{A}\,\bar{B}\,C$.

24. Differentiate volatile and non volatile memory with examples.

25. Reduce the expression $f = \sum_m (0, 2, 3, 4, 5, 6)$ using K Map and implement the logic circuit.

(5 × 4 = 20 marks)

Section D

Answer any **two** *questions.*
Each question carries 10 *marks.*

26. Explain the working of JK flip-flop. What are the limitations ? How can you eliminate the limitations?

27. (a) Discuss De Morgan's first and second theorems. Draw the gate equivalent.

    (b) Realize NOT, OR, AND and NAND gates with the help of universal gate NOR.

28. (a) What do you mean by Encoding. Explain Octal to Binary encoder

    (b) With truth table explain the working of a Full Adder circuit

29. (a) What is memory. Explain general memory operations.

(b) A certain memory has a capacity of 8K × 16.

(i) How many data input and data output lines does it have ?

(ii) How many address lines does it have ?

(2 × 10 = 20 marks)

14. Convert the Boolean expression $A\bar{B}C + \bar{A}\bar{B} + AB\bar{C}D$ into the standard SOP form.

15. What are the applications of shift registers ?

16. Explain the operation of SR flip-flop.

17. Distinguish between SRAM and DRAM ?

(7 × 2 = 14 marks)

Section C

Answer any **five** *questions.*
Each question carries 4 *marks.*

18. Discuss the various types of Shift registers. Illustrate the process of data shifting ?

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20. Draw and explain the working of T flip-flop.

21. State and prove the Commutative, Associative and distributive laws associated with Boolean algebra.

22. Explain the concept of 4 × 1 multiplexer.

23. Using Boolean algebra techniques, Simplify the expression $\overline{AB + AC} + \bar{A}\,\bar{B}\,C$.

24. Differentiate volatile and non volatile memory with examples.

25. Reduce the expression $f = \sum_m (0, 2, 3, 4, 5, 6)$ using K Map and implement the logic circuit.

(5 × 4 = 20 marks)

Section D

Answer any **two** *questions.*
Each question carries 10 *marks.*

26. Explain the working of JK flip-flop. What are the limitations ? How can you eliminate the limitations ?

27. (a) Discuss De Morgan's first and second theorems. Draw the gate equivalent.

    (b) Realize NOT, OR, AND and NAND gates with the help of universal gate NOR.

28. (a) What do you mean by Encoding. Explain Octal to Binary encoder.

    (b) With truth table explain the working of a Full Adder circuit.

29. (a) What is memory. Explain general memory operations.

(b) A certain memory has a capacity of 8K × 16.

(i) How many data input and data output lines does it have ?

(ii) How many address lines does it have ?

(2 × 10 = 20 marks)

D 91690 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER (CUCBCSS-UG) DEGREE EXAMINATION NOVEMBER 2020

Electronics

ELE 3B 04—ANALOG AND DIGITAL INTEGRATED CIRCUITS

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. Draw the equivalent circuit of an op-amp.
2. What is drop out voltage in a linear voltage regulator ?
3. Write the equation for frequency of oscillation of 555 astable multivibrator.
4. What is zero crossing detector ?
5. Draw the frequency response curve of a band reject filter.
6. The Number of data select lines required in a MUX for selecting 16 inputs is ————.
7. What is meant by clocked flip-flop ?
8. Which is the most popular and most widely used digital IC family ?
9. Convert 11011.101_2 to decimal.
10. What is the maximum modulus of a counter with 6 flip flops ?

(10 × 1 = 10 marks)

Part B

Answer any **five** *questions.*
Each question carries 2 *marks.*

11. What is a differential amplifier ? What is its significance in operational amplifier ?
12. Define CMRR and Slew rate.
13. Draw the circuit diagram of a Wein bridge oscillator using IC 741.
14. Draw a voltage follower using IC 714. What is its significance ?
15. Write down De Morgan's first and second theorems.
16. Implement the Boolean expression $Y = AB + A\bar{C} + \bar{A}BC$.
17. What is race around condition. How it can be avoided ?

(5 × 2 = 10 marks)

Turn over

Part C

Answer any **six** *questions.*
Each question carries 5 *marks.*

18. Draw the circuit diagram of a Schmitt trigger and explain its working.
19. Design a first order high pass filter for a cutoff frequency of 10 KHz and draw the circuit diagram
20. Explain the working of IC 566 as a VCO.
21. Draw the block diagram of an operational amplifier and explain each block.
22. What is a NAND gate and prove that it is a universal gate ?
23. Show that

$$\bar{A}BC + B + B\bar{D} + AB\bar{D} + AC = B + C.$$

24. With diagram discuss the concept of SISO shift register.
25. Explain the working of a 4-bit Ring counter. Draw necessary timing diagrams.

(6 × 5 = 30 marks)

Part D

Answer any two *questions.*
Each question carries 15 *marks.*

26. (a) Derive an expression for the gain of a noninverting amplifier. (8 marks)

    (b) Explain about an Integrator using IC 741. (7 marks)

27. (a) Draw an astable multivibrator using IC 741 and explain with necessary waveforms. (10 marks)

    (b) Design an astable multivibrator using IC 741 for a frequency of 2 KHz. (5 marks)

28. With the help of logic diagram, Excitation table and state diagrams, explain the concept of a 4 bit synchronous up counter.
29. (a) Explain a two-bit magnitude comparator. (8 marks)

    (b) Discuss the concept of 1 × 4 Demultiplexer. (7 marks)