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DCEL201

Reg. No.

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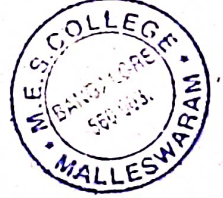
II Semester B.Sc. Degree Examination, September - 2023

ELECTRONICS

Analog and Digital Electronics (DSC)

Paper : ELE - CT - 2

(NEP - 2020)



Time : 2½ Hours

Maximum Marks : 60

Instructions to Candidates:

1. Answer all the questions from Part A, any Four questions from Part - B and any Four questions from Part - C.
2. Answer all the questions of Part - A in any one page and to be answered only once, In this part of answering the same questions answered multiple times will not be considered for evaluation.

PART - A

1. Answer all the subdivisions.

(12×1=12)

- i. D-MOSFET can be operated with
 - a. Negative gate voltage only.
 - b. Positive gate voltage only
 - c. Positive as well as Negative gate voltage
 - d. None of the above.
- ii. Triac is a device which conducts during.
 - a. Positive half cycle of the input signal.
 - b. Negative half cycle of the input signal.
 - c. Both Positive and Negative half cycles of the input signal.
 - d. Alternative Positive half cycles of the input signal.

[P.T.O.]

- iii. In the construction of UJT, emitter contact is
- a. Near to base 1
 - b. Exactly in the middle of the channel
 - c. Near to base 2
 - d. Always attached to base 1
- iv. In an inverting Operational amplifier, if $R_1 = 1k\Omega$ and $R_F = 10k\Omega$ then the voltage gain is
- a. 10
 - b. -10
 - c. 11
 - d. -11
- v. Low pass filter allows
- a. low frequency signals
 - b. high frequency signals
 - c. intermediate frequency signals
 - d. none of the above
- vi. The minimum voltage gain of the amplifier used in phase shift oscillator for sustain oscillations is
- a. 1
 - b. 3
 - c. $1/29$
 - d. 29
- vii. Rise time of a pulse in logic families is
- a. 50% of steady value
 - b. 10% to 90% of High value.
 - c. 90% to 10% of low value
 - d. all the above.
- viii. A 3 variable K map has
- a. 8 cells
 - b. 4 cells
 - c. 16 cells
 - d. 32 cells
- ix. In a 4 - bit binary weighted D to A converter circuit if MSB resistor is $12k\Omega$, then the LSB resistor is
- a. $1.25k\Omega$
 - b. $48k\Omega$
 - c. $12k\Omega$
 - d. $96k\Omega$
- x. RAM is
- a. volatile memory
 - b. non volatile memory
 - c. magnetic memory
 - d. not a memory



(3)

DCEL201

- xi. 4 - bit data 1011 is loaded in to a register and it is shifted 2 times right. The new content of the register is
- | | |
|---------|---------|
| a. 0100 | b. 1000 |
| c. 0010 | d. 1100 |
- xii. The minimum number of flip - flops required to build mod-13 counter is
- | | |
|------|------|
| a. 5 | b. 2 |
| c. 4 | d. 3 |

PART - BAnswer any **Four** question.

(4×7=28)

2. a. Compare BJT and JFET.
b. Explain the working of E - MOSFET with necessary diagram. (3+4)
3. Explain the working of SCR with necessary diagrams and draw its I-V characteristics.
4. Draw the circuit diagram of Op-amp as non inverting amplifier and obtain the relation for its voltage gain.
5. What is Barkhausen criterion for sustained oscillations? With circuit diagram, explain the working of Wein bridge oscillator. Write the expression for frequency of oscillations.
6. a. With circuit diagram using AND gates, explain the working of a 2:4 Decoder. Also write its truth table.
b. Draw the circuit diagram of a 2 - bit magnitude comparator. (5+2)
7. With circuit diagram, explain the working of clocked RS flip - flop. Draw its truth table and timing diagram.

PART - CAnswer any **Four** questions.

(4×5=20)

8. A UJT has $R_{B1} = 8.6k\Omega$ and $R_{B2} = 2.2k\Omega$. Find Intrinsic stand off ratio, peak point voltage, if $V_{BB} = 15V$ and $V_D = 0.63V$.
9. SCRs used in a full wave rectifier will fire at 110 V for a gate current of 1.2 mA. If the peak ac voltage across SCR is 200 V, calculate
 - a. firing angle.
 - b. average output voltage.
 - c. average current for a load resistance of 200Ω .

[P.T.O.]



(4)

DCEL201

10. Design and draw the circuit of a first order low pass filter with a cut off frequency of 4kHz and pass band gain of 11. Assume $C = 0.01\mu F$ and $R_F = 10k\Omega$.
 11. A phase shift oscillator has $C = 0.1\mu F$, $R = 4.7k\Omega$ and $R_F = 20k\Omega$. Determine the frequency of oscillations.
 12. Simplify the Boolean function $f(A, B, C, D) = \sum m(1, 2, 3, 5, 8, 9, 11, 15) + \sum d(0, 10, 13)$ using K-map.
 13. Design a synchronous mod - 3 up counter using k map.
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