DCEL201

Reg. No. | | | | | | | | |

II Semester B.Sc. Degree Examination, October - 2022

ELECTRONICS (ELE-CT2)

Analog and Digital Electronics (DSC)

(NEP - 2020)

Paper : II

Time : 2½ Hours **Maximum Marks : 60**

Instructions to Candidates:

Answer all the questions from Part A, any Four questions from Part - B and any Four questions from Part - C.

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 multiple times will not be considered for evaluation.

PART - A

1. Answer all the subdivisions. **(12×1=12)**

i. Tunnel diode is bascially.

a. Heavily doped PN junction. b. Lightly doped PN junction.

c. Moderately doped PN junction d. None of the above.

ii. JFET is a

a. Current controlled device

b. Voltage controlled device

c. Bipolar device

d. Both current and voltage controlled device

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 op amp inverting amplifier, if $R_1 = 10k\Omega$ and $R_F = 25k\Omega$ the voltage gain is

a. 2.5 b. 25

c. -2.5 d. -25

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 wien bridge oscillator to sustain oscillation is

a. 1 b. 3

c. 1/3 d. 29

vii. A standard TTL circuit operates with a ___ volt power supply.

a. 2 b. 4

c. 5 d. 3

viii. A 4 variable K map has

a. 8 cells b. 4 cells

c. 16 cells d. 32 cells

ix. In a 4 - bit binary weighted DAC, MSB resistor is $10k\Omega$. The LSB resistor is

a. $1.25k\Omega$ b. $40\ k\Omega$

c. $10\ k\Omega$ d. $80\ k\Omega$

x. RAM is

a. Volatile memory b. Non volatile memory

c. Magnetic memory d. Not a memory

xi. 4 - bit data 1010 is loaded in to a register and it is shifted 2 times left. The new content of the register is

a. 0100 b. 1000

c. 0001 d. 0101

xii. The minimum number of flip - flops required to build mod-9 counter is

a. 5 b. 2

c. 4 d. 3

PART - B

Answer any **Four** question. (4×7=28)

2. a. Compare BJT and JFET.

   b. Explain the working of E - MOSFET. (3+4)

3. Explain the working of UJT with necessary diagrams. 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. What is a Full Adder? Draw the circuit using logic gates and write its truth table.

   b. Draw tthe logic 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 - C

Answer any **Four** questions. (4×5=20)

8. A UJT has $R_{B1} = 6.8k\Omega$ and $R_{B2} = 3.3k\Omega$. Find Intrinsic stand off ratio, peak point voltage if $V_{BB} = 12V$ and $V_D = 0.65V$.

9. SCRs used in a full wave rectifier will fire at 100 V for a gate current of 1 mA. If the peak a.c. voltage across SCR is 200 V, calculate

   a. Firing angle.

   b. Average output voltage.

   c. Average current for a load resistance of 220Ω.

10. Design and draw the circuit of a first order low pass filter with a cut off frequency of $4kH_2$ and pass band gain of 11. Assume $C = 0.01\mu F$ and $RF = 10k\Omega$.

11. A phase shift oscillator has $C = 0.1\mu F$, $R = 3.9k\Omega$ and $R_F = 29k\Omega$. Determine the frequency of oscillations.

12. Simplify the Boolean function $f(A,B,C,D) = \sum m(1,3,5,8,9,11,15) + \sum d(2,13)$ using K-map and realize the simplified expression using logic gates.

13. Design a synchronous mod - 5 up counter using k map.