DCEL101

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

I Semester B.Sc. Degree Examination, April - 2023

ELECTRONICS

Electronics Devices and Circuits

Paper : ELE - CT - 1

(NEP Scheme 2020)

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.

Note : *(Answer all questions of Part – A in any one page, the same questions answered multiple times will not be considered for Evaluation.)*

PART - A

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

1. i) Internal resistance of an Ideal Voltage source _____

a) one b) infinity

c) zero d) none of the above

ii) The algebraic sum of voltage in any closed path of network is equal to

a) zero b) infinity

c) one d) two

iii) Theoretical value of efficiency for a half-wave rectifier is

a) 33.3% b) 40.6%

c) 66.6% d) 72.9%

iv) The output voltage of IC 7915 voltage regulator is

a) +15V b) –5V

c) +5V d) –15V

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v) Which of the following points locate the quiescent point in CE mode

a) (I_C, V_{CE}) b) (I_E, V_{CB})

c) (I_B, V_{CE}) d) (I_C, V_{CC})

vi) β gain of the transistor indicates

a) Regulation capability b) Amplification capability

c) Rectification capability d) All of the above

vii) Which of the following is the universal biasing circuit

a) Collector to base bias b) Voltage divider bias

c) Emitter bias d) Fixed bias

viii) Which amplifier is used for unity voltage gain

a) CC Amplifier b) CB Amplifier

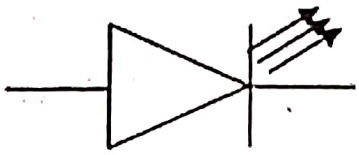
c) CE Amplifier d) None of the above

ix) What is the input voltage of an amplifier with gain of 100 to generate 10V output?

a) 1V b) 100mV

c) 10mV d) 1mV

x) Identify the component shown in the figure



a) Zener diode b) Junction diode

c) Schottky diode d) Light emitting diode

xi) The BCD Code for decimal number 22

a) 0000 0010 b) 0010 0010

c) 0001 0110 d) 0010 0000

xii) _____ is a Universal logic gate

a) NAND b) XOR

c) OR d) AND

PART - B

Answer any Four of the following questions. (4×7=28)

2. State Maximum power transfer theorem and explain with an example. (7)

3. Draw the block diagram of regulated power supply and explain its functional blocks. (7)

4. a) Explain the operation of a NPN transistor.

   b) Establish the relation between α and β. (5+2)

5. With circuit diagram explain the working principle of single stage CE amplifier and draw the frequency response curve. (7)

6. With an example explain the method to convert decimal number to binary and Hexadecimal equivalent. (7)

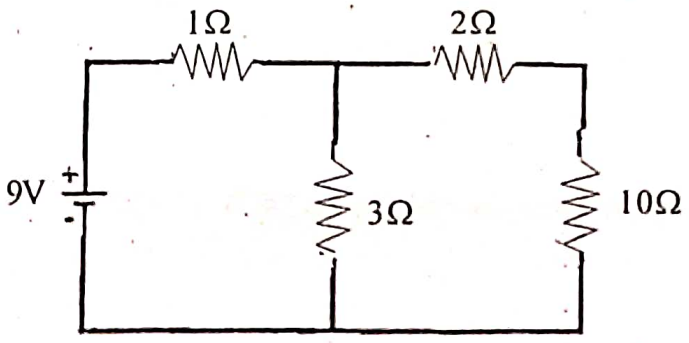
7. a) State and verify De Morgan's theorem.

   b) Verify the universal property of NAND gate by realizing OR gate. (5+2)

PART - C

Answer any Four of the following questions. (4×5=20)

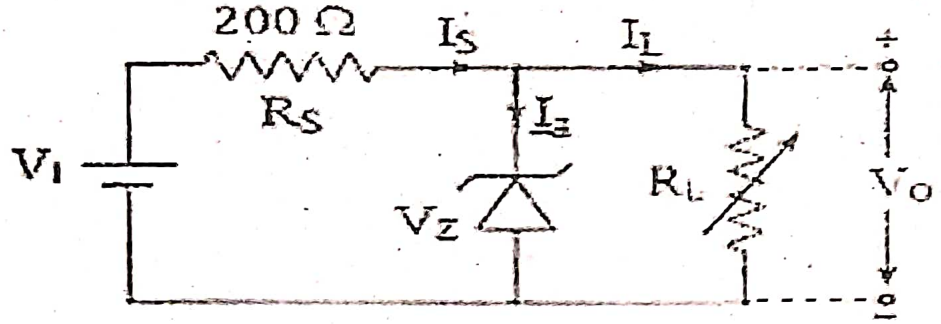
8. Find the value of current through 10Ω resistor in the given circuit using Thevenin' s theorem.



9. Calculate the efficiency and V_{DC} of a HWR with an input voltage of 250V rms and load resistance of 20 Ω, with turns ratio 10:1.

10. Draw the DC load line and mark the operating point for the voltage divider biasing circuit using silicon transistor. Given β=200, R_1=1 1KΩ, R_2 = 3.2KΩ, R_C = 1.3KΩ, R_E = 750Ω and V_{CC} = 9V.

11. Calculate $R_{L(min)}$ and $R_{L(max)}$ in the circuit shown for getting regulated output voltage. Given: V_Z = 5.6V, V_I = 30 V and $I_{Z(max)}$ = 25 mA.



12. a) Subtract 30H from 7DH using 2's complement method.

    b) Add $(110110)_2$ and $(110110)_2$ express the result in decimal. (3+2)

13. Simplify the expression $Y = A \cdot \overline{B} \cdot C + \overline{A} \cdot B(B \cdot C + \overline{B})$ using Boolean laws and draw the circuit for simplified expression using basic gates.