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C.B.S. (Second Semester)
EXAMINATION, MAY-JUNE, 2022
ELECTRONICS AND INSTRUMENTATION
(G-201)

Time : Three Hours]   *[Maximum Marks:40*

Note : Attempt all sections as directed. 15 minutes extra time is given in the begining to go through the question paper.

Section-A
(Objective/Multiple Choice Questions)
(0.5 marks each)

Note: Attempt all question:

Choose the correct answer :

1. Band gap in semiconductor is of the order of -

   (A) 6ev

   (B) 1ev

   (C) 0.01ev

   (D) None of these

2. In intrinsic semiconductors, femi level lies:

   (A) Midway the band gap

   (B) Out of the band gap

   (C) In the conduction band

   (D) In the valence band

3. The Thevenin equivalent voltage is:

   (A) The open circuit voltage

   (B) The short circuit voltage

   (C) The voltage a cross an equivalent load

   (D) None of these

4. In common base mode, the current gain of a transitor is:

   (A) 1

   (B) less than 1

   (C) More than 1

   (D) Zero

5. The ripple factor of a full-wave rectifier is

   (A) 1.11

   (B) 1.21

   (C) 0.482

   (D) None of these

6. The maximum possible efficiency of a half-wave rectifier is :

   (A) 40.6%

   (B) 81.2%

   (C) 78.5%

   (D) None of these

7. Series inductor filter is used when :

   (A) Load resistance is low

   (B) Load resistance is high

   (C) Load current is low

   (D) None of these

8. In a regulated power supply along with a full-wave rectifier use is made of :

   (A) A filter circuit

   (B) A voltage regulator zener diode

   (C) Both filter circuit and a zener dioed

   (D) None of these.

9. What is the level of the voltage between the input terminal of an op-amp?

   (A) Virtually zero

   (B) 5V

   (C) 18V

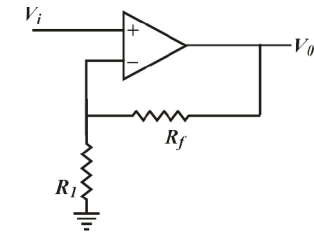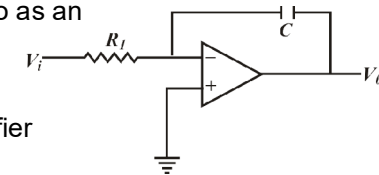   (D) 22V

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10. Calculate the overall Voltage gain of the circuit if $R_1 = 100\,\Omega$ and $R_f = 1\,k\Omega$

    (A) -1

    (B) -11

    (C) +1

    (D) +11

11. The circuit is referred to as an

    (A) inverting amplifier

    (B) non-inverting amplifier

    (C) differentiator

    (D) integrator

12. In which of the following op-amps used?

    (A) Oscillators

    (B) Filters

    (C) Instrumentation Circuits

    (D) All the above

13. De-Morgan's law converts

    (A) NOR to AND

    (B) NOR to NAND

    (C) NOR to OR

    (D) None of the above

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14. In Boolean algebra, $A+A$ equals:

(A) 1

(B) 2A

(C) A

(D) 0

15. In Boolean algebra, $A+\overline{A}$ equals :

(A) A

(B) $\overline{A}$

(C) 0

(D) 1

16. Which of the following is known as universal gate :

(A) NAND gate

(B) NOR gate

(C) NOT gate

(D) NAND and NOR gate

17. NOT gate also known as by another name

(A) Universal gate

(B) Reversal gate

(C) Obstucal gate

(D) Emitter gate

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18. The 1+1+1+1+1 binary addition equal to
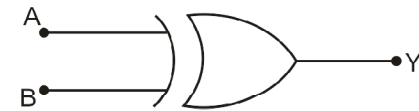
(A) 11111

(B) 1001

(C) 101

(D) 111

19. The boolean algebra basically based on

(A) Number

(B) Signal

(C) Logic

(D) N.O.T.

20. The logic symbol show :

(A) NAND gate

(B) NOR gate

(C) XOR gate

(D) XNOR gate

Section-B

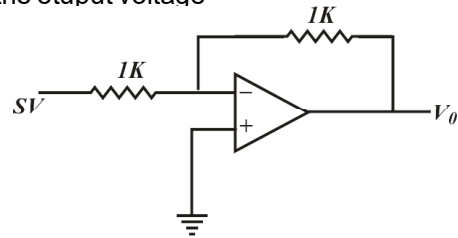**(Very Short Answer Type Questions)**

(0.75 marks each)

Note: Attempt all questions :

1. Write the truth table for NOR gate.

2. Convert decimal number 19 into binary.

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3. Find the otuput voltage

4. Draw the transistor circuit in CC mode

5. Build a D Flip-flop using an RS flip-flop.

6. Draw the circuit diagram of the output AB+CD.

7. State Thevnin's theorem.

8. What is filter?

9. For what load resistance will this circuit give maximum power across load and what will be value of power for that case?

10. What is the equivalent resistance $(in\,K\Omega)$ across 10V battery shown in the circuit?
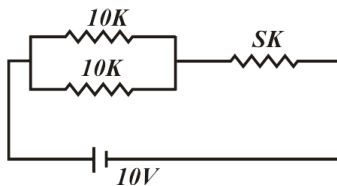
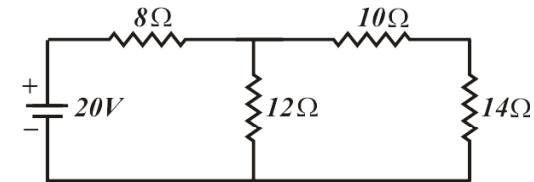
Section-C

(Short Answer Type Questions)

(1.25 marks each)

Note: Attempt all question:

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1. List the characteristics of an ideal op-amp.

2. Solve the boolean expression

$$AB + \overline{AC} + \overline{ABC}(AB + C)$$

3. The current gain of a transistor in CB mode is 0.98. Find current gain in CC mode.

4. Name the three configuration in which a transistor can be used.

5. What is rectifier?

6. Build and derive the relation for an RC integrator using op-amp.

7. State and prove De-Morgan's theorem.

8. Draw the circuit of the JK flip-flop. Write its truth table and explain the race around condition.

9. Calculate the current on resistance 12Ω.

10. Draw V-I characteristics of Zener diode

Section-D

(Long Answer Type Questions)

(2 marks each)

Note : Attempt any *Five* questions:

1. State and prove maximum power transfer theorem.

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2. Explain the working of CE amplifier with the help of circuit diagram.

3. Draw the circuit diagram of a half wave rectifier and explain its working.

4. What is transducer? Explain the types of transducer.

5. Write down the truth table for a full adder and explain how you will implement it.

6. What is a power supply? Explain the working of a regulated power supply with the help of a proper circuit diagram.

7. What is a converter? Explain the types of converter.

8. What is operational Amplifier? Explain the types of operational Amplifier?

9. Simplify the Boolean expression :

$$\overline{A}\,\overline{B}C + \overline{A}B\overline{C} + \overline{A}BC + A\overline{B}C + ABC$$

10. Draw the circuit diagram of the output

$$ABC + A\overline{B}C + AB\overline{C}$$