STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086
(For candidates admitted during the academic year 2019-2020 & thereafter)
                                                    SUBJECT CODE :19PH/MC/EL63

B.Sc. DEGREE EXAMINATION APRIL 2023
BRANCH III - PHYSICS
SIXTH SEMESTER

COURSE   :   **MAJOR – CORE**
PAPER   :   **ELECTRONICS II**
TIME   :   **3 HOURS.**   **MAX. MARKS :100**

SECTION – A
ANSWER ALL QUESTIONS: **(25 MARKS)**

I. CHOOSE THE CORRECT ANSWER: **(10 X 1 = 10)**

1 The sudden change of _____ is not allowed in inductors.
    a) Resistance   b) current   c) voltage   d) temperature

2. Norton theorem can be applied to _____
    a) Only non linear unilateral networks   b) both linear and nonlinear networks
    c) Only nonlinear networks   d) linear networks

3. If the maximum collector current due to signal alone is 3 mA, then zero signal collector current
    should be at least equal to _____
    a) 6 mA   b) 6 mA   c) 3 mA   d) 5 mA

4. RC coupling is used for _____ amplification
    a) Voltage   b) Current   c) Power   d) None of the above

5. Saturation region of a JFET is also known as.........region
    a) Pinch off   b) Analog   c) Source   d) Ohmic

6. The peak point voltage and the valley point voltage are characteristics of a _____
    a) Zener diode   b) Tunnel diode   c) Varactor diode   d) Schottky diode

7. As the common mode voltage gain decreases, The CMRR _____
    a) decreases   b) increases   c) remains the same   d) Zero

8. A voltage follower _____
    a) has a voltage gain of 1 b) is non-inverting   c) has no feedback resistor d) has all of these

9. The difference between analog voltage represented by two adjacent digital codes of
    an analog to digital converter is ……….
    a) accuracy   b) resolution   c) quantization   d) precision

10. In a voltage to frequency converter type integrated DVM _____
    a) voltage is converted into time   b) voltage is converted into frequency
    c) frequency is converted into voltage   d) frequency is converted into time

## II. FILL IN THE BLANKS: (5 X 1 = 5)

11. Superposition theorem is applicable for the calculation of _____ and _____
12. _____ Indicates not only whether a system is stable, but also its degree of stability
    and how stability may be imposed if necessary
13. Intrinsic stand-off ratio is a characteristic of _____
14. For an ideal non-inverting operational amplifier, input resistance is infinity and
    output resistance is _____
15. The intrinsic stand off ratio of a uni-junction transistor when $R_{B1} = 10$ KΩ and $R_{BB} = 15$ KΩ
    is _____

III. ANSWER BRIEFLY: (5 X 2 = 10)

16. Define linear and non-linear network.
17. Define quiescent point
18. What is Pinch Off Voltage with an example?
19. What is an Inverting Op Amp?
20. Define a Weighted Resistor DAC

SECTION – B

ANSWER ANY FIVE QUESTIONS: (5 X 6 = 30)

21. Find the current through 3 Ω resistor using superposition theorem.
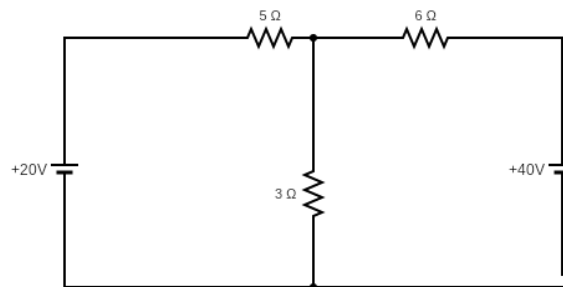
22. i) In an amplifier, the output power is 1.5 watts at 2 kHz and 0.3 watt at 20 Hz, while the
    input power is constant at 10 mW. Calculate by how many decibels gain at 20 Hz
    is below that at 2 kHz?
    ii) A certain amplifier has voltage gain of 15 db. If the input signal voltage is 0.8V, what
    is the output voltage?

23. i) Fig. 1 shows the transfer characteristic curve of a JFET. Write the equation for
    drain current.

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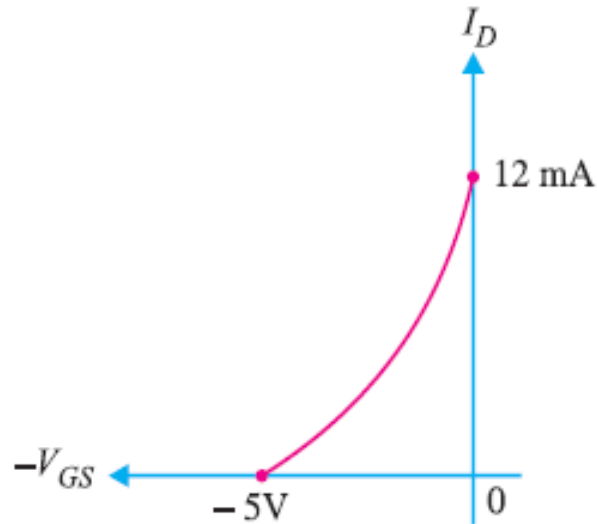
ii) A JFET has the following parameters: IDSS = 32 mA ; VGS (off) = – 8V ; VGS = – 4.5 V. Find the value of drain current.

24. A single stage amplifier has a voltage gain of 60. The collector load RC = 500Ω and the input impedance is 1kΩ. Calculate the overall gain when two such stages are cascaded through R-C coupling.

25..i)The voltage gain of an amplifier without feedback is 3000. Calculate the voltage gain of the amplifier if negative voltage feedback is introduced in the circuit. Given that feedback fraction mv = 0.01.
   ii)The overall gain of a multistage amplifier is 140. When negative voltage feedback is applied, the gain is reduced to 17.5. Find the fraction of the output that is feedback to the input.

26. What are characteristics of an ideal op-amp?

27. Explain about transducer and Analog-to-Digital Converter (ADC).

SECTION – C

ANSWER ANY THREE QUESTIONS: **(3 X 15 = 45)**

28. Explain the network theory of Thevenin's Theorem and discuss the methods of finding Thevenin equivalent circuit.
29. Explain Single Stage Transistor Amplifier in detail with diagram.
30. Describe the Parameters of JFET in detail.
31. Draw an op-amp circuit symbol and label the terminals. Describe the op-amp as an adder and subtractor.
32. Explain the D/A converter theory using a block diagram. Describe the operation of a 4-bit binary weighted D/A converter using a circuit.

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