KATHMANDU UNIVERSITY
End Semester Examination
March, 2025

Marks Scored:

Level : B.Sc.
Year : II

Course : EEEG 211
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date : 24 MAR 2025

SECTION "A"

[20 Q. × 0.5 = 10 marks]

Choose and encircle the most appropriate option from each set of choices

1. Which type of extrensic semiconductor is created when pentavalent impurities are added to pure silicon? _____

2. What is the main function of a Zener diode?
   a. To rectify AC signal
   b. To amplify signals
   c. To regulate voltage
   d. To switch circuits

3. What happens if a diode is reverse biased beyond its breakdown voltage?
   a. It stops conducting permanently
   b. It starts conducting heavily
   c. It operates normally
   d. It decreases resistance

4. A diode clipper circuit is used to limit the:
   a. Frequency of a signal
   b. Amplitude of a signal
   c. Phase of a signal
   d. Power of a signal

5. In a voltage divider bias circuit, what is the primary advantage?
   a. Simplicity.
   b. High stability of the Q-point.
   c. Low cost.
   d. High gain.

6. What is the purpose of a bypass capacitor in an emitter-biased amplifier?
   a. To block DC signals.
   b. To provide AC feedback.
   c. To short AC signals to ground.
   d. To increase DC gain.

7. Given an emitter-bias circuit with $V_{EE} = -10V$, $R_E = 2k\Omega$, and assuming $V_{BE} = 0.7V$, the emitter current (I_E) is _____mA.

8. In AC small signal analysis, what happens to DC voltage sources?
   a. They are replaced by open circuits.
   b. They are replaced by short circuits.
   c. They are doubled.
   d. They remain the same.

9. A circuit designer needs a transistor with extremely high input impedance. Which of the following would be the most suitable choice, and why?
   a. BJT, due to its high current gain.
   b. JFET, because of its reverse-biased gate-source junction.
   c. MOSFET, due to its insulated gate.
   d. Any transistor, as input impedance is not a significant factor.

10. A JFET's drain current (I_D) saturates at a certain drain-source voltage (V_{DS}). What is the primary factor that limits the further increase of I_D with increasing V_{DS} in the saturation region?
    a. The gate current.
    b. The channel pinch-off.
    c. The source resistance.
    d. The ambient temperature.

11. Which amplifier is characterized by a low input impedance and a high output impedance?
    a. Current amplifier.
    b. Transresistance amplifier.
    c. Voltage amplifier.
    d. Transconductance amplifier.

12. The purpose of impedance matching is to:
    a. Maximize voltage gain.
    b. Maximize power fransfer.
    c. Minimize current gain.
    d. Minimize signal distortion.

13. Why are push-pull configurations so often used in class B power amplifiers?
    a. To increase the amplifiers class A operation.
    b. To reduce even order harmonic distortion.
    c. To decrease the total power output.
    d. To increase the amplifiers input impedance.

14. Which class of amplifier operates for the entire input signal cycle?
    a. Class A. b. Class B. c. Class C. d. Class D.

15. What is the purpose of a comparator circuit using an op-amp?
    a. To amplify the input signal
    b. To compare two input voltages and provide a digital output
    c. To integrate the input signal
    d. To differentiate the input signal

16. What is the meaning of I_{DSS} in relation to JFETs?
    a. Input Drain Source Signal.
    b. Ideal Drain Source State.
    c. Drain-to-Source current with Gate shorted to Source.
    d. Indirect Drain Supply State.

17. In a half-wave rectifier, a capacitor is added in parallel with the load. What is the effect on the ripple voltage?
    a. The ripple voltage increases.
    b. The ripple voltage decreases.
    c. The ripple voltage remains the same.
    d. The ripple voltage becomes a square wave.

18. An amplifier has a gain of 40 dB. If the input signal power is doubled, the change in the output signal power (in dB) is _____.

19. A Zener diode is used in a voltage regulator circuit. If the load current increases significantly, what happens to the current through the Zener diode?
    a. It increases.
    b. It decreases.
    c. It remains constant.
    d. It becomes zero.

20. A circuit combines a diode bridge rectifier, a capacitor filter, and a Zener diode regulator. If the AC input voltage fluctuates significantly, which component primarily ensures a stable DC output voltage?
    a. The diode bridge.
    b. The capacitor filter.
    c. The Zener diode.
    d. All components contribute equally.