

KATHMANDU UNIVERSITY
End Semester Examination c.
November/December, 2023

Marks Scored:

Level : B.E./B.Sc.
Year : II

Course : EEG 211
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date 29 Nov 2023

SECTION "A"

[20 Q. \times 0.5 = 10 marks]

Choose and encircle the most appropriate option. Symbols have their usual meanings.

- For PN junction diode, appropriate option is _____
 - lightly doped P and N cause narrow depletion layer.
 - lightly doped P and N cause wide depletion layer.
 - heavily doped P and N cause wide depletion layer.
 - all are correct.
- The knee voltage of Silicon diode is _____.
 - 0.3 V
 - 0.4 V
 - 0.5 V
 - 0.7 V
- In full-wave rectification, if input frequency is 50 Hz then output frequency is _____.
 - 50 Hz.
 - 75 Hz
 - 100 Hz
 - 150 Hz
- For a JFET, when V_{DS} is increased beyond the pinch off voltage, the drain current _____.
 - Increases
 - Decreases
 - Remains constant
 - First decreases and then increases
- Rectification efficiency of a half wave rectifier without filter is nearly equal to _____.
 - 81 %
 - 61 %
 - 51 %
 - 41 %
- The emitter-base junction of a bipolar transistor is _____.
 - always forward bias
 - always reverse bias
 - open junction
 - neither forward or reverse bias
- In P Channel MOSFET, what is the condition of cut-off region _____.
 - $V_{GS} > V_{th}$
 - $V_{GS} < V_{th}$
 - $V_{GS} = V_{th}$
 - $V_{GS} = 0$
- The current amplification factor in CE configuration is _____.
 - α
 - $\beta + 1$
 - $1/\beta$
 - β
- The important characteristic of emitter-follower is _____.
 - High input impedance and high output impedance
 - High input impedance and low output impedance
 - Low input impedance and low output impedance
 - Low input impedance and high output impedance

10. Field effect transistors are _____.
- Voltage controlling device
 - Current controlling device
 - Both current and voltage controlling device
 - Neither current nor voltage controlling device
11. The common collector amplifier is also known as _____.
- Collector Follower
 - Base Follower
 - Emitter Follower
 - Source Follower
12. If the feedback signal is returned to the input in series with the applied voltage, the input impedance _____.
- decreases
 - increases
 - does not change
 - becomes infinity
13. The bandwidth of a single stage amplifier is _____ that of multistage amplifier.
- more than
 - same as
 - less than
 - no relation with
14. Two amplifiers each of gain 10 and 25 are cascaded. If the input voltage to the first amplifier is 10 mV, the output of the second stage will be _____.
- 25 V
 - 2.5 V
 - 250 V
 - 250 mV
15. The type of power amplifier which exhibits crossover distortion in its output is _____.
- Class A
 - Class B
 - Class AB
 - Class C
16. In a class B power amplifier, output cycle is _____ of the input full cycle.
- half
 - more than half and less than full
 - full
 - less than half
17. In Class-A amplifier, the output current flows for _____.
- a part of the cycle or the input signal
 - $3/4^{\text{th}}$ of the cycle of the input signal
 - half the cycle of the input signal
 - the full cycle of the input signal
18. In an op-amp, the input impedance is _____ and the output impedance is _____.
- high; high
 - low; low
 - low; high
 - high; low
19. When a sine wave of 1 Volt peak amplitude is passed through an operational amplifier of very high gain, it converts into _____.
- Cosine wave
 - Square wave
 - Random wave
 - Triangular wave
20. The 'slew rate' of an operational amplifier indicates _____.
- how fast its output voltage can change
 - how fast its output impedance can change
 - how fast its output power can change
 - how fast its output current can change

KATHMANDU UNIVERSITY
End Semester Examination [C]
November/December, 2023

29 NOV 2023

Level : B.E./B.Sc.
Year : II
Time : 2 hrs. 30 mins.

Course : EEG 211
Semester : I
F. M. : 40

SECTION "B"

[5 Q. × 8 = 40 marks]

Attempt *ANY FIVE* questions. Assume suitable data if necessary, Symbol has their usual meaning.

1.

- a. Discuss the working of practical diode and explain its V-I characteristics.
- b. What is clipper circuit? Draw and explain the output waveform (V_{out}) for Figure-1.

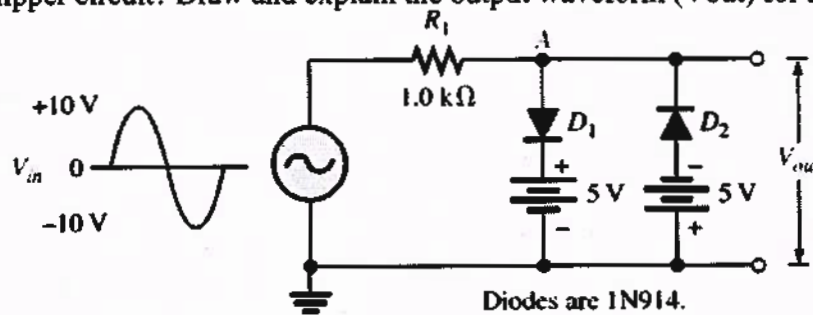


Figure-1

2.

- a. From Figure 2, calculate Q-point, V_E and Value of R_1

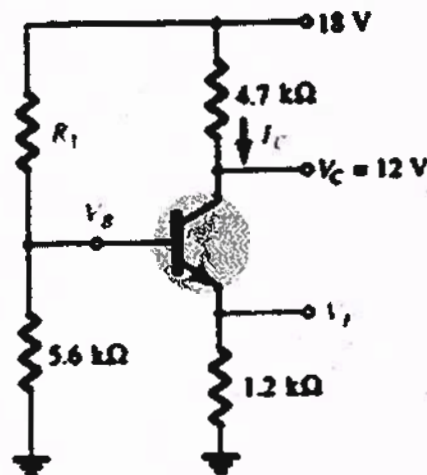


Figure-2

- b. For any single stage amplifier determine:
 - i. r_e
 - ii. Input impedance (Z_i)
 - iii. Output impedance (Z_o)
 - iv. Voltage Gain (A_v)

3.

- a. Explain the operation of N-channel E-MOSFET. Sketch and discuss its V-I characteristics and transfer characteristics.
- b. In the given Figure-3, $V_{GS(off)} = -8V$, $I_{DSS} = 16mA$. Determine the operating point (Q-point)

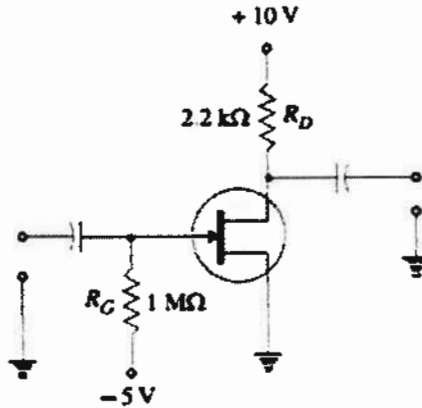


Figure 3

4.

- a. Discuss the brief overview of voltage and current amplifier, with the help of suitable circuit diagram.
- b. What is the frequency response of an amplifier? Explain with suitable diagram.

5.

- a. Derive the expression for efficiency of transformer-coupled class A amplifier.
- b. What is cross over distortion in class-B amplifier? For a class B amplifier using a supply of $V_{CC} = 30V$ and driving a load of $8\ \Omega$, determine the maximum input power, output power and efficiency.

6.

- a. Discuss Op-amp circuit, and their application as an integrator circuit.
- b. Design an operational amplifier-based circuit to obtain $V_O = V_1 + V_2 - V_3$, where V_O is the output, V_1 , V_2 and V_3 are three inputs.