Name: **ADM No:**

Section:

SEMESTER: MONSOON, SESSION: 2022-2023

Subject: Basics of Electronics Engineering [Quiz-1] Subject Code: ECI101
Time: 40 Mins Maximum Marks: 26

Instructions: **Tick only the correct option. Each Question carries 2 marks.**

1. The forward bias voltage required by a pn-junction diode with saturation current $\mathbf{10^{-2}}$ **nA** to produce a current of **150 µA** is **[V_T =26 mV]**
   (A) 0.34 V **(B) 0.43 V** (C) 0.7 V (D) 0 V

2. Consider a pn-junction diode biased at $\mathbf{I_{DQ} = 1\ mA}$. A sinusoidal voltage is superimposed on V_{DQ} such that peak-to-peak sinusoidal current is $\mathbf{0.05I_{DQ}}$. The value of the applied peak-to-peak sinusoidal voltage is **[V_T =26 mV]**
   (A) 701.3 mV (B) 700 mV (C) 26 mV **(D) 1.3 mV**

3. In the voltage regulator circuit given in **Fig. 1**, the Zener diode current is to be limited to the range **5 mA to 100 mA**. The possible load resistances are

   (A) 40 Ω to 192 Ω (B) 21.33 Ω to 160 Ω (C) 40 Ω to 160 Ω (D) 21.33 Ω to 192 Ω

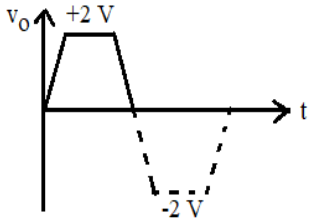
4. In the following voltage regulator circuit shown in **Fig. 2**, the maximum Zener power is **400 mW**. The current through the Zener diode is

   (A) 45 mA (B) 26.3 mA **(C) 18.7 mA** (D) 40 mA

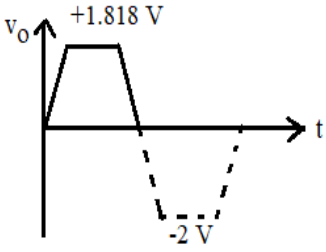
5. The input voltage to a half-wave rectifier (diode is forward biased at positive half-cycle) is a triangular wave with **20 V** peak-to-peak with zero time-average value. The diode has a knee voltage of **0.6 V** and forward resistance of **20 Ω**. Assuming piecewise linear diode model, the peak output voltage can be found as
   (A) 9.22 V (B) 10.6 V (C) 18.4 V (D) 9.4 V

6. Consider the diode clipper circuit shown in **Fig. 3**. Assuming the diode is ideal, the output waveform will look like,

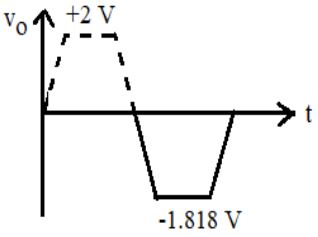
(A)



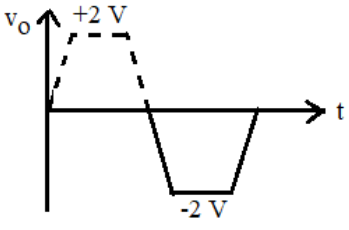
(B)



(C)



(D)



7. In **Fig. 4**, consider the input wave applied to the circuit is a square wave with **8 V** peak-to-peak with zero time-average value. The output waveform will be a square wave between

(A) -2 V and +6 V (B) +2 V and +10 V **(C) -2 V and -10 V** (D) +2 V and -6 V

8. Identify the region of operation for the circuit given in **Fig. 5**. Assume β is very high i.e. I_B=0. Given **R_1 = 4.7 kΩ and R_2 = 3.3 kΩ**.
(A) Active Region (B) Cut–off Region (C) Saturation Region (D) Reverse Active Region

9. Consider the circuit given in **Fig. 6**. Find out the V_{B2}. Take **V_{BE1} = V_{BE2} = 0.7 V** and **β_1 = β_2 = 100**.
(A) 0.5 V (B) 0.6 V (C) 1.0 V **(D) 1.1 V**

10. For the transistor shown in **Fig. 7, β = 50** The value of voltage V_{EC} is:
(A) 3.13 V (B) 4.24 V (C) 5.18 V **(D) 6.07 V**

11. The JFET in the circuit shown in **Fig. 8** has an **I_{DSS} = 10 mA** and pinch-off voltage, **V_P = -5 V**. The value of resistance, **R_S** for the drain current, **I_{DS} = 6.4 mA** is?
(A) 0.82 KΩ (B) 0.24 KΩ **(C) 0.16 KΩ** (D) 0.32 KΩ

12. The circuit given below in **Fig. 9** is of the N-Channel JFET. The pinch–off voltage V_P and maximum saturation current, I_{DSS} are **-8 V and 10 mA** respectively. Calculate the drain current I_D?
(A) 25 mA **(B) 2.5 mA** (C) 30 mA (D) 3.0 mA

13. For the circuit given below in **Fig. 10**, Find the voltage at the emitter terminal (V_E) and emitter current (I_E). Assume **V_{BE} = 0.7 V, β = 100**.
(A) 4.3 V, 1.33 mA (B) 3.87 V, 1.33 mA (C) 4.3 V, 1.29 mA **(D) 3.87 V, 1.29 mA**

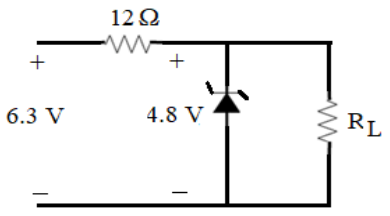


Fig. 1

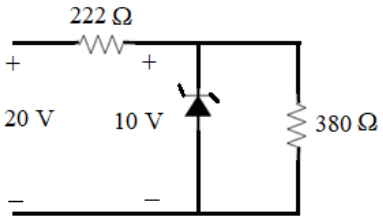


Fig. 2

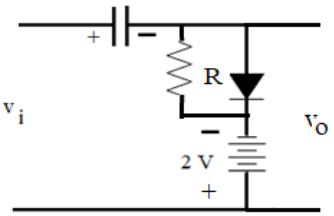
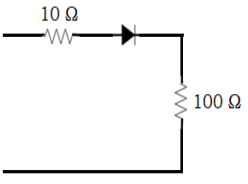


Fig. 4



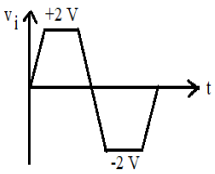


Fig. 3

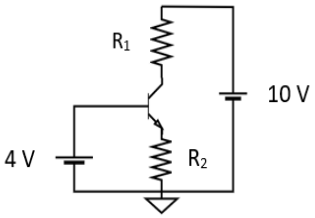


Fig. 5

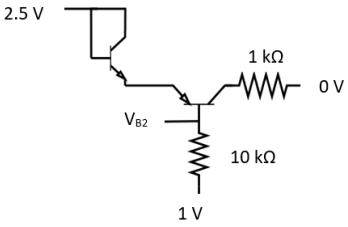


Fig. 6

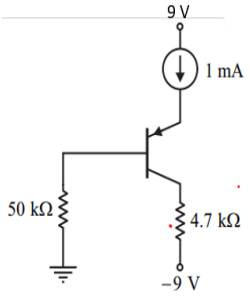


Fig. 7

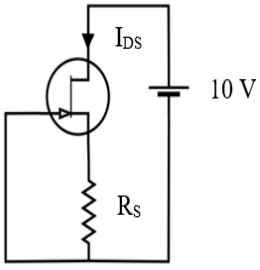


Fig. 8

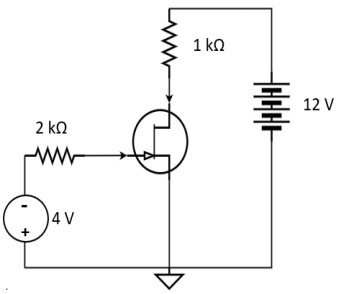


Fig. 9

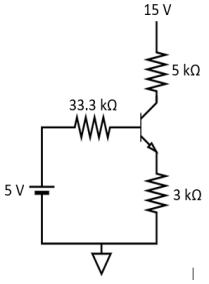


Fig. 10