

# POKHARA UNIVERSITY

Level: Bachelor

Semester: Fall

Year : 2022

Programme: BE

Full Marks: 100

Course: Electronic Devices and Circuits

Pass Marks: 45

Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What happens when the forward biased diode is suddenly reversed biased? Explain with necessary diagrams. If reversed saturation current of diode is  $6\text{ nA}$  at  $30^\circ\text{C}$ , Find reversed saturation current at  $150^\circ\text{C}$ . 7

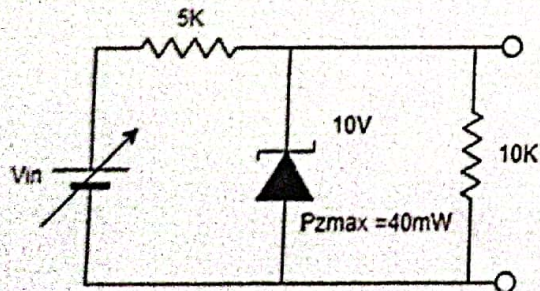
OR

What do you mean by forward-biasing and reversed-biasing of a diode? Draw the V-I characteristics curves for a P-N diode.

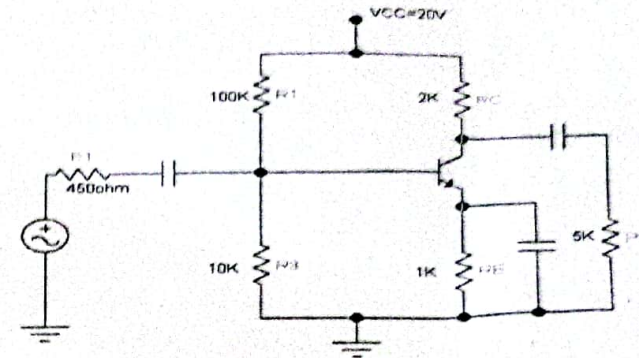
- b) For the circuit shown in figure, find 8

- i.  $V_o$
- ii.  $I_z(\text{max})$
- iii.  $I_z(\text{min})$

Assume  $V_{in}$  varies from  $20\text{ V}$  to  $40\text{ V}$ .



2. a) What is bipolar junction transistor? Explain the operation of NPN transistor with its current direction? 7
- b) For the circuit shown below, draw dc load line and find the operating point. Also find the stability factor  $S$  for the circuit. Assume silicon transistor with  $\beta \approx 100$  8

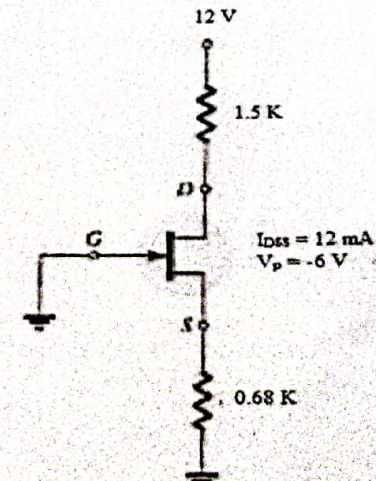


3. a) What is the difference between clipper and clamping circuit? Explain how regulated power is achieved from unregulated supply with necessary block diagram. 8

OR

Compare between full wave and half wave rectifier. Explain the working principle of full wave bridge rectifier.

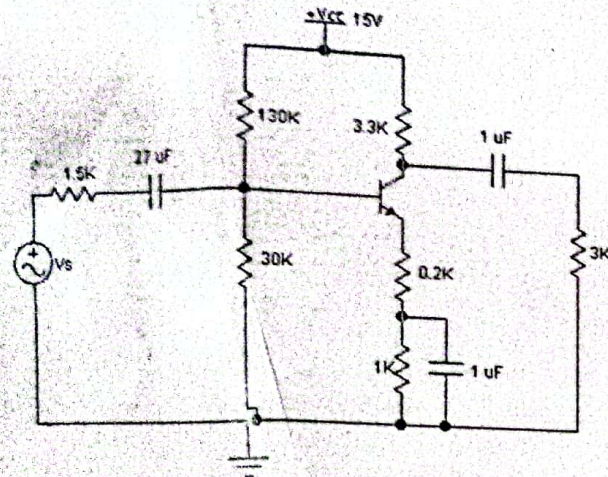
- b) For the circuit given, Find out Drain Current and Drain to source voltage at operating point. Given  $I_{DSS} = 12\text{ mA}$ ,  $V_p = -6\text{ V}$  7



4. a) Briefly explain the operation of a NJFET with drain characteristics and transfer characteristics curves. What is trans conductance. 8



- b) An amplifier has an input 25mV and a gain of 150 without the feedback. The distortion produced at the output of the amplifier is 10%, it is desired to reduce the distortion to 2% by using negative feedback. Calculate the gain and the output voltage with the feedback 7
5. a) For the given CE amplifier showed in figure. Find Overall voltage gain using  $r_e$  model. Assume  $\beta=100$  8



- b) Why multistage amplifier is needed? Show that  $\beta_D = \beta^2$  for Darlington pair amplifier? 7
6. a) What are the essential condition for oscillation? Explain 3 stage RC phase shift oscillator with circuit Diagram. Derive the expression for the frequency of oscillator? 8
- b) Write the salient feature of operational amplifier. Design a summing operational amplifier circuit that will produce an output voltage  $V_{out} = -2V_1 + 5V_2 - 20V_3$ . 7
- Where  $V_1$ ,  $V_2$  and  $V_3$  are the inputs. Assume  $R_f = 50 K\Omega$ .
7. Write short notes on: (Any two) 2x5
- Comparison between BJT and FET
  - Virtual ground concept and CMRR
  - MOSFET