Notes: 1. All questions carry marks as indicated.
2. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Write short note on element values, nodes, circuit elements, element nodes and sources
b) Discuss in detail the format of circuit and output file.

## OR

2. a) What are the advantages of Pspice?
b) Write short note on exponential source, Rube source, piecewise linear source and sinusoidal source.
3. a) Discuss the formation of contact potential between P-N Junction.

Draw energy band diagram under equilibrium condition.
b) With neat sketch explain the minority carrier distribution reversed biased p-n junction.

## OR

4. a) Explain PN junction using energy band structure.
b) Explain in detail the diode switching time.
5. a) Explain the concept of amplification in BJT in terms of base transport factor, emitter injection efficiency, and base to collector current amplification factor.
b) Draw and comment on the different modes used for BJT in Pspice.

## OR

6. a) Discuss in detail the hole concentration for a pnp transistor under normal and inverted mode and also when base-emitter and base collector function are forward biased.
b) Derive Ebers - Moll equations.
7. a) With neat sketches discuss the enhancement mode and depletion mode MOS transistor. 8
b) What is pinch off voltage? Derive equation for $V_{P}$.

## OR

8. a) Write a short note on short channel and narrow width effect.
$\begin{array}{ll}\text { b) What do mean by drain induced barrier lowering? } & \mathbf{8}\end{array}$
9. a) Write short note on MSNM. 8
b) Write short note on MOS models in spice. $\quad \mathbf{8}$

## OR

10. a) Discuss in detail the MOS layout and schematic for spice modelling. 8
b) Write short note on BSIM3 model.
