B.E. (Electrical Engineering (Electronics & Power)) Third Semester (C. B. S.)

Electronics Devices & Circuits Paper – V

P. Pages : 2 **TKN/KS/16/7314**

Time : Three Hours * 1 0 8 3 * Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Diagrams and equations should be given whenever necessary.

1. a) Explain the working of P-N Junction Diode. Draw its V-I characteristics. **6**

b) Differentiate between Avalanche Breakdown and Zener Breakdown? **6**

c) Define : i) Transition capacitance. ii) Diffusion capacitance. **2**

OR

2. a) Explain the working of full wave bridge rectifier. Derive the expression for its efficiency. **8**

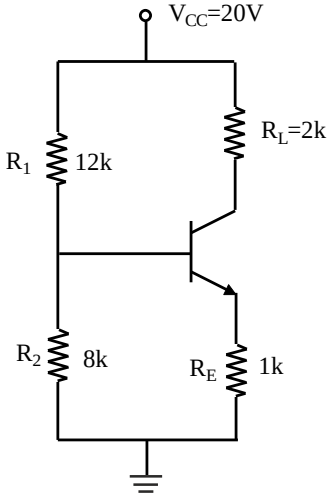
b) A half wave Rectifier supplies a power to 1kΩ load. The input supply voltage is 220V rms. Neglecting forward Resistance of diode, calculate **6**
i) Vdc ii) Idc and iii) Ripple voltage (rms value)

3. a) Why BJT is known as current controlled device? Explain with necessary diagram. **6**

b) Draw and explain common emitter characteristics of BJT. What is β ? **7**

OR

4. a) Find emitter current for a Transistor with self-bias circuit as shown below with β =100. **7**



b) Explain, How Transistor can be used as a switch. **6**

5. a) Differentiate class A, B, AB & C power amplifier. **6**

b) Derive the expression for efficiency of direct coupled class A Power Amplifier. **7**

OR

6. a) What are the effects of Negative feedback on Amplifier gain, Distortion and Bandwidth. **6**

b) A class A power amplifier operates from V_{CC}= 20V, draws a no signal current of 5A and feeds a load of 40 Ω through step up transformer of $n_2/\eta_1 = 3.16$. **7**

Find

i) Max ac signal power output. ii) max dc power input.

iii) Efficiency.

7. a) State the conditions under which feedback amplifier works as an oscillator. **3**

b) Draw and explain the working of Wein bridge oscillator. **7**

c) A crystal oscillator has the following parameters. **3**

L= 0.33H, C=0.065 pF, C_m= 1pF & R= 5.5kΩ.

Calculate

i) Series Resonant frequency. ii) Parallel Resonant frequency.

OR

8. a) Draw and explain N-channel FET with the help of drain & Transfer characteristics. **6**

b) A JFET has drain current of 5mA. If I_{DSS} is 10mA and V_{GSoff} is – 6V. Find the value of V_{GS} & V_P. **4**

c) Compair FET & MOSFET. **3**

9. a) What is differential amplifier? Why differential amplifiers are preferred over single ended amplifier? **6**

b) What is the need of level shifting circuits? Explain any one method of level shifting. **7**

OR

10. a) What do you mean by CMRR? Draw diagram of differential amplifier in common mode configuration. Derive the expression for common mode Gain. **7**

b) Draw and explain current mirror circuit & derive the equation for the same. **6**

11. a) Convert the following numbers **6**

i) $(20.652)_{10} = (?)_2 = (?)_{BCD}$ ii) $(2AFC)_H = (?)_8$

iii) $[1101.001]_{Gray} = (?)_{Binary}$

b) Explain the concept of Logic Gate & its types. **3**

c) Realise AND & OR gates using, NOR Gate. **5**

OR

12. a) Convert the following function into standard SOP form. **6**

i) $f(a,b,c,d) = a + a\bar{b} + ac + ad$ ii) $f(A,B,C) = A\bar{B}C + A\bar{C} + BC$

b) Give advantages of digital systems over analog system. **4**

c) State & prove De Morgan's laws. **4**

****