



KC-8069

B. E. II (Sem. III) (ECC/EL/CO/IT/IC) Examination

November / December – 2012

Basic Electronics

(New Course)

Time : 3 Hours]

[Total Marks : 100

Instructions : (1)

नीचे दृशविवेक निशान्चीवाणी विगतो उत्तरवडी पर अवश्य वजवी.
Fillup strictly the details of signs on your answer book.

Name of the Examination :
B. E. 2 (Sem. 3) (ECC/EL/CO/IT/IC)

Name of the Subject :
Basic Electronics (New)

Subject Code No. : 8 0 6 9 Section No. (1, 2,.....): Nil

Seat No. :
[] [] [] [] [] []

Student's Signature

- (2) Attempt all questions.
- (3) Figures to the right indicate full marks.
- (4) Assume suitable data whenever necessary.
- (5) Programmable calculators are not allowed.

1 (a) Answer the following questions : (any ten) 10

- (1) Define intrinsic and extrinsic semiconductor.
- (2) The cut-in voltage for Si p-n junction diode is _____ volt.
 - (a) 0.1
 - (b) 0.3
 - (c) 0.7
- (3) The _____ current flows due to a non-uniform concentration.
 - (a) diffusion
 - (b) drift
 - (c) base current
- (4) The _____ diode shows a negative resistance region in its characteristic.
 - (a) Zener diode
 - (b) Tunnel diode
 - (c) Schottky diode
- (5) Name the three operating region of the transistor.
- (6) The process of adding impurities to intrinsic semiconductor is known as _____ .

- (7) The _____ diode can be used as the light detector.
- LED
 - Photo diode
 - Zener diode
- (8) The transistor can be operated as an amplifier in _____ region.
- active
 - cut-off
 - saturation
- (9) What is Reverse Saturation Current ?
- (10) The relation between α and β is _____ .
- $\beta = \frac{\alpha}{1+\alpha}$
 - $\beta = \frac{\alpha}{1-\alpha}$
 - $\beta = \frac{1+\alpha}{\alpha}$
- (11) In CB configuration with emitter open, the collector current is equal to _____ .
- I_B
 - I_{CEO}
 - I_{CBO}
- (12) The conduction in BJT takes place due to _____ .
- electrons
 - holes
 - both electrons and holes
- (b) (i) Explain transistor current components. **5**
- (ii) Derive the expression for current density and conductivity for metal bar of length L and cross section area of A. **5**
- 2** (a) Explain the full wave centerup Rectifier and derive the following parameters : **5**
- $I_{L,dc}$
 - $U_{L,dc}$
 - Ripple factor
- (b) Discuss the Bohr's model of atom and derive expression of total Energy. **5**

$$W_n = -\frac{mq^4}{8n^2 h^2 \epsilon_o^2}$$

- (c) In a transistor 0.5% of the carriers injected into the base region constitute the base current and 99.5% cross the base region to enter into the collector region. The leakage current is $3 \mu\text{A}$ and collector current is measured to be equal to 15 mA . Calculate α_{dc} and I_E . 5

OR

- (c) A bar of N-type Si has length of 4 cm and circular cross section of 10 mm^2 . When it is subjected to a voltage of 1 Volt applied across its lengths, the current flowing through it is 5 mA . Calculate : 5
- (i) Concentration of free e^- s
 - (ii) Drift velocity of e^- s
- Assume : Mobility of free e^- s as $1300 \text{ cm}^2 / \text{v-s}$.

- 3** Write short notes : (any **three**) 15

- (1) Base Width Modulation
- (2) Operation of P-N-P transistor in the active region
- (3) Tunnel diode
- (4) Conductivity Modulation
- (5) Diode Switching times.

- 4** Attempt followings : 20

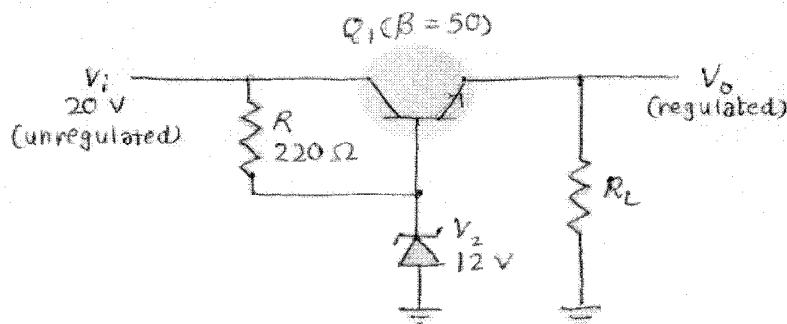
- (1) Draw hybrid model of two port network.
- (2) Define following term :
 - (a) Thermal runaway
 - (b) Biasing.
- (3) Explain The venin's theorem.
- (4) Explain advantages of push-pull amplifier.
- (5) Compare CE, CB and CC configuration of Transistor amplifier.
- (6) Explain MOSFET (negative) NAND GATE.
- (7) Explain cross-over distortion.
- (8) Define conversion efficiency η of a power stage.
- (9) Define input regulation factor, output regulation factor and Temperature coefficient for voltage regulator.
- (10) Compare p-channel FET with n-channel FET.

5 Attempt the followings :

- (1) Find out Current gain, Input impedance, Output impedance and Voltage gain of Two-port active network in terms of h-parameter. 8
- (2) Find out the interms of CB h parameter. 7

OR

Calculate the output voltage and Zener current in the given regulator circuit for $R_L = 1 \text{ k}\Omega$.



6 Write short notes : (any three) 15

- (1) Common drain amplifier at high frequency
- (2) Digital MOSFET
- (3) Self Bias
- (4) Series voltage regulator
- (5) FET as voltage variable resistor.