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Total Number of Pages : 02

B.Tech
BE2101

1st Semester Back Examination 2017-18

BASIC ELECTRONICS

BRANCH: AUTO, CHEM, CIVIL,

CSE, ECE, EEE, EIE, ELECTRICAL, ETC, IT, MECH, MME, PE, PLASTIC, TEXTILE

Time: 3 Hours

Max Marks: 70

Q.CODE: B1202

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions : **(2 x 10)**

- a) What will happen at the screen of CRO when time base voltage is given to Y-plate and a pulse is given to X-plate?
- b) Define Slew rate and CMRR of an op-amp.
- c) Establish the relation between α and β of a BJT.
- d) Determine the DC resistance of a diode at $V_D = -20V$ if its reverse saturation currents $1\mu A$. (Take $V_T = 25mV$ at room temperature)
- e) Convert the decimal number -32 to its equivalent 1's complement and 2's complement form.
- f) Implement the logic function using NAND gate only: $X = A' + BC$.
- g) Define Ripple Factor. What is the value of ripple factor of half wave and full wave rectifier respectively?
- h) What is the significance of the gain bandwidth product?
- i) Write down the excitation equation of S-R flip-flops. What is its limitation?
- j) What is Binary Counter? How many flip-flops are required for MOD-12 counter design?

Q2 a) Draw the forward and reverse bias characteristics of a p-n junction diode and explain them qualitatively. **(5)**

b) A transistor is operated at a forward current of $2\mu A$ and with the collector open circuited. Calculate the junction voltage V_C and V_E , the collector to emitter voltage V_{CE} assuming $I_{CO} = 2\mu A$, $I_{EO} = 1.6\mu A$ and $\alpha = 0.98$. **(5)**

Q3 a) Write the truth table of half adder and full adder. Draw their block diagram. **(5)**

b) Draw the circuits of integrator and differentiator using op-amp. Derive the expression for output voltage. **(5)**

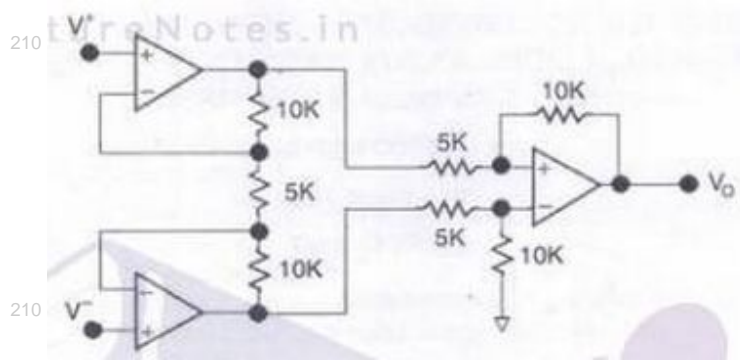
Q4 a) Draw the circuit of an emitter follower. Derive the expression for an input impedance. Mention at least two applications of an emitter follower. **(5)**

b) What is MUX? Implementation the following Boolean function using 4X1 MUX **(5)**

$$F = A'B'C' + ABC + AB'C + A'BC'$$

Q5 a) What is the condition of oscillation? Derive the expression of frequency of oscillation and also the condition of oscillation in a RC-phase shift oscillator. **(5)**

- b) Derive the expression for the output voltage and then find the magnitude of the output voltage of the op-amp circuits shown below: **(5)**



- Q6 (a)** A CE amplifier has mid frequency gain of 200. The upper and lower 3dB frequency of the amplifier is 10KHz and 100KHz respectively. A negative feedback of 10% is incorporated in the amplifier circuit. Find the new gain and new bandwidth after feedback? **(5)**

- (b)** With suitable diagram explain the working principle of CRO. **(5)**

- Q7** Explain the operation of half wave and full wave rectifier with input and output waveform. Find the ripple factor in both cases. **(10)**

- Q8 Write short answer on any TWO: (5 x 2)**

- a) ROM and RAM
- b) Voltage Divider Circuit
- c) Class-B Amplifier
- d) Small Signal Analysis