The Open University of Sri Lanka
B.Sc. Degree Programme, Level – 04
NBT 2 – 2017
PYU 2262 – Electronics
Duration: 1 ½ hour

Date: 29th October 2017 **Time: 10.30 a.m. to 12.00 n.n.** **Index No:**

Answer ALL the questions

Non-programmable calculators are allowed.

1)

a) Convert the following hexadecimal numbers to Octal
   i) FF
   ii) A20
   iii) 010

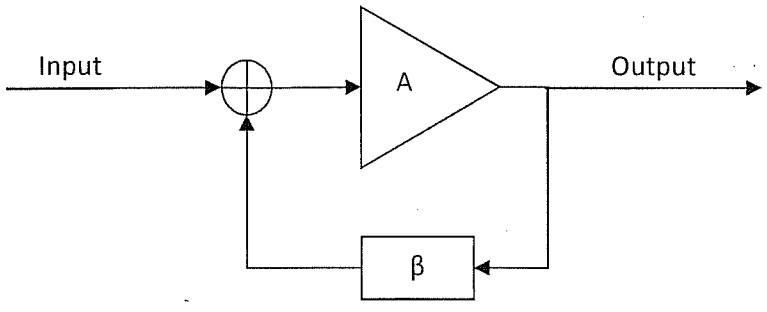
b) Convert following decimal numbers to binary numbers
   i) 25
   ii) 3.25
   iii) 0.8

c) Simplify following expressions using Boolean algebra
   i) $(A + B).(A + C)$
   ii) $(A + C)(AD + A\overline{D}) + AC + C$

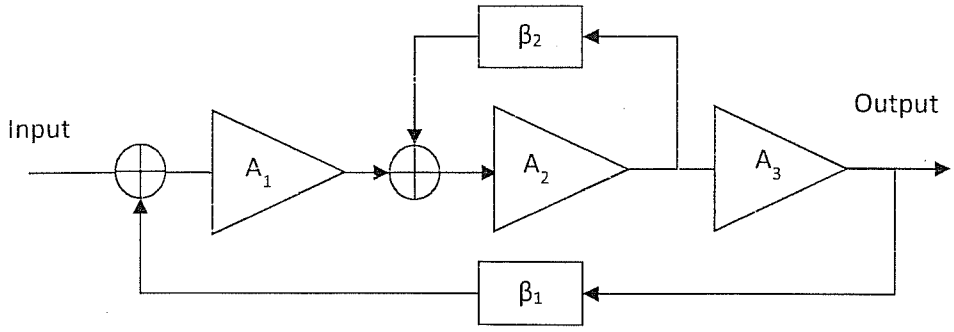
2)

a) Name three advantages of using Negative feedback in an amplification circuit.

b) Consider the following system with a feedback. *A* is the open loop gain of the amplifier. β is the feedback fraction. Derive an expression for the overall gain of the circuit.

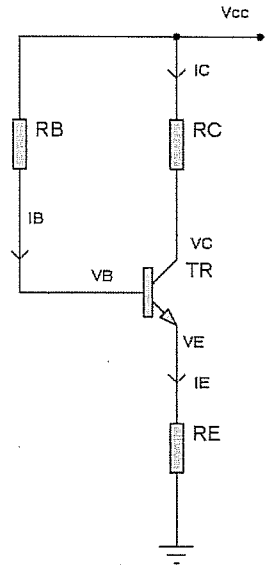


c) Obtain an expression for the net gain of the following system. A_1, A_2 and A_2, are the open loop gain of the respective three amplifiers. β_1 and β_2 are the feedback fractions.



3)

a) Consider the circuit given below. All the notations have the standard meanings.



i) If the current gain of the transistor is β, obtain a relationship between I_C and I_B.

ii) Obtain a relationship between I_C , I_E and I_B.

iii) Write an expression for V_B using I_E, R_E and V_{BE}

iv) Obtain an expression for I_B using V_{cc}, V_B and R_B.

v) Using previous results obtain an expression for I_B which only contains terms, V_{cc}, V_{BE}, R_B , R_E and β.

vi) Let V_{cc} = 12 V, R_E = 100 Ω, R_C = 100 Ω , V_{BE} = 0.7 V and β =200. Calculate **I_B and V_c** for each of the following values.

(1) R_B = 10 kΩ

(2) R_B = 22 kΩ

(3) R_B = 56 kΩ

4)

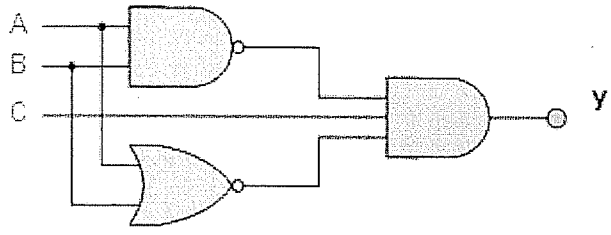
a)

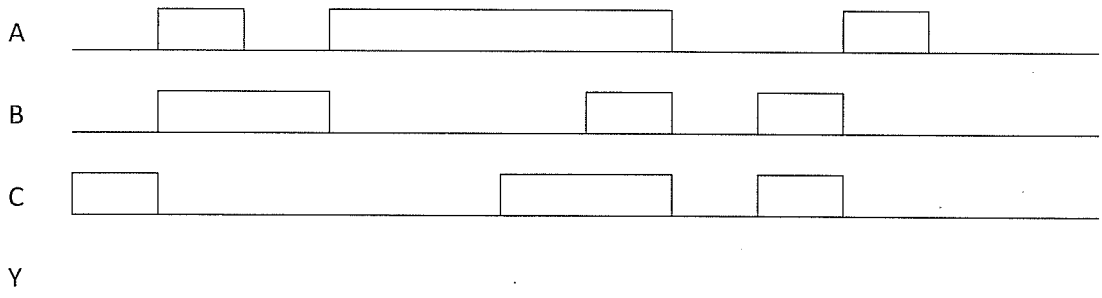
i) Name three different types of oscillators used in electronics.

ii) Draw a circuit diagram of an LC tank.

iii) Write the equation for the resonance frequency of a LC tank.

b) Following timing diagram shows a signal applied to the given circuit. Copy the diagram to your paper. Plot the result of the circuit (y) in the same timing diagram. Clearly mark the places where changes are occurring.





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