VCD 030315

VCD   S.Y. B.Sc.   PHYSICS-II   IV- SEMESTER 2014-15   75 MARKS   2 1/2HRS.

Note: i) All the questions are compulsory.

ii) Figures to the right indicate full marks.

iii) Use of non programmable calculator is allowed.

Q1 : Answer the following questions:

A) Convert the following into
   SOP form $F(a,b,c) = \Sigma m(0,5,6,7)$ and draw logical circuit diagram.   (7M)

OR

A) Convert the following into
   POS form $F(a\ b\ c) = \Pi M(0,1,5,6)$ and draw logical circuit.   (7M)

B) Convert the following   (8M)
   i) $(B4D)_{16} = (?)_8$ ii) $(10101.10)_2 = (?)_{10}$

OR

B) Perform A+B, A-B & -A-B using 2's compliment method where A=43, B= 29

C) Draw & explain the working of RS flipflop.   (5M)

OR

C) Perform the following in binary arithmetic   (5M)
   i) $11110.11 + 111.1101$ ii) 11011×101.1
   iii) 11001×101
   iv) $1011101 + 0111010$ v) $11001 \div 101$

Q2 : Answer the following questions:

A) With the help of neat labelled diagram explain the operation of RC phase shift oscillator. A phase shift oscillator has $R = 5\ K\Omega$, $C = 0.001\mu F$. Find the frequency of oscillation.   (7M)

OR

A) With the help of neat labelled diagram explain the operation of colpitt's oscillator. A colpitt's oscillator is designed by using components $C1 = 0.02\ \mu f$, $C2 = 0.002\mu F$ & $L = 10\mu H$. Calculate oscillating frequency.   (7M)

B) With the help of neat labelled diagram obtained the expression for output voltage of summing amplifier? OP-amp as inverting adder determine feedback register R_f if $V1 = 0.9V$, $V2 = 1.2V$, $V3 = 2.0V$ for $R1 = 3M$ $R2 = 4M\ \Omega$ and $R3 = 6M\ \Omega$.   (8M)

OR

B) Derive the expression for gain of Op-amp as a inverting amplifier. What is input resistance of OP Amp used as inverting amplifier when its output is -12V. With input of 120mV. The feedback resistor is $10M\Omega$.   (8M)

C) Explain the block diagram of OP-Amp amplifier   (5M)

OR

C) What is oscillator? Explain the requirement for oscillator.   (5M)

Q3 : Answer the following questions:

A) Describe with neat diagram stability factor of collector to base resistor method for transistor biasing. (7M)

OR

A) Explain frequency response of an amplifier. What are lower cut off frequency (f1) and higher cut off frequency (f2) of an amplifier? What is relation of bandwidth in terms of f1 & f2? (7M)

B) What is faithful amplification? State & explain the condition to be fulfilled to achieve faithful amplification in a transistorized amplifier. (8M)

OR

B) Draw and explain black box representation of amplifier circuit & write all amplifier notations. (8M)

C) What is feedback amplifier? Sate various types of feedback? (5M)

OR

C) What is stabilization? What is need for stabilization? (5M)

Q4 : Answer the following questions (any 3) : (15)

A) Convert the following

1) $(26.25)_{10} = (?)_2$　　　　2) $(10111001.11101)_2 = (?)_{10}$

B) Convert the following

1) $(3AC.8)_{16} = (?)_{10}$　　　　2) $(745.23)_8 = (?)_2$

C) Write a short note on OP- amp as a integrator.

D) i) Define Slew Rate & write its unit.　　ii) Define stability factor.

E) With the ckt diagram explain the use of op-amp as emitter coupled differential amplifier.

F) What is transistor biasing? What is its need?

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