

9/10/2017

S.Y. B.Sc. IV- SEMESTER ATKY PHYSICS-II

2017-18 75 MARKS 2 1/2 HRS.

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) 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 (f_1) and higher cut off frequency (f_2) of an amplifier? What is relation of bandwidth in terms of f_1 & f_2 ? (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 & explain black box representation of amplifier circuit & write all amplifier notations. (8M)

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

OR

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

Q2 : Answer the following questions:

A) With the help of neat labelled diagram explain the operation of RC phase shift oscillator. (7M)

OR

A) With the help of neat labelled diagram obtain the expression for output voltage of summing amplifier? OP-amp as inverting adder has $V_1 = -2V$, $V_2 = +3V$, $V_3 = +1V$, $R_1 = 200k$, $R_2 = 500k$, $R_3 = R_f = 1M$. Find the output voltage. (7M)

B) Derive the expression for gain of Op-amp as a inverting amplifier. (8M)

OR

B) Derive the expression for gain of Op-amp as a NON inverting amplifier. Determine output voltage of non inverting amplifier for $R_f = 200k$, $R_1 = 2M\Omega$ & input voltage $10mV$. (8M)

(5M)

C) Explain the block diagram of OP-Amp as amplifier.

(5M)

OR

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

Q3 : Answer the following questions:

(7M)

A) Convert the following into

SOP form $F(a, b, c) = \sum m(0, 5, 6, 7)$ and draw logical circuit

(7M)

OR

A) Convert the following into

POS form $F(a, b, c) = \prod M(1, 4, 6, 7)$ and draw logical circuit

(8M)

B) Convert the following

1. $(B4D)_{16} = ()_2 = ()_8$

2) $(10101.10)_2 = ()_8 = ()_{10}$

OR

B) Perform $A+B$ & $A-B$, $-A+B$ using 2's complement method where $A=43$, $B=29$ (8M)

(5M)

C) Draw & explain the working of RS flipflop.

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) $11001 \div 101$

Q4 : Answer the following questions (any 3) :

(15)

1. Convert the following

1) $(26.25)_{10} = ()_2$

2) $(10111001.11101)_2 = ()_{10}$

2. Perform subtraction using 2's complement

i) $110101 - 101111$

ii) $11001 - 110$

3. With the ckt diagram explain the use of op-amp as differentiator.

4. A colpitt's oscillator is designed by using components $C_1 = 0.02 \mu F$, $C_2 = 0.002 \mu F$ &

$L = 10 \mu H$. Calculate oscillating frequency.

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

6. What is transistor biasing? What is its need?