



K18P 1377

Reg. No. :

Name :

**First Semester M.Sc. Degree (Reg./Supple./Imp.)
Examination, October 2018
(2014 Admn. Onwards)
PHYSICS
PHY 1C04 : Electronics**

Time : 3 Hours

Max. Marks : 60

SECTION – A

Answer both questions (either **a** or **b**). **(2×12=24)**

1. a) Explain the electrical characteristics of an ideal op amp. Describe with circuit diagram the working of V to I converter with floating load. Explain a differentiator with suitable figure and derive the expression for output frequency. Also draw the figure of practical differentiator.

OR

- b) Draw the circuit diagram and explain the working of first order Butterworth high pass filter. Derive the expression for magnitude of voltage gain. Draw the frequency response. Also explain the steps involved in the design and the frequency scaling procedure of this filter.

2. a) Explain with logic symbol, logic diagram and truth table, the working of
i) NOR gate S-R latch ii) gated S-R latch

OR

- b) What is an astable multivibrator ? What are its applications ? Describe with circuit diagram and waveforms the operation of an astable multivibrator
i) using 555 timer ii) using only inverters.

SECTION – B

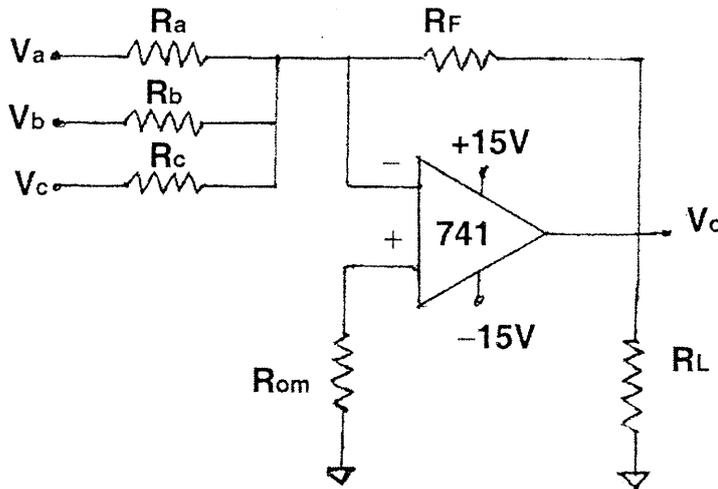
Answer **any four** (1 mark for part 'a', 3 marks for part 'b'. 5 marks for part 'c')
(4×9=36)

3. a) What is an op-amp ?
b) Explain with necessary figures the double ended input operation.
c) Determine the output voltage of an op-amp for input voltages of $V_{i1} = 150 \mu\text{V}$ and $V_{i2} = 140 \mu\text{V}$. The amplifier has a differential gain of $A_d = 4000$ and the value of CMRR is 100.

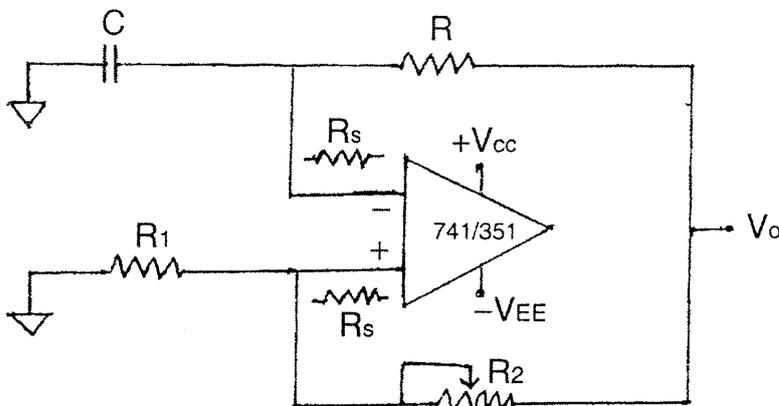
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4. a) What is a compensating network in an op-amp ?
- b) Explain the difference between inverting and non inverting averaging amplifier with suitable figures.
- c) In the circuit diagram shown below $V_a = +1V$, $V_b = +2V$, $V_c = +3V$, $R_a = R_b = R_c = 3k\Omega$, $R_F = 1k\Omega$, $R_{om} = 270 \Omega$ and supply voltages. $\pm 15V$. If the op-amp is initially nulled, calculate the output voltage V_o .



5. a) How is a triangular wave generated using op-amp ?
- b) Explain the characteristics of a comparator.
- c) In the square wave generator shown below, if $R_1 = 12 k\Omega$, $R = 13.92 k\Omega$, $R = 100 k\Omega$ and $C = 0.01 \mu F$. What is the frequency of oscillation ?





6.
 - a) What are the different types of shift registers ?
 - b) What are shift registers ? What is the basic difference between a shift register and a counter ?
 - c) Describe with logic diagram and timing diagram, the working of an asynchronous 2-bit down-counter using positive edge triggered J-K flip-flops.

 7.
 - a) What is race around condition associated with J-K flip-flop ?
 - b) Briefly explain
 - i) RAM
 - ii) ROM
 - iii) EEPROM
 - c) An 8-bit successive approximation ADC has a resolution of 30 mV. What will be its digital output for an analog input of 2.88 V ?

 8.
 - a) What is a microprocessor ?
 - b) Write a brief note on temporary register and general purpose register.
 - c) Give a detailed account of the evolution of microprocessors.
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