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C028512(028)

B. Tech. (Fifth Semester) Examination, Nov.-Dec. 2021

AICTE

(~~New~~ Scheme)

(Electronics & Telecommunication Engg. Branch)

DESIGN of ELECTRONICS CIRCUIT

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : *Attempt all questions. Part (a) of each question is compulsory and carries 4 marks each. Attempt any two parts from (b), (c) and (d) of each questions & carrying 8 marks each.*

1. (a) List the ideal characteristics of an Op-amp.

(b) What is the use of level shifter stage? Draw and explain its circuit diagram.

(c) Draw the circuit symbol of Op-amp. Explain what is mean by inverting input and non-inverting input?

(d) Define the following terms on the reference of practical Op-amp.

(i) CMRR, Slew Rate

(ii) Input Offset voltage, Output Offset Voltage

2. (a) For the inverting amplifier in below figure (a) if the input voltages are 2V, 3V and 1V and corresponding resistances are 2K, 1K and 4K respectively and feedback resistor is 4K. Calculate the output voltage.

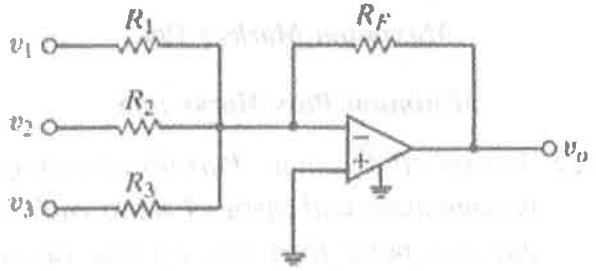

Figure (a)

(b) What is instrumentation amplifier? What are the basic requirements of an instrumentation amplifier?

(c) Explain sample and hold circuit using op-amp and also write the performance parameters of the circuit.

(d) Calculate the output voltage V_0 of the circuit given in figure (b).

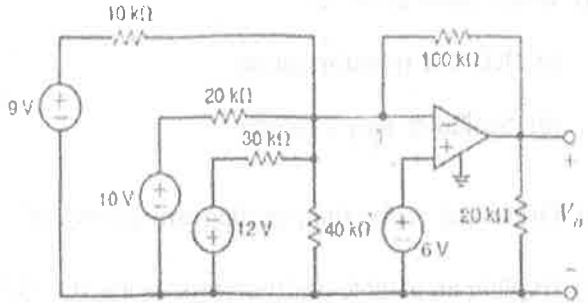

Figure (b)

3. (a) Write the advantages of active filters over the passive filters.

(b) Write the transfer function of a 2nd order Low Pass Filter (LPF) shown in figure (c).

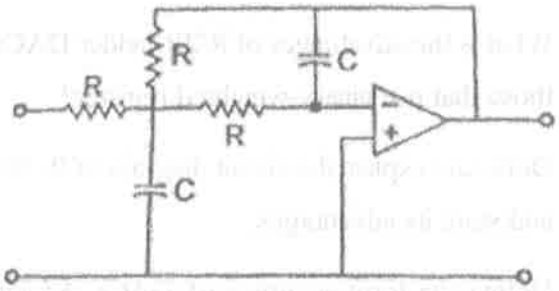

Figure (c)

(c) Explain the design of Low Pass Butterworth filter in

details.

(d) Write short notes on :

(i) RC-CR transformation

(ii) Sallen & Key Circuits

4. (a) Draw and name the pin diagram of 555 IC.

(b) Explain an astable multivibrator using IC-555 with neat diagram.

(c) Explain monolithic PLL IC 565 in details with their applications.

(d) What is SMPS? What are its advantages? Draw the circuit for SMPS and explain its operation.

5. (a) What is the advatnages of R/2R ladder DACs over those that use binary-weighted register?

(b) Draw and explain the circuit diagram of R-2R DAC and state its advantages.

(c) Define the term accuracy of DACs. A5-bit D/A converter produces $V_{out} = 0{\cdot}2$ V for a digital input

of 0001. Find the value of V_{out} for an input of 11111.

(d) Explain the operation of successive approximation ADC. Discuss it merits and demerits.