RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, JUNE 2022

SECOND YEAR (BATCH 2020-23)

Date : 27/06/2022 **ELECTRONICS (GENERAL)**

Time : 11.00 am – 1.00 pm **Paper : IV** Full Marks : 50

Answer **any five** questions of the following: [5×10]

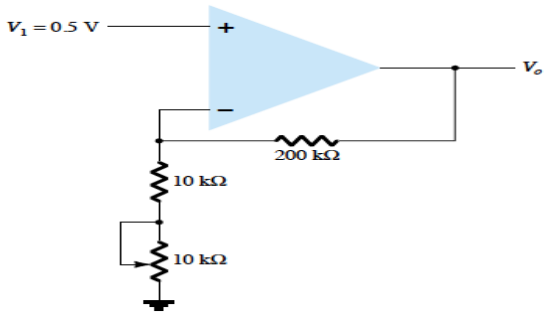
1. a) What is common mode rejection (CMR)? Define common mode rejection ratio (CMRR).
   b) Determine the output voltage of an op-amp for input voltages of $V_{i1} = 150\,\mu V, V_{i2} = 140\,\mu V$. The op-amp has a differential gain of $A_d = 4000$ and the value of CMRR is 100. [(2+2)+6]

2. a) Calculate the output voltage of a non-inverting of an op-amp for $V_1 = 2V, R_f = 500\,K\Omega$ and $R_1 = 100\,K\Omega$
   b) Explain Schmitt trigger for inverting and non-inverting mode of an op-amp with the help of Hysteresis loop. [4+6]

3. Give IC-555 pin diagram. Using it's internal circuit diagram explain mono-stable and bi-stable multivariator. [2+4+4]

4. a) What is the principle of modulation index?
   b) What is multi-tone modulation? Write its expression.
   c) Write a short note on spectrum of radio waves.
   d) What is the importance of signal to noise ratio?
   e) What is double side band suppressed carrier (DSB-SC)? [2+2+2+2+2]

5. a) Using block and circuit diagram explain amplitude de-modulation.
   b) What range of output voltage is developed in the following circuit? [5+5]



6. a) Write a short note on Wein bridge oscillator.
   b) Prove that (for the oscillator) $\frac{R_4}{R_3} = \frac{R_1}{R_2} + \frac{C_2}{C_1}$ required for sustain oscillations. [5+5]

7. a) Differentiate between analog, pulse and digital modulation and demodulation.
   b) Describe the scheme of Pulse Code Modulation (PCM) with suitable schematic diagrams.
   c) What do you mean by Nyquest rate? Explain why is it necessary? [3+(4+1)+(1+1)]

8. a) What are the advantages of DPCM and DM than PCM?
   b) What do you mean by amplitude shift keying and frequency shift keying?
   c) Describe the coherent modulation and demodulation techniques used for ASK. [2+(2+2)+(2+2)]

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