RAN-2103000206021005

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B.Sc. (Sem. VI) Examination October - 2023

Physics – X – PH-610 : Analog and Digital Electronics

[Total Marks: 50

સૂચના : / Instructions

(૧) **નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.**
Fill up strictly the details of ☛ signs on your answer book

Name of the Examination:

☛ **B.Sc. (Sem. VI)**

Name of the Subject :

☛ **Physics – X – PH-610 : Analog and Digital Electronics**

Subject Code No.: **2103000206021005**

Seat No.:

Student's Signature

(2) Draw neat diagrams wherever necessary.
(3) Symbols used in the paper have their usual meaning.
(4) Question 1 is compulsory and figures to the right indicate full marks of the question.

Q. 1 Answer the following questions in short: (10)

1. Write voltage gain equation for non-inverting amplifier for an OP-amp.
2. Voltage gain is unity for buffer amplifier of an OP-amp. (True/False)
3. Define CMRR and slew rate.
4. What is differential and operational amplifier?
5. What is 555-timmer?
6. Full form of ICVS and VCIS in negative feedback amplifier.
7. Define multi-vibrator and duty cycle.
8. Write oscillation frequency equation of phase shift oscillator.
9. Write application of flip flop.
10. Write the name of types of flip flop.

Q. 2 (A) Write anyone of the following. **(06)**

(1) Prove that voltage gain equation for inverting amplifier of an OP-amp is $A_v = -\left(\frac{R_f}{R_i}\right)$

(2) Write short note on instrumentation amplifier of an OP-amp.

(B) Write anyone of the following. **(04)**

(1) What is common mode rejection ratio of an LF157A at low frequency? Convert this decibel value of an ordinary number.

(2) Write short note on summing amplifier of an OP-amp.

Q. 3 (A) Write anyone of the following. **(06)**

(1) Define oscillator. Obtain an expression for the frequency of an oscillation for Colpitt oscillator using transistor.

(2) Write short note on Wein bridge oscillator.

(B) Write anyone of the following. **(04)**

(1) Write short note on Astable mode 555-timmer.

(2) A Hartley oscillator like the one inductance L_1 = 1 μH and L_2 = 0.2 μH. What is the feedback fraction? The frequency of the oscillation if C = 1000 PF? The minimum voltage gain needed to start oscillation?

Q. 4. (A) Write anyone of the following. **(06)**

(1) Prove that Pulse width equation W = 1.1RC for a mono-stable mode 555-timmer.

(2) Write a short note on Schmitt trigger of an arithmetic circuit.

(B) Write anyone of the following. **(04)**

(1) Explain in brief clock waveform of an arithmetic circuit.

(2) Write short note on TTL-clock circuit of an arithmetic circuit.

Q. 5 (A) Write anyone of the following. **(06)**

(1) Construct RS-flip flop using NOR gate with truth table.

(2) Write short note on JK-master-slave-flip flop using universal logic gate.

(B) Write anyone of the following. **(04)**

(1) Construct D-flip flop Edge trigger.

(2) Construct Edge trigger JK-flip flop.