



RAN-2103000206021005

B. Sc. (Sem. - VI) Examination September - 2025

Physics (Paper - X - PH-610) Analog and Digital Electronics

Time: 2 Hours]

[Total Marks: 50

સૂચના : / Instructions

(1)

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 (Paper - X - PH-610) Analog and Digital Electronics

Subject Code No.: **2103000206021005**

Seat No.:

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Student's Signature

Q. 1. Attempt any five in short

(10)

1. What is the clock cycle time for a system that uses a 50 kHz Clock?
2. Draw the Pin diagram of Op-Amps.
3. In negative feedback amplifier stands for VCVS.
4. Define Schmitt trigger and TTL Clock
5. What is Summing amplifier w.r.t Op-amps?
6. What is Astable and Monostable amplifier?
7. Write oscillation frequency equation for Wein-bridge Oscillator.
8. Draw block diagram of D- F.F using JK FF.
9. Define open loop voltage gain.
10. Define CMRR and Slew rate.

Q. 2. A. Write any one of the following

(06)

1. Draw the equivalent circuit for ICVS negative feedback
2. Write short notes on Summing Amplifier.

B. Write any one of the following

(04)

1. Draw the equivalent circuit for VCVS negative feedback
2. Draw the equivalent circuit for ICIS negative feedback.

Q. 3. A. Write any one of the following (06)

1. Draw the circuit diagram of Colpitts's Oscillator and explain its action. Obtain condition of oscillation of this oscillator.
2. With suitable circuit diagram explain the operation of Wein bridge Oscillator. What will be frequency of Oscillation of this oscillator.

B. Write any one of the following (04)

1. A Hartley oscillator like $L_1 = 2 \mu\text{H}$ and $L_2 = 0.3 \mu\text{H}$, what is the feedback fraction? The frequency of oscillation if, $C = 100 \text{ pF}$? The minimum voltage gain needed to start oscillation?
2. A Wein bridge oscillator is used for a frequency range 20 Hz to 2 kHz the capacitance has a range 50 pF to 500 pF find out the resistance values variable required.

Q. 4. A. Write any one of the following (06)

1. Define Multivibrator. Explain Monostable M.V using Timer.
2. Write short note on TTL clock.

B. Write any one of the following (04)

1. The IC-555 timer of astable multi-vibrator has $R_1 = 50 \text{ k}\Omega$, $R_2 = 20 \text{ k}\Omega$ and $C = 47 \text{ nF}$. What frequency of the output signal?
2. Find the output pulse width for the timer monostable. Given $R_A = 10 \text{ k}\Omega$ and $C = 0.1 \mu\text{F}$ and also find frequency.

Q. 5. A. Write any one of the following (06)

1. Write short note on Edge triggered R-S Flip flop with truth table.
2. Write short note on Master-slaves Flip-flop using J-K flip-flop.

B. Write any one of the following (04)

1. Show how to convert D Flip-flop from J-K flip-flop.
2. Explain in brief R-S Flip-flop using NAND gate.