**21P109** (Pages: 2) Name: .....

Reg.No: .....

**FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2021**

(CBCSS - PG)

(Regular/Supplementary/Improvement)

**CC19P PHY1 C04 - ELECTRONICS**

(Physics)

(2019 Admission onwards)

Time : 3 Hours Maximum : 30 Weightage

**Section A**

Answer ***all*** questions. Each question carries weightage.

1. What is transconductance? Give the relation between transconductance and pinch off voltage of an FET.
2. Write a note on digital MOSFET circuits.
3. Explain the characteristic curve of Tunnel diode.
4. Write a note on the materials used for near-IR and visible LEDs.
5. Explain the working of Op- Amp differential amplifier
6. Draw the frequency response curve of Op- Amp and explain.
7. Explain the design procedure for second order butterworth lowpass filter.
8. The FF is essentially a 1-bit memory or storage unit. Why ?

**(8 × 1 = 8 Weightage)**

**Section B**

Answer any ***two*** questions. Each question carries 5 weightage.

9. Draw the circuit diagram of a common source amplifier and its AC equivalent. Derive expressions for voltage gain, input impedance and output impedances. Show that gain of the amplifier is reduced when the source bypass capacitor is removed.
10. Discuss the principle and working of a semiconductor laser. Deduce the expression for threshold current density.
11. Explain the working of an integrator with frequency response curve. Draw the output wave forms for step input and square wave subjected to integrator.

12. Discuss the pin diagram of INTEL 8085 microprocessor.Explain the functions.

**(2 × 5 = 10 Weightage)**

## Section C

Answer any ***four*** questions. Each question carries 3 weightage.

13. In a voltage divider bias method for FET , of $I_{dss}$=12mA, $V_p$=-6V $Y_{os}$=25 micro siemen. $R_1$=240MΩ, $R_2$=47MΩ, $R_d$=3KΩ, $R_s$=1.3KΩ and $V_{dd}$=15V. Find its voltage gain. If the input voltage is 0.5V, what is its output voltage?

14. Obtain an expression for the gain of a photoconductor.

15. An Op - Amp has a CMRR value 50dB and differential gain 900. Find the common mode gain.

16. Design an Op-Amp scale changer to scale an input signal to 5 times its original value. Draw the circuit diagram and mark the component values in the diagram.

17. Design an astable multivibrator of frequency 1 kHz using an OPAMP with a DC dual supply voltage of 15 V.

18. Draw the logic diagram, truth table and waveforms for a mod-3 counter using two flip flop and explain how it works.

19. Design a D/A converter with R and 2R resistor which converts a three input signal ranging from 000 to 111.

**(4 × 3 = 12 Weightage)**

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