Reg. No…….. Name…… **19U321**

B. Sc. DEGREE END SEMESTER EXAMINATION - OCTOBER 2019

SEMESTER – **3: PHYSICS (CORE COURSE)**

COURSE: **15U3CRPHY3, ELECTRONICS**

(For Regular - 2018 Admission and Supplementary / Improvement 2017, 2016, 2015, 2014 Admissions)

Time: Three Hours Max Marks: 60

Part A (Very short answer questions)

(Answer all questions) Each question carries 1 Mark

1. What do you mean by the peak inverse voltage of a diode?
2. What is the effect of temperature on reverse saturation current of a diode?
3. Draw the I-V characteristics of a Zener diode.
4. In the cutoff region of a transistor in CB configuration, the collector-base junction of the transistor is …… biased. (forward/reverse)
5. Which transistor configuration is used for impedance matching purposes and why?
6. What is the basic difference between a BJT and a JFET?
7. List two advantages of negative feedback.
8. Does phase reversal happen in a unity follower?
9. What is the value of bandwidth in amplitude modulation?
10. List any two advantages of frequency modulation.

(1 x 10 = 10)

Part B (Short answer questions)

(Answer any 7 questions) Each question carries 2 Marks

11. Explain the Zener breakdown mechanism?
12. Draw the circuit diagram of a positive clipper showing a typical input waveform and its output.
13. Explain the amplifying action of a transistor?
14. What do you mean by thermal runaway of a transistor?
15. Draw schematically the construction of an n-channel MOSFET.
16. What do you mean by an emitter follower? List two of its characteristics.
17. What is the effect of negative feedback on gain and bandwidth of an amplifier?
18. Distinguish between differential and common mode operations of an OPAMP.
19. What do you understand by sideband frequencies in an AM wave?

(2 x 7 = 14)

Part C (Problem/Derivations)

(Answer any 4 question) Each question carries 4 Marks

20. A 6.2 V zener diode is used to regulate an input voltage, which fluctuates between 9V and 12 V. It is connected across a load of 1 kilo ohms and a series resistance of 330 ohms. Calculate the maximum and minimum values of the zener current.
21. A power supply delivers 10 V dc with a ripple of 0.5 V rms. Another power supply delivers 25 V dc with a ripple of 1mV rms. Which one is the better supply?
22. For an npn transistor connected in CE configuration, β=45 and the voltage drop across the 1kΩ collector resistance is 1 V. Determine the base current.
23. A transistor uses voltage divider method of biasing with R_1=50 kΩ, R_2=10 kΩ , R_E=1kΩ and V_{BE}=0.1V . If V_{CC} =12V find Ic.
24. Find the operating frequency of a Collpitt's transistor oscillator if C_1=0.001µF,C_2=0.01µF and L=15µH .
25. An OPAMP inverting amplifier uses an input resistor 1kΩ and a feedback resistor 10kΩ . A dc voltage of 20 mV is given as the input. Calculate its output voltage and voltage gain.

(4 x 4 = 16)

Part D (Long answer questions)

(Answer any 2 question) Each question carries 10 Marks

26. Using suitable figures, discuss the working principle of a voltage doubler. Also draw the circuit diagram of a tripler and a quadrupler.
27. Explain the voltage divider method of biasing transistor circuits.
28. Discuss the principle of feedback amplifier. With the help of suitable block diagrams, explain voltage series, voltage shunt, current series and current shunt feedback connections.
29. Using suitable diagrams, explain inverting amplifier, non-inverting amplifier and summing amplifier using OPAMP. Give expressions for the output voltage.

(10 x 2 = 20)

****