2021/TDC(CBCS)/EVEN/SEM/ PHSDSE–602T/099

TDC (CBCS) Even Semester Exam., September—2021

PHYSICS

(6th Semester)

Course No. : PHSDSE–602T

(Physics of Devices and Communications)

Full Marks : 70

Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION—A

Answer any *twenty* questions : 1×20=20

1. What are the charge carriers in *n*-channel JFET?

2. Define the term 'drain' in FET.

3. Why MOSFET is also called IGFET?

4. Draw the characteristic curve of a UJT.

5. How many PN junction diode the UJT consists of?

6. What do you mean by interbase resistance?

7. Fill in the blank :

   The depletion layer of tunnel diode is very small because ____.

8. Why are tunnel diodes made up of germanium and silicon semiconductors?

9. Draw the block diagram of a power supply.

10. Write two limitations of an unregulated power supply.

11. Write the expression for repel factor for a full-wave rectifier.

12. Draw the output voltage waveform of a rectified and filtered half-wave rectifier.

13. Draw the waveform of an astable multivibrator.

14. What is the function of commutating capacitors in a transistorized multivibrator?

15. What is the full form of PLL?

16. What do you mean by voltage controlled oscillator?

17. What do you mean by photomasking?

18. Write two drawbacks of integrated circuits.

19. How many masks are required to complete an IC?

20. How capacitors are made during the fabrication of integrated circuits?

21. Define optical lithography.

22. How integrated resistors are made in ICs?

23. What do you mean by the lattice of a crystal?

24. What is lift-off technique?

25. What is the full form of USB?

26. What is the full form of GPIB?

27. What do you mean by UART?

28. What are the elements of USB transfers?

29. What is the function of USB port in a PC?

30. Write any two standards of USB specifications.

31. Write one advantage of using USB port over a COM port.

32. Define interface management.

33. Define modulation index.

34. What is the full form of AM in electronic communication systems?

35. Write one drawback of amplitude modulation over the frequency modulation.

36. Write the equation of an amplitude modulated wave.

37. What do you mean by demodulation?

38. Define SSB in amplitude modulation.

39. Write one difference between PCM and PPM.

40. Draw the output waveform of pulse amplitude modulation.

SECTION—B

Answer any *five* questions : 2×5=10

41. Why FET is called a voltage controlled device?

42. Define pinch-off and out-off voltages.

43. Obtain the expression of voltage regulation in a full-wave rectifier.

44. What is the necessity of using a filter in a rectifier?

45. Define positive and negative maskings.

46. What do you mean by electronic grade silicon?

47. Write various USB standards.

48. Discuss briefly about GPIB signals and lines.

49. Why modulation is needed in electronic communication system?

50. With a circuit diagram, explain briefly about AM demodulator.

SECTION—C

Answer any *five* questions : 8×5=40

51. What are the basic differences between a JFET and a BJT? Draw the structure of an *n*-channel JFET and explain its principle of operation in brief. 3+5=8

52. Distinguish between *n*-channel and *p*-channel MOSFETs. Explain briefly the working of a *p*-channel MOSFET. 4+4=8

53. Explain the action of *L*-section filter with a full-wave rectifier. Show that the repel factor is independent of load resistance. 8

54. A power supply of 20 V, 50 Hz a.c. source provides 100 mA current. It uses a *C*-filter. Calculate the ripple factor of full-wave rectification. Given that $C = 1000\ \mu F$. 8

(Continued)

55. Describe the various steps used during an IC fabrication. 8

56. Distinguish between the process of optical lithography and electron lithography used during IC fabrication. 8

57. What do you mean by handshaking? How GPIB is implemented on a personal computer? 3+5=8

58. What are the objectives behind the development of USB transfers? Explain its various standards used in digital electronic devices. 3+5=8

59. With a neat block diagram, describe the various stages of electronic communication system. 8

60. Obtain the equation of an amplitude modulated wave with a clear explanation of its various terms. 8

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