GOVERNMENT POLYTECHNIC CHAPRA

MORHOWRAH, BIHAR

DEPARTMENT OF ELECTRICAL ENGINEERING

DIPLOMA – 3RD SEMESTER – ASSIGNMENT – 2022

SUBJECT CODE: **2020305**

SUBJECT NAME: **FUNDAMENTAL OF BASIC ELECTRONICS &** **DIGITAL ELECTRONICS**

* Very Short Answer type questions.

Q. The radix of octal number is \_\_\_\_\_\_\_.  
Q Define 1's complement method.  
Q What is truth table?  
Q Define Combinational circuits.  
Q Define DeMorgan's theorem.  
Q Define De- multiplexer.  
Q Write any two applications of flip flops.  
Q Write any two types of counters.  
Q Define D/A converter.  
Q Define semi-conductor memories.  
Q IC 8085 has \_\_\_\_\_\_\_ number of pins.  
Q \_\_\_\_\_\_ is non- maskable interrupts.  
Q What is function of program counter?  
Q Define register indirect addressing mode.  
Q Define debugging.  
Q Define Opcode.  
Q Define stack.  
Q iC 8259 is used for \_\_\_\_.

* Short answer type questions

Q Write a short note on "BCD code".  
Q Subtract 11011 from 11110 using 2's compliment method.  
Q Why NAND and NOR gates are known as Universal gates?  
Q What are three basic laws of Boolean algebra?  
Q State and explain DeMorgan's Theorems.  
Q What is the difference between half adder and full adder?  
Q Draw block diagram and truth table of 4:1 MUX.  
Q Explain operation of J-K flip flops with the help of truth table.  
Q Write a short note on "Counters".  
Q What are different types of Semi conductor memories?

* Long answer type questions.

1. (a) Define linear and non-linear circuit.

(b) How many gates per IC can be fabricated in Large Scale Integration.

(c) What is called Data flip flop.

(d) Write the names of the uni-polar logic families which contain MOSFET’s.

2. Find the decimal equivalent of the binary number 11011001.01012 and find the decimal equivalent of the octal number 7126.458.

3. Do the following conversions:

1. (127)10 into binary number.
2. Convert (4AC7.4B)16 into octal number.
3. (8765.025)10 into hexadecimal number.
4. (100010111)2 into gray code.

4. Do the following questions:

1. Add 7 and 8 in excess-3 code.
2. Add 476 and 394 in BCD code.
3. Perform binary subtraction (11011012 - 11001112).
4. Perform binary multiplication (101012 - 100112).

5. Draw the logic diagram of RTL and explain it briefly.

6. Draw the logic symbols of all basic gates and explain it with the help of truth table.

7. Draw the general block diagram of encoders and decoders and explain it.

8.Draw symbol and truth table of OR, AND, NAND, NOR & X-OR gates.

9. what is binary number system, decimal number system, octal number system and hexadecimal number system.

10. what is excess-3 codes, alphanumeric codes, and gray codes.

11. explain in detail about weighted and non-weighted codes.

12. briefly explain about parity and error detection and correction.

13. define logic families and explain the full concept of TTL with the help of circuit diagram.

14. explain about universal gates.

15. explain about RTL, DCTL, DTL, MOS and CMOS with their characteristics and circuit configuration.

16. briefly explain about tristate logic.

17. Define NOT, OR, AND, NAND, NOR, XOR, XNOR gates justify it with the help of truth-table and logic symbol.

18. State the De Morgan's Theorem?

19. what is Boolean algebra, Boolean expression, K-Map? Name the two forms of Boolean expression.

20. what is minterm and maxterm? Write down the characteristic of digital IC?

21. what are the limitations and advantages and disadvantages of K-Map method.?

22. Explain with the help of examples the realization of basic gates using universal gates?

23. Briefly show the realization of simple Boolean expression using universal gates with the help of example.?

24. what is venn diagram and explain it.

25. write down the logical diagram, truth table, timing diagram and operation of the following latches and flip-flops: NOR latch, RS, T, D, JK, Master/Slave JK flip flops, Encoders, Decoders.

26. what are the applications of flip-flops and latches?

27. what is shift register ? explain in detail about all the shift registers?.

28. Define counter and differentiate between Synchronous and Asynchronous counters.

29. Explain about ring counter, Modern counters, decade counter and write down it its application.

30. what is half adder and full adder? Explain with the help of truth table

31. what is half subtractor and full subtractor? Explain with the help of truth table

32. what is 4-bit adder and subtractor?

33. what is A/D and D/A Converters?

34. explain the different types of A/D converters?

35. Explain the different types of D/A converters?

36. write down the specifications of A/D converter and D/A converter?

37. Define semi-conductor memories and write short notes on ROM, RAM, PAL, and PLA.

38. Differentiate between static and dynamic memories?

39. state the concept of memories using registers?

40. what is memory unit, control unit and cache memory?

41. Distinguish between decoders and display devices.

42. Differentiate between LED and LCD.

43. explain the working principle of seven segment display.

44. explain with the help of example the 4-bit decoder circuits for 7-segment display and Decoder/driver ICs.

45. Explain the working principle of multiplexer and de-multiplexer with the help of block diagram.

46. Explain and Draw the logic diagram of half adder and full adder and also write its

truth table.

47. Do the following conversions:

1. (129)10 into binary number.
2. Convert (4BC7)16 into octal number.
3. (101011)2 into decimal number.
4. (1000101111011)2 into hexadecimal number.

48. What is NAND gate and NOR gate and why it is called universal gates.

49. Explain about multiplexer and demultiplexer with suitable diagram.

50. Draw the logic symbols of all basic gates and explain it with the help of truth table. 51.  Explain and Draw the logic diagram of half subtractor and full subtractor and also

write its truth table.

52. Draw the general block diagram of encoders and decoders and explain it.

53. Distinguish between up down counter.

54. Define data converter and explain the different types of converter.

55. (a) Define semiconductor and diodes.

(b) What is called NPN & PNP TRANSISTORS?

(c) How does the current flow in PN junction diode?

(d) Write short notes on small signal amplifiers and large signal amplifiers.

56. Explain the biasing conditions for the P-N junction Diode with suitable diagrams.

57. Distinguish between p-type and N-type semi conductor.

58. Write about the rectifying diode review of P-type and N-type semiconductor junction of P-type and N-type.

59. What is PN junction barrier voltage, depletion region , junction capacitance.

60. Briefly explain the biasing conditions for the P-N junction Diode with suitable diagrams.

61. State the V-I characteristics of PN junction diode.

62. Draw the circuit diagram of V/S characteristics (forward & reversed) .

63. Write short note on the following: forward voltage drop, reversed saturation current, maximum forward current, power dissipation, package view of diodes of different power ratings.

64. What is bipolar junction and state is working principle with suitable circuit diagram.

65. Distinguish between NPN and PNP transistor.

66. What is the operation and characteristics of NPN and PNP transistor?

66. Explain about the CB, CE, CC configuration.

67. Explain the V-I characteristics of CB, CE, CC configuration.

68. Why we need Biasing in Bipolar Junction Transistor?

69. What is the concept of Bipolar Junction Transistor?

70. Write the concept of Dc load line.

71. Why we need stabilization of Q point (Thermal runway concept).

72. Brief about the selection of operating point (Q point).

73. Explain the different types of biasing circuits.

74. Differentiate between fixed biased circuit and base biased with emitter feedback,

75. State about base biased with collector feedback.

76. Distinguish between voltage divider and emitter biased.

77. Explain the working principle of Field Effect Transistor.

78. Write down the classification of FET.

79. Write down the classification of MOSFET.

80. Briefly explain about the N-channel and P-channel MOSFET?

81. What is the characteristics of JFET and explain its different types.

82. State the characteristics of MOSFET.

83. What is enhancement mode and depletion mode in FET?

84. What is the working principle and draw the equivalent circuit of Uni-Junction transistor?

85. How MOSFET can be used as a switch.

86. Write down the classification of amplifiers.

87. what is called common source amplifiers.