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(FOR THE CANDIDATES ADMITTED DURING THE ACADEMIC YEAR 2023-24 ONLY) **SUBJECT CODE** **23 UMS 4A4 / 23UCY4A5**

REG.NO.

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS : MAY– 2025

B.Sc. – MATHEMATICS / CHEMISTRY **MAXIMUM MARKS: 75**

IV SEMESTER **TIME : 3 HOURS**

PART – III
ANCILLARY PHYSICS FOR MATHEMATICS AND CHEMISTRY-II

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS. **(K1)**

1. The device utilized to measure potential difference is ……
   a) magnetometer b) zener diode c) ammeter d) voltmeter
2. The phenomenon observed in Young's double slit experiment is ……..
   a) polarization b) diffraction c) interference d) rectilinear propagation
3. Which one of the following is unidirectional device ?
   a) transistor b) Zener diode c) junction diode d) capacitor
4. Sum of opaque and transparent region in a grating is called as …….
   a) grating element b) corresponding region c) bandwidth d) grating wavelength
5. The NOR gate is ON only when all its inputs are …….
   a) ON b) positive c) high d) OFF

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES. **(K2)**

6. State "Kirchoff's second law".
7. What is circular polarization?
8. What is the application of a rectifier?
9. What are known as excess 3 code?
10. Give the truth table of XOR gate.

SECTION – B (5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. **(K3)**

11. a) Obtain an expression for Energy Stored in a charged capacitor.

(OR)

b) Draw the diagram of potentiometer and describe is construction and uses.

12. a) How do interference fringes are formed? Explain it theory.

(OR)

b) Define the term dispersive power of the prism. Deduce an expression for it.

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13. a) Draw the ciruit diagram for full wave rectifier and describe its working.

(OR)

b) Describe the action of the transistor with its construction details.

14. a) Convert the following binary operations

i)1100 X 101 (2marks) ii) 101011-10010 (2marks) iii)1011+1001(1 mark)

(OR)

b) Write a note on ASCII codes

15. a) State and prove Demorgan's theorem.

(OR)

b) Construct OR and AND gates using discrete components and describe it working with truth tables.

SECTION – C (5 X 8 = 40 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.

(K4 (Or) K5)

16. a) Describe the construction and working of parallel plate capacitor and deduce the expression for capacitance of a capacitor.

(OR)

b) State Biot- Savart law and utilize this law to determine the field along the axis of circular coil.

17. a) Describe the construction details of Young's double slit experiment and deduce an expression for forming of bright and dark and bright fringes.

(OR)

b) Give the theory plane transmission grating with construction details.

18. a) Draw the circuit diagram to study the charzacteristics of zener diode and explain its working.

(OR)

b) Draw a circuit diagram for common emitter configuration and discuss the input and output characteristics

19. a) Summarize the rules followed in binary addition with two examples.

(OR)

b) Obtain the results of the following using 1's complement subtraction and 2's complement subtraction and verify them by converting decimal numbers.

i)1101-1011 ii)1000 -11

20. a) Prove the statement "NAND as Universal gate" with circuit diagrams and truth tables.

(OR)

b) List the laws and theorems of Boolean algebra.

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