

Reg. No.:



Y8706

Name:

University of Kerala

Second Semester FYUGP Degree Examination, June 2026

Discipline Specific Core Course

PHYSICS

UK2DSCPHY103 - Modern Physics

Academic Level: 100-199

2024 Admission onwards

Time: 1 Hour 30 Minutes(90 Mins.)

Max. Marks: 42

Part A. 6 Marks.Time:6 Minutes.(Cognitive Level:Remember(RE)/Understand(UN)) Objective Type. 1 Mark
Each.Answer all questions

Qn No.	Question	CL	CO
1	Identify the limitation of wave theory in explaining the photoelectric effect	RE	1
2	List the salient features of vector atom model.	RE	3
3	Explain binding energy.	UN	4
4	Distinguish the input-output behaviour of AND and OR gates	UN	2
5	Write down the empirical formula for estimating the size of atomic nucleus.	UN	4
6	Explain the limitations of Bohr atom model	UN	3

Part B. 8 Marks.Time:24 Minutes.(Cognitive Level:Understand(UN)/Apply(AP))Short Answer. 2 marks each.Answer all questions

Qn No.	Question	CL	CO
7	Infer the given binary numbers to find which one is greater a) 1111 b) 1100	UN	2
8	Describe the two postulates of Bohr atom model.	UN	3
9	Employ Pauli's exclusion principle to explain how electron configurations are determined in multi-electron atoms.	AP	3
10	A radioactive substance has a decay constant $\lambda = 0.173\text{hr}^{-1}$, Compute its half – life.	AP	4

Part C. 28 Marks.Time:60 Minutes (Cognitive Level:Apply(AP)/Analyse(AN)/Evaluate(EV)/Create(CR)) Long Answer:7 marks each.Answer all 4 Questions choosing among options * within each question

Qn No.	Question	CL	CO
11	A) Use vector atom model to determine the various quantum numbers associated with the electron in an atom. Apply the method to identify the quantum state of an electron in $n=2$. OR B) Compute the longest and shortest wavelengths of the Balmer series.	AP	3, 3
12	A) Deduce the difference (i) using 2's complement method: $(111001)_2 - (100110)_2$ (ii) using 1's complement method. $(1001)_2 - (1110)_2$ OR B) Examine the accuracy and consistency of converting the decimal number $(156)_{10}$ to its binary, octal, and hexadecimal equivalents. Break down the conversion steps for each base and compare the results by converting them back to decimal.	AN	2, 2
13	A) Assess why mean life is always greater than half-life for a radioactive substance. OR B) Assess radioactivity measurements and radiocarbon dating	EV	4, 4
14	A) Create a truth table for AND, OR, and NOT gates and explain their functions. OR B) Create the basic gates (NOT, OR and AND) by combining NAND gates only.	CR	2, 2