MANONMANIAM SUNDARANAR UNIVERSITY

DIRECTORATE OF DISTANCE AND CONTINUING EDUCATION

INTERNAL ASSIGNMENT

B.Sc. Physics

Electricity Magnetism and Electromagnetism

Sub-Code: JMPH51

1) **(A)** Explain the principle of a parallel plate capacitor and derive an expression for its capacitance with and without a dielectric medium.

(OR)

(B) State and explain Biot-Savart's law. Derive the expression for the magnetic field along the axis of a circular loop.

2) **(A)** What is self-inductance? Derive the expression for the self-inductance of a long solenoid.

(OR)

(B) Derive the expression for the charge growth in an RC circuit during charging and sketch the growth curve.

MANONMANIAM SUNDARANAR UNIVERSITY

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INTERNAL ASSIGNMENT

B.Sc. Physics

Atomic and Nuclear Physics

Sub-Code: JMPH52

1) **(A)** Explain the Pauli's Exclusion and Magnetic dipole moment due to orbital motion of the electron.

(OR)

(B) State the Zeeman Effect. Explain the quantum mechanical explanation of normal Zeeman effect.

2) **(A)** Describe the Liquid Drop Model

(OR)

(B) Explain the properties of alpha rays, beta rays and gamma rays.

MANONMANIAM SUNDARANAR UNIVERSITY

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INTERNAL ASSIGNMENT

B.Sc. Physics

Analog and Communication Electronics

Sub-Code: JMPH53

1) **(A)** Describe the operation of a Zener diode as a voltage regulator with a suitable diagram.

(OR)

(B) Explain the concept of a DC load line and Q-point in a transistor amplifier circuit.

2) **(A)** Draw the circuit diagram and explain the operation of a Hartley oscillator.

(OR)

(B) Draw the explain the circuit diagram of an inverting amplifier using IC 741.

MANONMANIAM SUNDARANAR UNIVERSITY

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INTERNAL ASSIGNMENT

B.Sc. Physics

Laser Physics

Sub-Code: JMPH54

1) **(A)** Explain spontaneous emission, stimulated emission, and population inversion. How does a metastable state help in achieving laser action?

(OR)

(B) Describe the working principles and construction of any one gas laser (Helium-Neon laser or CO_2 laser) with a neat diagram.

2) **(A)** Discuss the principle of laser cutting and welding. Explain how lasers are used in drilling and in the formation of holograms.

(OR)

(B) Explain the applications of lasers in ophthalmology and cancer treatment. Why are lasers preferred in medical surgery?

MANONMANIAM SUNDARANAR UNIVERSITY

DIRECTORATE OF DISTANCE AND CONTINUING EDUCATION

INTERNAL ASSIGNMENT

B.Sc. Physics

Python Programming and Basics of AI and Data Science

Sub-Code: JEPH51

1) **(A)** What are the differences between literals, variables and reserved words in Python?

(OR)

(B) Compare and contrast lists, tuples, sets, and dictionaries regarding mutability and use cases.

2) **(A)** Explain the concept of variable scope (local vs. global) within Python functions.

(OR)

(B) What are some common applications of Artificial Intelligence?

MANONMANIAM SUNDARANAR UNIVERSITY

DIRECTORATE OF DISTANCE AND CONTINUING EDUCATION

INTERNAL ASSIGNMENT

B.Sc. Physics

Modern Physics

Sub-Code: JNPH51

1) **(A)** Explain the generation of transverse and longitudinal waves with suitable examples and derive the equation of a vibrating spring-mass system.

(OR)

(B) State Coulomb's law and derive the expression for the electric field intensity at a point due to a single point charge.

2) **(A)** Describe Ohm's law and derive the relation connecting resistance, specific resistance, and conductivity.

(OR)

(B) Explain intrinsic and extrinsic semiconductors and compare their charge carrier concentration with a neat diagram.