

20C53076CA

B.Sc. (Three Years) DEGREE EXAMINATION, NOVEMBER/DECEMBER 2024.

End Semester Examination

Fifth Semester

Physics (WOM)

Topic: DC: APPLICATIONS OF ELECTRICITY AND ELECTRONICS

Time: 3 Hours

Max. Marks: 75

PART — I (25 marks)

SECTION — A

Answer ALL questions.

1. Multiple choice questions: (10 × 1 = 10 Marks)
1. Which type of resistor has a fixed resistance value?
- (a) Variable resistor (b) Potentiometer
(c) Carbon film resistor (d) Thermistor
2. What is the unit of inductance?
- (a) Ohm (b) Farad
(c) Henry (d) Watt
3. In which application would you most likely find a lead-acid battery?
- (a) Mobile phones (b) Electric vehicles
(c) Digital cameras (d) Laptop computers
4. What is the primary difference between AC and DC?
- (a) AC flows in one direction, while DC flows back and forth
(b) AC flows back and forth, while DC flows in one direction
(c) AC is used in batteries, while DC is used in power plants
(d) AC is always safer than DC

Turn Over



5. What is the primary function of a transformer?
- (a) To increase or decrease voltage
 - (b) To store electrical energy
 - (c) To convert AC to DC
 - (d) To regulate current flow
6. What is a common use of a DC motor?
- (a) Power generation
 - (b) Robotics
 - (c) HVAC systems
 - (d) Induction heating
7. What is the primary purpose of a DC regulated power supply?
- (a) To convert AC voltage to AC voltage
 - (b) To provide a stable DC output voltage
 - (c) To increase AC voltage
 - (d) To charge batteries
8. What is the primary function of an SMPS?
- (a) To convert DC to AC
 - (b) To provide a regulated output voltage
 - (c) To increase power factor
 - (d) To act as a filter
9. What is the primary function of a generator?
- (a) To store electrical energy
 - (b) To convert mechanical energy into electrical energy
 - (c) To regulate voltage
 - (d) To amplify electrical signals
10. The terminal voltage of a DC generator is affected by:
- (a) Armature resistance
 - (b) Load current
 - (c) Field current
 - (d) All of the above
- II. Fill in the blanks: (5 × 1 = 5 Marks)
11. The tolerance of a resistor can be indicated by the color _____.
12. _____ batteries are commonly used in portable electronic devices and have a high energy density.
13. In a step-up transformer, the output voltage is _____ than the input voltage.

14. An SMPS means Switch Mode _____ Supply.
15. A _____ generator converts mechanical energy into direct current electricity.

SECTION — B

Short answer questions.

Answer any FIVE of the following.

(5 × 2 = 10 Marks)

16. What are Passive elements and give examples?
17. What are the various types of power sources?
18. Explain the working principle of Transformer.
19. What is Step-up Transformers?
20. Write the expression for power in a DC motor.
21. Write about Li-PO batteries.
22. Mention the uses of Transformer in a Regulated power supplies.
23. Write about Constant voltage source.

PART — II

Essay type questions.

Answer ALL questions.

(5 × 10 = 50 Marks)

24. (a) Describe various types of capacitors. Derive an expression for energy stored in a Capacitor.

Or

- (b) With a neat circuit explain series Resonance as Radio Tuning circuit.

25. (a) Explain the construction and working of a Lead Acid battery. Mention its Advantages and Disadvantages.

Or

- (b) Explain about Series-parallel configuration of batteries.

26. (a) Explain the construction and working principle of AC generator.

Or

- (b) Explain the working principle of single phase motor.

27. (a) Explain the design of Step-up and Step-down Transformers.

Or

(b) Explain the design of 5V DC charger.

28. (a) Explain the construction and working principle of DC generator.

Or

(b) Describe the construction and operating principle of DC Motor.

20C53077CA

B.Sc. (Three Year) DEGREE EXAMINATION, NOVEMBER/DECEMBER 2024.

End Semester Examinations

Fifth Semester

Physics (WM)

Course 7C : ELECTRONIC INSTRUMENTATION

Time : 3 Hours

Max. Marks : 75

PART — I

SECTION A

- I. Multiple choice questions : (10 × 1 = 10 Marks)
1. Which component is commonly used in AC voltmeters to convert AC to DC?
(a) Rectifier (b) Transformer
(c) Capacitor (d) Inductor
 2. Which of the following waveforms can typically be generated by a function generator?
(a) Sine wave only
(b) Square wave only
(c) Triangle wave only
(d) Sine, square, and triangle waves
 3. In a dual-trace oscilloscope, the device can display:
(a) One signal at a time (b) Only DC signals
(c) Two signals simultaneously (d) Only AC signals
 4. Which component in a CRT is responsible for controlling the brightness of the display?
(a) Cathode (b) Control grid
(c) Focusing anode (d) Deflection plates
 5. Which of the following devices is an example of a photoelectric transducer?
(a) Thermocouple (b) Strain gauge
(c) Photodiode (d) Thermistor

Turn Over



6. In a capacitive transducer, the _____ of the capacitor changes in response to a physical quantity.
- (a) Voltage (b) Current
(c) Capacitance (d) Resistance
7. The Number '8' on a seven-segment display is represented by lighting up _____ segments.
- (a) 3 (b) 4
(c) 5 (d) 7
8. Which color is NOT commonly available in basic LED displays?
- (a) Red (b) Green
(c) Blue (d) Ultraviolet
9. What type of analyzer is used for measuring blood glucose levels?
- (a) Electrocardiogram (b) Glucometer
(c) Hemoglobinometer (d) Pulse oximeter
10. The main purpose of a sphygmomanometer is to measure:
- (a) Blood glucose levels
(b) Blood pressure
(c) Heart rate
(d) Oxygen saturation

II. Fill in the blanks

(5 × 1 = 5)

11. Digital instruments are generally preferred for their _____ and accuracy over analog instruments.
12. The high-voltage _____ in a CRT accelerates the electrons toward the screen.
13. A photoelectric transducer converts _____ energy into electrical energy.
14. There are two main types of seven-segment displays: LED and _____
15. A _____ is a medical device used to measure body temperature.

SECTION — B

Short answer questions.

Answer any FIVE of the following.

(5 × 2 = 10 Marks)

16. Give the basic idea on Function generator.
17. What are the major components of a CRT?
18. What are Fibre optic sensors?
19. Mention any two Limitations of SSD's.
20. Mention the uses of Clinical Thermometer.
21. Write about $3\frac{1}{2}$ display Digital Multimeter.
22. What are the applications of LCD modules?
23. Give the basic idea on Glucometer.

PART — II

Essay type questions.

Answer ALL following.

(5 × 10 = 50 Marks)

24. (a) Define Analog and Digital Instruments. Distinguish the differences between DC Voltmeter and AC Voltmeter.

Or

- (b) With a neat block diagram explain the construction and working of an Analog Multimeter.

25. (a) Explain the following terms in CRO

- (i) Electron gun assembly
- (ii) Screen for CRT
- (iii) Time base operation.

Or

- (b) Explain about Various types of Oscilloscopes and give a short note on Digital storage oscilloscope.

26. (a) Explain the selection of Transducers. Explain how the Resistive and capacitive touch screen transducers in mobiles.

Or

(b) Explain the following transducers.

(i) Digital transducer

(ii) Photo transducer

27. (a) Explain the construction and working of SSD and classify them.

Or

(b) Explain about the construction and working of LED Displays.

28. (a) What are the basic components in ECG and explain how they works.

Or

(b) Explain the terms Stethoscope, sphygmomanometer, CT scan and MRI scan.

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23C08301

B.Sc. (Three Year) DEGREE EXAMINATION, NOVEMBER/DECEMBER 2024.

End Semester Examinations

Third Semester

Physics (Major)

Course I – OPTICS

(w.e.f. 2023–24 Admitted Batch)

Time : 3 Hours

Max. Marks : 70

PART — A

Answer any FIVE of the following. (5 × 4 = 20 Marks)

1. With the help of a diagram explain about coma.
2. What is coherence and what are the conditions for interference of light?
3. Distinguish between Fresnel and Fraunhofer diffraction.
4. What is Brewster's? Explain.
5. Give the applications of holography.
6. Explain about circular Polarization.
7. Explain about curvature of field.
8. Explain diffraction due to single slit.

PART — B

Answer ALL the following. (5 × 10 = 50 Marks)

9. (a) What are the methods used for minimizing spherical aberration? Explain.
Or
(b) Explain Achromatism of two lenses when in contact what is achromatic doublet.
10. (a) Explain Newton's rings in reflected light.

Or

- (b) With the help of a diagram explain the construction and working of michelson interferometer.

Turn Over



11. (a) Explain Fraunhofer diffraction pattern with N Slits?

Or

(b) Explain determination of wavelength of light in normal incidence using diffraction grating.

12. (a) Explain Quarter wave plate and half wave plate.

Or

(b) Explain the construction and working of Nicol prism polarizer and analyzer.

13. (a) Explain about He-Ne laser. What is population inversion?

Or

(b) Explain about Gabor hologram. Give the principle of holography.

23C08302

B.Sc. (Three Year) DEGREE EXAMINATION, NOVEMBER/DECEMBER 2024.

End Semester Examinations

Third Semester

Physics (Major)

Course II — HEAT AND THERMODYNAMICS

(w.e.f. 2023-24 Admitted Batch)

Time : 3 Hours

Max. Marks : 70

PART — A

Answer any FIVE questions.

(5 × 4 = 20 Marks)

1. What is mean free path?
2. Prove Carnot's theorem.
3. Explain Gibb's free energy and their significance.
4. Distinguish between adiabatic and Joule Thomson expansion.
5. Explain Rayleigh Jean's law.
6. Explain about Enthalpy.
7. What is Joule Kelvin effect?
8. What is Solar constant?

PART — B

Answer ALL questions.

(5 × 10 = 50 Marks)

9. (a) Explain the principle of equipartition of energy. Explain Maxwell's law of distribution of molecular velocities.

Or

- (b) Explain about thermal conductivity in ideal gases.
10. (a) Explain about Carnot's engine and its efficiency. Explain thermodynamic scale of temperature.

Or

- (b) Draw and explain Entropy (T-S) diagram and what are its uses? Explain change of entropy when ice changes into steam.

Turn Over



11. (a) Derive for Maxwell's thermodynamic relations from thermodynamic potentials.

Or

- (b) Explain about Joule-Kelvin coefficient for Vander waals gases.
12. (a) Explain about of Porous plug experiment. Derive an expression for Joule Thomson cooling.

Or

- (b) By adiabatic demagnetization explain the production of low temperature.
13. (a) Derive Planck's law of black body radiation.

Or

- (b) Derive Wein's law from Planck's law. What is the estimation of surface temperature of sun.
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23C08303

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B.Sc. (Three Year) DEGREE EXAMINATION, NOVEMBER/DECEMBER 2024.

End Semester Examination

Third Semester

Physics (Major)

7P

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Course III – ELECTRONICS DEVICES AND CIRCUITS

(w.e.f. 2023-24 Admitted batch)

Time : 3 Hours

Max. Marks : 70

PART — A

Answer any FIVE of the following questions. (5 × 4 = 20 Marks)

1. Define Transistors.
2. What is Stabilization?
3. What Depletion type?
4. What is Photo electric devices?
5. Define Rectifiers.
6. What is emitter follower?
7. What is the need of biasing?
8. What is Filters?

PART — B

Answer ALL the following questions. (5 × 10 = 50 Marks)

UNIT I

9. (a) Draw and explain V-I characteristics of PN diode.

Or

- (b) Describe the principle of operation of tunnel diode.

UNIT II

10. (a) Explain working of PNP and NPN transistors.

Or

- (b) Discuss about biasing methods.

Turn Over



UNIT III

11. (a) Explain the construction and working of JFET.

Or

(b) Define about SCR and explain its construction and working.

UNIT IV

12. (a) What is LED's and explain its working and applications?

Or

(b) Explain Structure and operation of LDR.

UNIT V

13. (a) What are Rectifiers explain briefly with types?

Or

(b) Explain briefly about Filters.

23C08304

B.Sc. (Honours) (Three Year) DEGREE EXAMINATION,
NOVEMBER/DECEMBER 2024

End Semester Examination

Third Semester

Physics (Major)

Course 8 :ANALOG AND DIGITAL ELECTRONICS

(w.e.f. 2023-24 Admitted Batch)

Time : 3 Hours

Max. Marks : 70

SECTION – A

Answer any FIVE of the following questions. (5 × 4 = 20 Marks)

1. Draw and explain the block diagram of an op-amp.
2. Explain the concept of virtual ground.
3. State and prove Demorgan's laws.
4. What is a multiplexer? Explain.
5. Explain about RS-clocked flipflop with truth table.
6. Write about the characteristics of practical op-amp.
7. Obtain the following
 - (a) $(3A2F)_{16}$ to $()_{10}$
 - (b) $(11101)_2 - (10100)_2$ in 2's complement method.
8. Describe about Binary Adder.

SECTION – B

Answer ALL the following. (5 × 10 = 50 Marks)

9. (a) Write down the advantages and disadvantages of negative feedback. Discuss the effect of negative feedback on Gain and Bandwidth.

Or

- (b) Explain the operation of voltage shunt feedback amplifier. Derive its Gain and Bandwidth.

Turn Over



10. (a) Explain the operation of summing amplifier and subtractor.

Or

(b) Explain how an op-amp works as a voltage follower and difference amplifier.

11. (a) What is Number system? Explain Binary subtraction using 1's and 2's complement methods.

Or

(b) What is a Universal Gate? Explain the realization of basic logic gates using NAND gate.

12. (a) Describe the operation of Half adder and half subtractor using neat diagrams with their truth tables.

Or

(b) What is Demultiplexer? With the circuit explain its working.

13. (a) What is Flipflop? Explain the working of Master Slave JK-Flip Flop.

Or

(b) What is a code converter? Explain BCD to Gray code converter.

23C08301M

B.Sc. (Hons) (Three Year) DEGREE EXAMINATION, NOVEMBER/DECEMBER 2024.

End Semester Examination

Third Semester

Physics (Minor)

Course II — OPTICS

Time : 3 Hours

Max. Marks : 70

PART — A

Answer any five of the following.

(5 × 4 = 20 Marks)

1. Explain about monochromatic and spherical aberration.
2. Explain about colors of thin films.
3. Discuss about resolving power of grating.
4. What is double refraction? Explain.
5. What is a laser? Explain spontaneous and stimulated emission.
6. State Malus Law and explain.
7. What are the limitations of Gabor hologram?
8. Explain about the principle of superposition.

PART — B

Answer ALL the following.

(5 × 10 = 50 Marks)

9. (a) Explain achromatism of two lenses when separated by a distance.

Or

- (b) Explain the methods of minimizing spherical aberration.

10. (a) Explain the oblique incidence of a plane wave on a thin film due to reflected light.

Or

- (b) With a neat diagram explain wedge shaped film.

Turn Over



11. (a) Explain Fresnel's half period zones and area of half period zones.

Or

(b) Explain Fraunhofer diffraction pattern with N slits.

12. (a) With a neat diagram explain the construction and working of Nicol's prism polarizer and analyzer.

Or

(b) Explain Laurent's half shade polarimeter.

13. (a) What are the types of lasers? Explain about them.

Or

(b) Explain about Gabor hologram. Explain the applications of holography.

23C1109F

B.A./B.Com./B.B.A./B.C.A. (Three Year) DEGREE EXAMINATION,
NOVEMBER/DECEMBER 2024

End Semester Examination

First Semester

PRINCIPLES OF PHYSICAL SCIENCES

Time : 1½ Hours

Max. Marks : 50

PART — A

Answer any FOUR questions.

(4 × 5 = 20 Marks)

1. What are SI units? What is the importance of accurate and precise measurements.
2. Differentiate between Scalars and Vectors.
3. Explain the concept of Energy.
4. Explain the principles of acceleration and laws of motion.
5. What is Doppler effect? Explain.
6. Give the principles of interference and diffraction?
7. Explain the scope of Physics.
8. What are the different forms of energy? Explain.

PART — B

Answer any THREE questions.

(3 × 10 = 30 Marks)

9. Explain vectors addition and subtraction.
 10. Explain Newton's law of universal gravitation and what are its implications.
 11. Explain the formation of images by lenses and mirrors.
 12. What are the principles of circular motion and centripetal force. Give applications.
 13. What are Newton's law of gravitation and what are its implications?
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23C1113A

U.G. (Three Year) DEGREE EXAMINATION, NOVEMBER/DECEMBER 2024

End Semester Examination

First Semester

Course 1 – ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL
AND CHEMICAL SCIENCES

Time : 3 Hours

Max. Marks : 70

SECTION – A

I. Multiple Choice questions:

(30 × 1 = 30 Marks)

- $(3 + 2i) + (4 - 3i) =$ _____
(a) $-7 - i$ (b) $-7 + i$
(c) $7 - i$ (d) $7 + i$
- If $\sin 2A = 2 \sin A$ then A is _____
(a) 0° (b) 60°
(c) 30° (d) 90°
- If $\vec{a} = 3\vec{i} + 2\vec{j} - 6\vec{k}$ and $\vec{b} = 4\vec{i} - 3\vec{j} + \vec{k}$, then $\vec{a} \cdot \vec{b} =$ _____
(a) 2 (b) 3
(c) 0 (d) 1
- Mode of the data 15, 14, 19, 20, 14, 15, 14, 18, 14, 15, 17, 14, 18 is _____
(a) 15 (b) 20
(c) 18 (d) 14
- What is the value of $\tan^2 60^\circ - \sin^2 30^\circ$ is _____?
(a) $\frac{11}{4}$ (b) $\frac{2}{\sqrt{3}}$
(c) $\sqrt{2}$ (d) 1
- $(\vec{a} \times \vec{b}) \cdot \vec{c} =$ _____
(a) $\vec{a} \times \vec{b} \times \vec{c}$ (b) $\vec{a} \cdot (\vec{b} \times \vec{c})$
(c) $\vec{a} \times \vec{b}$ (d) $\vec{b} \cdot \vec{c}$

A

Turn Over



7. Which of the following is considered a Fundamental quantity in physics?
- (a) Temperature (b) Density
(c) Force (d) Volume
8. Acceleration is defined as the Rate of change of
- (a) Speed (b) Displacement
(c) Velocity (d) Time
9. Which Law of Thermodynamics states that absolute zero cannot be reached by any cooling process?
- (a) Zeroth Law (b) Second Law
(c) First Law (d) Third Law
10. Which colour of visible light has the shortest wavelength?
- (a) Red (b) Green
(c) Blue (d) Yellow
11. The SI unit of electric field intensity is
- (a) Volt (b) Ampere
(c) Coulomb (d) Newton/Coulomb
12. The number of protons in the Nucleus of an atom determines its :
- (a) Atomic mass (b) Atomic number
(c) Isotopic mass (d) Neutron count
13. The study of structure, properties and reactions of non-carbon chemical compounds is known as
- (a) Organic chemistry (b) Physical chemistry
(c) Analytical chemistry (d) Inorganic chemistry
14. Which Branch of chemistry is vital for understanding the chemical process occurred in Earth's crust, minerals and metals?
- (a) Bio chemistry (b) Geo chemistry
(c) Inorganic chemistry (d) Environmental chemistry

15. Mendeleev's design of a periodic table is based on
- (a) Increasing order of Atomic number
 - (b) Increasing order of Atomic weight
 - (c) Increasing order of Atomic volume
 - (d) None of the above
16. Which of the following is an example of a chemical change?
- (a) Ice melting into water
 - (b) Sugar dissolving in water
 - (c) Boiling water
 - (d) Iron Rusting
17. Matter that has a uniform composition and cannot be separated by physical means is known as
- (a) A mixture
 - (b) A compound
 - (c) An element
 - (d) A solution
18. Which of the following are not Biomolecules?
- (a) Proteins
 - (b) Carbohydrates
 - (c) Carbon dioxide
 - (d) Lipids
19. Complex Analysis plays an important role in understanding the behaviour of chemical compounds in
- (a) Chemical kinetics
 - (b) Nuclear chemistry
 - (c) Electro chemical cells
 - (d) None of the above
20. The design and operation of Anti-lock Braking system (ABS) in vehicles are Governed by principles from
- (a) Special Relativity
 - (b) Newton's law of Motion
 - (c) Quantum Mechanics
 - (d) Electromagnetic Induction
21. Which mathematical concept is essential for determining the reaction rates in chemical kinetics?
- (a) Calculus of variations
 - (b) Integral calculus
 - (c) Vector calculus
 - (d) Differential calculus
22. Which principle of Physics explains the propulsion of Rockets in space?
- (a) Archimede's principle
 - (b) Newton's Laws of motion
 - (c) Coulomb's law
 - (d) Heisenberg's uncertainty principle

II. Fill in the blanks:

(10 × 1 = 10 Marks)

31. The Number $\frac{(1-i)^3}{1-i^3}$ is equal to _____.
32. The median of 6, 8, 9, 10, 11, 12, 13 is _____.
33. The unit 'Newton' is used to measure _____.
34. The particles with no electric charge in an atomic nucleus are _____.
35. The full form of DNA is _____.
36. The branch of chemistry that deals with identification separation and Quantification is _____.
37. The study of electric and magnetic fields in physics uses the _____ functions to represent a real and imaginary parts.
38. In Automotive industries, _____ principle is used for the operation of an combustive engine.
39. The _____ is a permanent storage device on a computer to store data when the power is switch off.
40. _____ is a Network system connecting cities and countries.

SECTION — B

III. Very Short answer questions.

(10 × 1 = 10 Marks)

41. Evaluate : $\tan 60^\circ \operatorname{cosec}^2 45^\circ + \sec^2 60^\circ \tan 45^\circ$.
42. Find the Mean of 20, 22, 25, 28, 30.
43. Define Law of Inertia with an example.
44. State the First Law of Thermodynamics and give its equation.
45. Define Electronic configuration.
46. Write the classification of Lipids.
47. Write the uses and scope of physics in Aerospace industries.
48. What are Artificial Sweetening Agents with two examples?
49. What is an Internet?
50. Explain about Phishing.

(10 × 1 = 10 Marks)

IV. Match the following :

- | | |
|----------------------------------------------|---------------------------------------|
| 51. If $ z + 2 = z - 2 $, Locus of 'z' is | (a) Radians/sec |
| 52. Sec 90° is | (b) Remote sensing |
| 53. Luminous Intensity | (c) Amino Acids |
| 54. Angular velocity | (d) Candela |
| 55. Biomolecules | (e) Not defined |
| 56. Proteins | (f) COBOL |
| 57. LIDAR | (g) Perpendicular bisector of segment |
| 58. Food preservative | (h) Unsolicited communication |
| 59. 3 rd Generation computers | (i) Richard Henderson |
| 60. SPAM | (j) Sodium Benzoate |

SECTION — C

V. True or False :

(10 × 1 = 10 Marks)

61. Is $|z_1 + z_2| \leq |z_1| + |z_2|$.
(A) True (B) False
62. $\tan^2 60^\circ - \sin^2 30^\circ = \frac{8}{4}$.
(A) True (B) False
63. Is the SI unit of temperature is Fahrenheit.
(A) True (B) False
64. The work done by a moving charge in Magnetic field is given by Negative.
(A) True (B) False
65. The Atomic Number of Arsenic is 33?
(A) True (B) False
66. Compounds are always Homogeneous in Nature?
(A) True (B) False
67. Is Differential equations can describe the diffusion of solutes in liquids and Gases.
(A) True (B) False
68. In Lithium-ion batteries the storage of electrical energy by exploiting electrochemical reactions.
(A) True (B) False
69. UNIX was not an operating system which was developed by Microsoft.
(A) True (B) False
70. "Malware" is a software which protects the computer.
(A) True (B) False

20C53076-C

B.Sc. (Three Year) DEGREE EXAMINATION, JANUARY 2024.

End Semester Examination

Fifth Semester

Physics

Course 6C — APPLICATIONS OF ELECTRICITY AND ELECTRONICS

Time : 3 Hours

Max. Marks : 70

SECTION — A

Answer ALL the questions.

(5 × 10 = 50 Marks)

1. (a) Explain the color coding of resistors.

నిరోధకం యొక్క కలర్ కోడింగ్ ను వివరింపుము.

Or

- (b) With a neat circuit explain series resonance circuit as a radio tuning circuit.

చక్కటి వలయంతో శ్రేణి ప్రతిధ్వని వలయంను రేడియో ట్యూనింగ్ వలయంగా వివరించండి.

2. (a) Explain Li-Po batteries.

Li-Po బ్యాటరీలు ను వివరింపుము.

Or

- (b) Explain series parallel configuration of batteries.

బ్యాటరీలు యొక్క శ్రేణి-సమాంతర విన్యాసంను వివరింపుము.

3. (a) Explain step-up and step-down transformer.

స్టెప్ అప్ మరియు స్టెప్ డౌన్ ట్రాన్స్‌ఫార్మర్ ను వివరించండి.

Or

- (b) Explain the working principle of single phase motor.

సింగిల్ ఫేజ్ మోటార్ యొక్క పనిసూత్రంను వివరించండి.

Turn Over



4. (a) Explain the design of a simple 5 volts DC charge.
5 వోల్ట్ DC చార్జర్ యొక్క రూపకల్పన గురించి వివరింపుము.

Or

- (b) Explain the working of DC regulated power supply.
DC నియంత్రిత విద్యుత్ సరఫరా పనితీరును వివరించండి.

5. (a) Explain the construction and working of DC motor.
DC మోటర్ నిర్మాణం మరియు పని తీరును వివరించండి.

Or

- (b) In a given DC motor calculate power, voltage and current.
ఒక DC మోటర్ లో శక్తి, వోల్టేజ్ మరియు విద్యుత్ను గణించండి.

SECTION — B

Answer any FIVE questions.

(5 × 4 = 20 Marks)

6. Explain and derive for energy stored in a capacitor.

కెపాసిటర్ లో శక్తి నిల్వకు ఉత్పన్నం చేసి మరియు వివరించండి.

7. Explain constant voltage source.

స్థిరమైన వోల్టేజ్ మూలంను వివరించండి.

8. Explain about water pump.

నీటి కొళాయి గురించి వివరాచండి.

9. Explain the working AC power source generator.

AC శక్తి మూలం జెనరేటర్ పని తీరును వివరించండి.

10. Explain the design of step up transformer.

స్టెప్-అప్ ట్రాన్స్ఫార్మర్ యొక్క రూప కల్పనను వివరించండి.

11. Explain about power supply for computer.

కంప్యూటర్లకు శక్తి సరఫరా గురించి వివరించండి.

12. Give the EMF equation for DC generator.

DC జనరేటర్ కు EMF సమీకరణం ఇవ్వండి.

13. Give the difference between AC and DC generators.

AC మరియు DC జనరేటర్ల మధ్య భేదాలను ఇవ్వండి.

20C53077-C

B.Sc. (Three Year) DEGREE EXAMINATION, JANUARY 2024.

End Semester Examination

Fifth Semester

Physics (With maths)

Paper VII(C) – ELECTRONIC INSTRUMENTATION

Time : 3 Hours

Max. Marks : 70

SECTION – A

Answer any FIVE questions.

(5 × 4 = 20 Marks)

1. Compare analog and digital instruments.
అనలాగ్ మరియు డిజిటల్ పరికరములను బేధించండి.
2. Explain digital storage oscilloscope.
డిజిటల్ నిల్వ ఒస్సిల్గ్రాఫ్ను వివరింపుము.
3. Give the measurement of frequency using CRO.
CRO ను ఉపయోగించి పౌనఃపున్యమును లెక్కించండి.
4. Explain the working of photo transducer.
ఫోటో ట్రాన్స్డ్యూసర్ను పని తీరును వివరించండి.
5. Discuss about Fibre optic sensors.
ఫైబర్ ఆప్టిక్ సెన్సార్లు గురించి చర్చించండి.
6. What are the limitations of SSDs.
SSD యొక్క అవధులు ఏమిటి?
7. Explain about LED displays.
LED డిస్ప్లే గురించి వివరింపుము.
8. Give the basic ideas of CT scan.
CT స్కాన్ యొక్క ప్రాథమిక ఐడియాస్ను ఇవ్వండి.

Turn Over



SECTION - B

Answer ALL questions.

(5 × 10 = 50 Marks)

9. (a) With the help of a diagram explain digital multimeter.

పట్టిక సహాయంతో డిజిటల్ మల్టీమీటర్‌ను వివరించండి.

Or

- (b) Explain about AC voltmeter and DC voltmeter.

AC వోల్ట్ మీటర్ మరియు DC వోల్ట్ మీటర్‌ను వివరించుము.

10. (a) Explain vertical deflection system and horizontal deflection system.

నిలువు విక్షేపం మరియు క్షితిజ సమాంతర విక్షేపం వ్యవస్థను వివరించండి.

Or

- (b) Draw and explain Cathode Ray Tube.

కాథోడ్ రే ట్యూబ్‌ను గీసి మరియు వివరించుము.

11. (a) Explain capacitive touch screen transducer used in mobiles.

మొబైల్స్‌లో ఉయోగించే కెపాసిటివ్ టచ్ స్క్రీన్ ట్రాన్స్డ్యూసర్‌ను వివరించండి.

Or

- (b) Explain the working of LVDT.

LVDT పని తీరును వివరించుము.

12. (a) Explain the principle and working of 2 × 16 display of LCD modules.

LCD మాడ్యూల్స్ యొక్క 2 × 16 డిస్ప్లీ యొక్క సూత్రం మరియు పనితీరును వివరించుము.

Or

- (b) Explain the construction and operation of LED display.

LED డిస్ప్లీ యొక్క నిర్మాణం మరియు పనిచేయు విధానాన్ని వివరించుము.

13. (a) What is ECG machine explain its working.

ECG మెషిన్ పని చేయు విధానాన్ని వివరించుము.

Or

- (b) What is the use of stethoscope and how does it work.

స్టెతస్కోప్ యొక్క అవసరం ఏంటి? ఎట్లు పని చేయును.

20C3307 A

B.Sc. (Three Year) DEGREE EXAMINATION, DECEMBER 2023.

End Semester Examination

Second Year / Third Semester

Physics

Course III — HEAT AND THERMODYNAMICS

(For Maths Combination)

Time : 3 Hours

Max. Marks : 75

PART — I

Answer ALL questions.

(10 × 1 = 10 Marks)

I. Multi choice questions :

1. According to Maxwell's distribution of velocities
 - (a) A small fraction of the molecule has either very high or very low velocities
 - (b) A small fraction of the molecule has either very high velocities
 - (c) A small fraction of the molecule has very low velocities
 - (d) None
2. Which one of the following forms of water have the highest value of thermal conductivity?
 - (a) Boiling water
 - (b) Steam
 - (c) Solid ice
 - (d) Melting ice
3. Boyle's law holds good for an ideal gas during
 - (a) Isobaric changes
 - (b) Isothermal changes
 - (c) Isochronic changes
 - (d) Adiabatic process
4. The Entropy of an isolated system can never ————.
 - (a) decrease
 - (b) be zero
 - (c) increase
 - (d) none
5. Which of the following is correct?
 - (a) $A = H - TS$; $G = H + TS$
 - (b) $A = U - TS$; $G = H - TS$
 - (c) $A = U + TS$; $G = H - TS$
 - (d) $A = U - TS$; $G = U + TS$

Turn Over



6. For n moles of an ideal gas $C_p - C_v$ is _____.
- (a) nR (b) R
(c) R^n (d) n^R
7. The region at which the Joule-Kelvin coefficient is negative is called as
- (a) cooling region (b) heating region
(c) negative region (d) positive region
8. What are the units of Joule-Thomson coefficient?
- (a) J/mol (b) J/K
(c) K/mol (d) K/J
9. A black body has maximum wavelength λ_m at 2000 K. Its corresponding wavelength at 3000 K will be
- (a) $\frac{3}{2}\lambda_m$ (b) $\frac{2}{3}\lambda_m$
(c) $\frac{16}{81}\lambda_m$ (d) $\frac{81}{16}\lambda_m$
10. The value of Planck's constant is _____ $\times 10^{-34}$ Js.
- (a) 1.1 (b) 3.3
(c) 6.6 (d) 8.8

II. Fill in the blanks :

(5 × 1 = 5 Marks)

11. The mean free path of moving gas molecules is directly proportional to K^{th} power of diameter of molecule. Here value of K is _____.
12. The change of Entropy of an ideal gas during a reversible isothermal expansion is _____.
13. $C_p - C_v = R$ is valid for _____.
14. Gibb's free energy is defined as _____.
15. "Good absorber of heat is good radiator of heat also" is _____.

III. Short answers :

(5 × 2 = 10 Marks)

16. Explain about the Diffusion of gases.
17. Explain the change in entropy in reversible process.
18. Write about the Enthalpy and Internal energy.
19. Distinguish between Adiabatic and Joule Thomson expansion.
20. Define Stefan-Boltzmann's law and Rayleigh Jean's law.

PART — II

Answer ALL questions.

(5 × 10 = 50 Marks)

21. (a) Maxwell's law of distribution of Molecular velocities. Explain.

Or

- (b) Define Mean free path and explain viscosity and thermal conductivity.

22. (a) Explain about carnot's engine and its efficiency.

Or

- (b) Define entropy and explain the change of entropy when ice changes into steam.

23. (a) Explain about Gibb's free energy and their significance.

Or

- (b) Explain Clausius-Clayperon's equation, value of $C_p - C_v$ and value of $\frac{C_p}{C_v}$.

24. (a) Explain about process plug experiment with a neat diagram.

Or

- (b) Explain the liquefaction of air by Linde's method.

25. (a) Define black body and obtain its spectral energy distribution of black body radiation.

Or

- (b) Define solar constant and its determination using angstrom pyroheliometer.

23C1113A

B.Sc. DEGREE EXAMINATION, JANUARY 2024.

First Semester

Course I : ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL
AND CHEMICAL SCIENCES

Max. Marks : 70

Time : 3 Hours

PART — A

(30 × 1 = 30 Marks)

I. Multiple choice questions :

1. $|Z_1 \cdot Z_2| = \underline{\hspace{2cm}}$
(a) $|Z_1| + |Z_2|$ (b) $|Z_1| \cdot |Z_2|$
(c) $Z_1 \cdot Z_2$ (d) None
2. If $\frac{2 \tan 60^\circ}{1 + \tan^2 60^\circ} = \underline{\hspace{2cm}}$
(a) $\sin 60^\circ$ (b) $\sin 30^\circ$
(c) $\tan 60^\circ$ (d) $\cos 60^\circ$
3. Which of the following is an example of vector?
(a) Time (b) Velocity
(c) Volume (d) Length
4. If each observation in the data is increased by 2, then their mean is
(a) Remains the same
(b) Is decreased by 2
(c) Becomes 2 times the original mean
(d) Is increased by 2
5. The value of $\cos^2 \theta + \sin^2 \theta = \underline{\hspace{2cm}}$
(a) 1 (b) $\cos \theta$
(c) 0 (d) $\sin \theta$
6. The observation that occurs most frequently in the data is called $\underline{\hspace{2cm}}$.
(a) Mean (b) Mode
(c) Median (d) None

A

Turn Over



7. The SI unit of energy is _____
- (a) Joule (b) Watt
(c) Newton (d) Calorie
8. According to Newton's First Law of motion, an object at Rest tends to?
- (a) Remain at Rest (b) Move with constant velocity
(c) Accelerate constantly (d) Move in a straight line
9. Entropy is a measure of
- (a) Temperature change (b) Disorder of Randomness
(c) Heat Transfer (d) Internal Energy of a system
10. Sound waves are a type of
- (a) Longitudinal waves (b) Transverse waves
(c) Mechanical waves (d) Electromagnetic waves
11. The electric field between two oppositely charged parallel plates is
- (a) Uniform (b) Changing
(c) Zero (d) Non-uniform
12. What is the charge of an Alpha particle?
- (a) +1 (b) -1
(c) +2 (d) -2
13. The branch of Chemistry concerned with the study of Carbon compounds is known as
- (a) Analytical Chemistry (b) Inorganic Chemistry
(c) Physical Chemistry (d) Organic Chemistry
14. Which drug is used for helping AIDS patients?
- (a) Cisplatin (b) AZT (Azidothymidine)
(c) Amoxicillin (d) Ciprofloxacin
15. Who is the Father of Modern Periodic Table?
- (a) Neil's Bohr (b) Mendeleev
(c) Moseley (d) Dobereiner
16. Another name of 16-group elements is
- (a) Halogens (b) Chalcogens
(c) Pnictogens (d) Noble gases

17. Which of the following is a pure substance?
- (a) Air (b) Soil
(c) Gold (d) Salt water
18. Which Vitamin Helps in Blood clotting?
- (a) Vitamin A (b) Vitamin D
(c) Vitamin K (d) Vitamin C
19. Which mathematical concept is fundamental to describe motion in Physics?
- (a) Calculus (b) Algebra
(c) Geometry (d) Trigonometry
20. In spectroscopy, complex analysis is crucial in interpreting and understanding.
- (a) Chemical kinetics (b) Electro chemistry
(c) Molecular orbitals (d) Nuclear Reactions
21. In Quality Control, the Principle behind non-destructive testing techniques, such as ultra sound and x-rays is based on
- (a) Newton's Laws of Motion (b) Wave-particle Duality
(c) Electromagnetic Radiation (d) Quantum enlargement
22. In Environmental Monitoring, what property of light is utilised in LIDAR technology for Remote Sensing.
- (a) Diffraction (b) Refraction
(c) Polarization (d) Reflection
23. What chemical concept is central to the Duping Process in Semi conductor manufacturing?
- (a) Oxidation (b) Ionization
(c) Reduction (d) Alloying
24. What role does salt primarily play as a food preservative?
- (a) Lowering pH (b) Increasing sweetness
(c) Enhancing Texture (d) Inhibiting microbial growth
25. In which generation did the use of Integrated Circuits (IC)'s begin?
- (a) Second (b) Third
(c) Fourth (d) Fifth

26. What does IP stands for in the context of Networking?
- (a) Internet Provider (b) Internet Protocol
(c) International Protocol (d) International Provider
27. What does VLSI stands for
- (a) Very Large Scale Integration (b) Very Large Software Integration
(c) Very Large System Integration (d) Very Large Storage Integration
28. ICMP is used for communication between
- (a) Domain names (b) Network devices
(c) IP Addresses (d) None of the above
29. What is the main function of a firewall?
- (a) To increase the speed of Network Traffic
(b) To monitor and control incoming and outgoing Network Traffic
(c) To act as an intermediatry between two systems
(d) To validate packets using state information
30. TCP is a :
- (a) Connection – Oriented Protocol (b) Connectionless Protocol
(c) Both (a) and (b) (d) None of the above.

II. Fill in the blanks : -

(10 × 1 = 10 Marks)

31. $\sin^2 60^\circ + \cos^2 45^\circ =$ _____.
32. The mode of 8, 5, 2, 5, 3, 5, 3, 1 is _____.
33. The electric field is defined as the force per unit is _____.
34. The de Broglie wave length of a particle is calculated by using the formula _____.
35. Which is the most abundant element in the universe is _____ and Helium.
36. Study of Hydro Carbons and their derivatives is called _____.
37. In thermodynamics, calculus is used to calculate the changes in _____, _____ and _____ of a system.
38. _____ type of sensors which use Robotics to detect changes in the environment.
39. The _____ is referred as a brain of the Computer.
40. A Computer's main memory is also called as _____.

PART — B

III. Very short answer questions :

(10 × 1 = 10 Marks)

41. Find the Modulus of a complex number $(1+i)(4-3i)$.
42. Find the mean of first seven Natural Numbers.
43. Define physics and its scope.
44. Define uncertainty principle.
45. State Mendeleev's Periodic Law.
46. Give the classification of Vitamins.
47. How physics helps in Environmental Monitoring?
48. What are Food Preservatives?
49. Write a short note on FIFTH Generation of Computers.
50. Explain the uses of Internet in own daily lives.

IV. Match the following :

(10 × 1 = 10 Marks)

- | | | |
|-------------------------------------|-----|--------------------------|
| 51. Reciprocal of $(1-i)$ lies in | (a) | Transition Element |
| 52. $\bar{i} \cdot \bar{i}$ | (b) | Artificial Intelligence |
| 53. Biot-Savart's Law | (c) | 1 |
| 54. Proton | (d) | Spectroscopy |
| 55. 17 th Group elements | (e) | Electric current |
| 56. Nickel | (f) | World Wide Web |
| 57. Principle of Optics | (g) | Goldstein |
| 58. Qubit | (h) | 1 st Quadrant |
| 59. Timberner Lee | (i) | Halogens |
| 60. FIFTH Generation of Computers | (j) | Quantum Computing |

PART — C

V. True or False :

(10 × 1 = 10 Marks)

61. If \vec{a} and \vec{b} are adjacent sides of a Rhombus, then $\vec{a} \cdot \vec{b} = 0$. (True/False)
62. Mode is the value with maximum frequency in the data. (True/False)
63. The Second Law of Thermodynamics is concerned with Energy Conservation? (True/False)
64. Longitudinal waves can which sound propagated through air? (True/False)
65. All Noble gas elements follows Octent Rule. (True/False)
66. In periodic table, 2nd periods is having only 6 elements? (True/False)
67. Differential equations Applications can be used to find the Simple Harmonic Motion of a Simple Pendulum. (True/False)
68. Photoelectric effect means which converts the Electricity to light energy. (True/False)
69. APPLE Company was introduced the First Microprocessor. (True/False)
70. Bluetooth Technology is an example of Personal Area Network (PAN). (True/False)

23C1113B

23C05057024

B.Sc. (Three Year) DEGREE EXAMINATION, JANUARY 2024.

First Semester

Course 2 -- ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

For mathematics / Physics / Chemical / Computer Science

Time : 3 Hours

Max. Marks : 70

SECTION — A

I. Multiple choice questions.

(30 × 1 = 30)

1. Hydro power is the electricity produced from _____
(a) Wind (b) Flowing water
(c) Heat (d) All of the above
2. The melting point of Particles in nano form _____
(a) Increases (b) Decreases
(c) Remains same (d) Increases then decreases
3. Drugs are injected to _____
(a) Veins (b) Muscles
(c) Blood cells (d) All of the above
4. One of the following is not used in QSAR :
(a) Molecular Connectivity index (b) Molecular's similarity index
(c) Topological polar surface area (d) Partition coefficient
5. Which of the following is a Green house gas?
(a) CO₂ (b) Hydrogen
(c) C₂H₄ (d) Propane
6. Burning of Fossil fuels results in
(a) Increased oxygen level (b) Decreases greenhouse gases
(c) Increased greenhouse gases (d) Increased ethane level

B

Turn Over



7. Ozone depletion causes _____
- (a) Increased incidence of Skin Cancer
 - (b) Eye damage
 - (c) Harm to aquatic eco systems
 - (d) All of the above
8. Which of the following is/are the examples of enzyme – mechanisms.
- (a) Acid–base Catalysis
 - (b) Covalent Catalysis
 - (c) Metal-ion Catalysis
 - (d) All of the above
9. What does MRI stands for _____
- (a) Magneto – Ray Isometry
 - (b) Medical Radiometry Instrument
 - (c) Magnetic Resonance Imaging
 - (d) Maximal Radiology Imaging
10. Nano-technology used in _____
- (a) Medical Science
 - (b) Material Science
 - (c) Environment Conservations
 - (d) All of these
11. Renewable energy can be used for _____
- (a) Electricity generation
 - (b) Water heating and Cooling
 - (c) Both (a) and (b)
 - (d) None of these
12. X-rays were discovered in the year _____
- (a) 1894
 - (b) 1893
 - (c) 1895
 - (d) 1896
13. Which of the following that the studies the nervous system.
- (a) Biophysics
 - (b) Neurophysics
 - (c) Nano physics
 - (d) None
14. Which of the following are water treatment steps?
- (a) Coagulation
 - (b) Chlorination
 - (c) Filtration
 - (d) All of these
15. A–F system is used in which of the following number systems.
- (a) Binary
 - (b) Octal
 - (c) Hexa-Decimal
 - (d) Decimal

16. What is the meaning of MODEM?
 (a) Modern electronic machine (b) Modulator and demodulator
 (c) Modern development machine (d) Modulator and converter
17. Multiplexing is used in _____
 (a) Packet Switching (b) Circuit Switching
 (c) Data Switching (d) Packet and Circuit Switching
18. In modulo - 2 arithmetic, we use only _____
 (a) 1 and 2 (b) 0 and 2
 (c) 0 and 1 (d) None
19. The bridge network device is Categorized into _____ types.
 (a) one (b) two
 (c) three (d) four
20. Which one of the following network devices connects two networks?
 (a) Bridge (b) Hub
 (c) Repeater (d) Gateway
21. The slope of the line through the points $P(2, 1)$ and $Q = (8, 5)$ is _____
 (a) $\frac{2}{3}$ (b) $\frac{3}{2}$
 (c) $\frac{2}{5}$ (d) $\frac{1}{5}$
22. Equation of the line passing through (x_1, y_1) and with slope 'm' is _____
 (a) $y - y_1 = m(x - x_1)$ (b) $y - x = m(x_1 - y_1)$
 (c) $y_1 = mx_1$ (d) None
23. $\lim_{x \rightarrow 0} \log(1+x) =$ _____
 (a) 1 (b) 0
 (c) $\log x$ (d) ∞
24. $\frac{d}{dx}(x^3) =$ _____
 (a) $3x$ (b) $4x^2$
 (c) $3x^2$ (d) $6x$

25. $\int \cos x dx =$ _____

- (a) $\tan x + c$
(c) $-\tan x + c$

- (b) $-\sin x + c$
(d) $\sin x + c$

26/ If A is non-singular matrix, then $A^{-1} =$ _____

(a) $\frac{\det A}{\text{Adj } A}$

(b) $\frac{\text{Adj } A}{\det A}$

(c) $\frac{\text{Adj } A}{A^T}$

(d) $\frac{\det A}{A^T}$

27. Solar energy systems use radiation from the _____

- (a) Moon
(c) Sun

- (b) Earth
(d) None of these

28. The negative end of a battery is connected to an electrode called _____

- (a) Anode
(c) Diode

- (b) Cathode
(d) None of these

29. Pumped hydro energy storage to store _____

- (a) Heat
(c) Electricity

- (b) Air
(d) Energy

30. The size of quantum dot should be in the range of _____

- (a) $5nm < L < 25 nm$
(c) $6nm < L < 12 nm$

- (b) $3nm < L < 15 nm$
(d) $4nm < L < 20 nm$

II. Fill in the blanks :

(10 × 1 = 10)

31. CADD abbrevates _____

32. The drug word is derived from _____

33. Radiotherapy, is a type of _____

34. The burning of solid waste is not recommended because _____

35. _____ is the name for convert digital signal to analog signal.

36. The full form of LAN is _____

37. The equation of a line passing through the points (0,1) and (3,2) is _____

B

38. $\lim_{x \rightarrow 2} \frac{x^2 - 3x + 2}{x - 2} =$ _____

39. _____ energy is converted into electrical energy by a solar cell.

40. The term "quantum dot" was coined by _____

SECTION — B

III. Very short Answer questions.

(10 × 1 = 10)

41. What are Quantum dot solar cells?

42. What are renewable energy sources?

43. What are various stages of drug design?

44. What are the applications of nano-sensor?

45. What is dye removal?

46. Explain Radiation therapy?

47. Write the intercept form of the equation of straight line.

48. Evaluate $\int 2x^3 dx$.

49. If $A = \begin{bmatrix} 2 & 3 & 1 \\ 0 & -1 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & -1 \\ 0 & -1 & 3 \end{bmatrix}$ then find $2A - 3B$.

50. What is solar energy?

IV. Match the following

(10 × 1 = 10)

51. Hydraulic power

(a) X-rays

52. Insulin

(b) Coder – decoder

53. Water treatment

(c) error detection and correction

54. Radiation therapy uses

(d) Photovoltaic

55. Coder

(e) NO₂

56. Cyclic Redundancy check

(f) Diabetes

57. $\frac{d}{dx}(8)$

(g) $4x^2$

58. $\int 8x dx$ (h) flow of water
 59. Nitrogen dioxide e (i) chlorination
 60. Conventional Solar cells d (j) 0

SECTION — C

V. True or False

(10 × 1 = 10)

61. All drugs are harmful
 (a) True (b) False
62. The Nervous system includes the brain and spinal cord.
 (a) True (b) False
63. Municipal solid waste is the same as hazardous waste.
 (a) True (b) False
64. Disinfection of water is the most important water treatment step.
 (a) True (b) False
65. The speed of the modem is measured in bits per second.
 (a) True (b) False
66. A hub connects multiple wires coming from different branches.
 (a) True (b) False
67. Is $\frac{d}{dx}(\cos x) = -\sin x$?
 (a) True (b) False
68. Is matrix addition commutative?
 (a) True (b) False
69. All removable sources of energy are based on sunlight.
 (a) True (b) False
70. Coal is a biomass fuel.
 (a) True (b) False

23C08201

B.Sc. (Honours) (Four Year) DEGREE EXAMINATION, MAY 2024.

End Semester Examination

Second Semester

MECHANICS AND PROPERTIES OF MATTER

Time : 3 Hours

Max. Marks : 70

SECTION — A

Answer any FIVE questions.

(5 × 4 = 20 Marks)

1. Derive for divergence of a vector field.
2. States the laws of motion.
3. Derive for conservation of momentum.
4. What is point load?
5. Explain any one type of bending.
6. Define central force with examples.
7. Explain conservative nature of central forces.
8. What are Absolute Frames?

SECTION — B

Answer ALL questions.

(5 × 10 = 50 Marks)

9. (a) State and prove gaussi's theorem.
Or
(b) State and prove stokes theorem.
10. (a) Derive for motion of a variable mass system.
Or
(b) Derive for Rutherford scattering.

Turn Over



11. (a) Derive for precession of a top.

Or

(b) Explain constants of isotropic solids and give their relations.

12. (a) Explain conservation force as a negative gradient of potential energy.

Or

(b) Explain about motion of satellites.

13. (a) With a neat diagram explain Michelson-Morley experiment.

Or

(b) Explain Lorentz transformation and time dilation.

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23C08202

B.Sc. (Three year) (Honours) DEGREE EXAMINATION, MAY 2024.

End Semester Examination

Second Semester

Physics

WAVES AND OSCILLATIONS

Time : 3 Hours

Max. Marks : 70

SECTION — A

Answer any FIVE questions.

(5 × 4 = 20 Marks)

1. What are beats? Explain.
2. Explain about relaxation time.
3. Explain about quality factor.
4. Analyse square wave.
5. Explain about energy transport and transverse impedance.
6. Give the general solution of wave equation.
7. What are lissajous figures?
8. What are the properties of ultrasonic waves.

SECTION — B

Answer ALL questions.

(5 × 10 = 50 Marks)

9. (a) Explain the combination of two mutually perpendicular simple harmonic vibrations of different frequencies.

Or

- (b) Using compound pendulum explain the measurement of 'g'.

10. (a) Explain differential equation of forced oscillator and its solution.

Or

- (b) Explain logarithmic decrement and amplitude and velocity resonance.

Turn Over



11. (a) Explain the evaluation of Fourier coefficients and Fourier theorem.

Or

(b) Explain triangular wave function and saw tooth wave function.

12. (a) Explain the modes of vibration of stretched string clamped at the ends.

Or

(b) Explain about longitudinal vibrations in bars-wave equation and give its general solution and also discuss when bar is fixed at both ends.

13. (a) Explain the production of ultrasonics by piezo electric methods.

Or

(b) Explain the detection of ultrasonics.

23C08201M

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Minor
2023-2024

B.Sc. (Honours) (Four Year) DEGREE EXAMINATION, MAY 2024.

End Semester Examination

Second semester

Physics

MECHANICS AND PROPERTIES OF MATTER

Time : 3 Hours

Max. Marks : 70

SECTION — A

Answer any FIVE questions.

(5 × 4 = 20 Marks)

1. Derive curl of a Vector field.
2. Derive for conservation of energy.
3. Mention Dewtons law of motion.
4. Explain the classification of beams.
5. Explain about point load.
6. What are the characteristics of central forces.
7. Explain conservative nature of central forces.
8. Give mass-energy relation.

SECTION — B

Answer the following.

(5 × 10 = 50 Marks)

9. (a) Derive for gradient of a scalar field and give its physical significance.
Or
(b) State and prove stokes theorem.
10. (a) Derive for collisions in two dimensions of objects.
Or
(b) Explain the equation for motion of a rocket.

Turn Over



11. (a) Explain precession of equinoxes.

Or

(b) Derive an expression for Poisson's Ratio.

12. (a) Derive Kepler's laws.

Or

(b) Explain Motion of Satellites.

13. (a) Explain about addition of velocities and give mass-energy relation.

Or

(b) With a neat diagram explain Michelson–Morley experiment.

20C4307-AA

B.Sc. (Three Year) DEGREE EXAMINATION, MAY 2024.

End Semester Examination

Second Year – Fourth Semester

Physics

ELECTRICITY, MAGNETISM AND ELECTRONICS

Time : 3 Hours

Max. Marks : 75

PART – I

SECTION – A

(10 × 1 = 10 Marks)

1. Multiple Choice Questions:

- (i) A body gets positive charge it means that
- (a) it has lost electrons (b) it has gained protons
(c) it has gained neutrons (d) both (a) and (b)
- (ii) The capacitance of a parallel plate capacitor with vacuum between the plates is given by
- (a) $C = \frac{E_0 A}{d}$ (b) $C = \frac{d}{E_0 A}$
(c) $C = \frac{A}{E_0 d}$ (d) $C = \frac{E_0}{A d}$
- (iii) Ampere's Law is a fundamental principle in
- (a) Quantum mechanics (b) Classical mechanics
(c) Thermodynamics (d) Electrodynamics
- (iv) What is the unit of mutual inductance?
- (a) Ohm (Ω) (b) Henry (H)
(c) Volt (V) (d) Ampere (A)
- (v) In an RC circuit, the phase Relation ship between current and voltage across the inductor is
- (a) In phase (b) Leading by 90°
(c) Lagging by 90° (d) Leading by 180°
- (vi) In a series Resonant circuit, the impedance is
- (a) Minimum (b) Maximum
(c) Zero (d) Indeterminate

Turn Over



- (vii) In Reverse bias, the PN Junction diode exhibits
 (a) High Resistance (b) Low Resistance
 (c) Constant Resistance (d) No Resistance
- (viii) In the common Emitter configuration, the input is applied to
 (a) Base (b) Collector
 (c) Emitter (d) None of these
- (ix) What is the Result of the Boolean expression $A+AB$?
 (a) A (b) B
 (c) $A+B$ (d) $\bar{A}B$
- (x) What is the function of a Half adder circuit
 (a) Adds two binary numbers and produce sum and carry.
 (b) Adds two binary numbers and produce carry with out sum
 (c) Adds two binary numbers and produces sum without carry.
 (d) Subtract two binary no's.

2. Fill in the blanks.

(5 × 1 = 5)

- (a) Dielectrics are commonly used in capacitors to increase their _____
 (b) A _____ is a closed loop of electric current that generates a magnetic field.
 (c) In an RC circuit, the phase relationship between current and voltage across the capacitor is _____ by 90 degrees.
 (d) The relation between β and γ in a transistor is given by _____
 (e) The Basic operations in Boolean Algebra are _____, _____ and _____

SECTION - B

(5 × 2 = 10 Marks)

Answer any FIVE of the following:

3. Define Electric field.

4. What are Eddy currents?

5. Explain power factor.

6. Draw the symbols of PNP and NPN transistors.

7. What is Boolean Algebra?

8. What is Zener Diode?

9. Convert the following (a) $(27)_{10} \rightarrow ()_2$ (b) $(35)_{10} \rightarrow ()_2$

10. What is the significance of Poynting Vector.

Answer ALL questions.

11. (a) Derive an expression for intensity of electric field due to uniformly charged solid sphere using Gauss Law.

Or

- (b) Derive expression for the capacitance of parallel plate condenser with di-electric slab between the parallel plates.

12. (a) What is Hall effect? Derive the equation of Hall coefficient. Write any two applications of Hall effect.

Or

- (b) Define self inductance and mutual inductance. Derive expression for the self inductance of long solenoid.

13. (a) Describe the LCR series circuit. Derive expression for current.

Or

- (b) Derive the wave equation for electro-magnetic waves using Maxwell's equation.

14. (a) Explain the construction and working of PN Junction Diode and its V-I characteristics.

Or

- (b) Explain CB, CE, CC configurations. Derive the relationship between α , β and γ .

15. (a) Using 1's and 2's complement explain Binary Addition and Subtraction.

Or

- (b) Develop AND, OR, NOT Gates using universal Gates.

20C4307BA

B.Sc. (Three Year) DEGREE EXAMINATION, MAY 2024.

End Semester Examinations

Fourth Semester

Maths Combination

MODERN PHYSICS

Time : 3 Hours

Max. Marks : 75

PART — I

SECTION A

1. Multiple choice questions :

(10 × 1 = 10 Marks)

- (a) What is Zeeman effect
- (i) Splitting of spectral lines in the presence of magnetic field
 - (ii) Scattering of light by molecules
 - (iii) Interaction of electrons with a polarized beam of light
 - (iv) The emission of light due to electronic transitions in atoms
- (b) Which of the following materials can be analyzed using Raman Spectroscopy.
- (i) Polymers
 - (ii) Biological samples
 - (iii) Pharmaceuticals
 - (iv) All of the above
- (c) The idea of matter waves was given by
- (i) Einstein
 - (ii) De-Broglie
 - (iii) Davisson and Gerner
 - (iv) Planck

Turn Over



2. Fill in the blanks : (5 × 1 = 5)
- (a) The Raman effect is classified into two main types _____ and _____
 - (b) According to De-Broglies hypothesis _____ waves are associated with particles.
 - (c) Eigen values and Eigen vectors are fundamental concepts in the study of _____ equations and linear transformations.
 - (d) Atomic nuclei are composed of _____ and _____.
 - (e) BCS theory describes the phenomenon of _____ in superconductors.

SECTION — B

Answer any FIVE of the following. (5 × 2 = 10 Marks)

- 3. Define vector atom model.
- 4. Explain wave velocity.
- 5. What are Eigen values.
- 6. Explain about magic numbers.
- 7. What is size effect in nanomaterials.
- 8. Write the properties of nanomaterials.
- 9. What are the basic properties of nucleus.
- 10. Define Binding energy.

PART — II

Answer ALL questions.

(5 × 10 = 50)

- 11. (a) Explain quantum number associated with vector atom model.
Or
(b) What is Raman effect? Describe the experimental arrangement of Raman effect.
- 12. (a) State Heisenberg's uncertainty principle and prove it in the following cases.
 - (i) Positron and momentum
 - (ii) Energy and time.Or
(b) Describe about Darisson and Germer experiment of diffracting electrons.

13. (a) Derive Schrodinger time dependent wave equation.

Or

(b) Obtain Schrodinger wave equation for a particle in a one-dimensional box.

14. (a) Describe about the liquid drop model.

Or

(b) Explain Yukawas mason theory.

15. (a) What are the properties of nanomaterials? Give the electrical and magnetic properties of nanomaterials.

Or

(b) Explain BCS theory of super conductivity and write its applications.
