

THE UNIVERSITY OF CHENAB



Department of Physical Sciences
Bachelor of Sciences in Physics (BS)

Address: Adjacent Chenab Riverside, N-5 GT Road Gujrat

Contact No: +92- 053 111 243 622,

Web: www.uchenab.edu.pk

Email: admissions@uchenab.edu.pk

Programs Offered by the Department of Physical Sciences	
Degree Name	Degree Details/Eligibility Criteria
Bachelor of Science in Physics	The Bachelor of Sciences in Physics program is of 4-years duration, spread over 8 regular semesters, and consisting of 133 credit hours after completing twelve years of higher secondary school certificate (FSc), ICS. At least, 45% marks in intermediate or equivalent are required for admission in BS Physics.
ADP Physics	The ADP Physics Studies is of two-year duration, spread over 4 regular semesters, and consists of 69 credit hours after completing twelve years of higher secondary school certificate (FSc) or ICS. At least, 45% marks in intermediate or equivalent are required for admission in ADP Physics Studies.
Bachelor of Science in Physics (5th Semester Induction)	1. Graduates with a minimum CGPA of 2.0 out of 4.0 or at least 45% marks in a 2-year associate degree in physics studies (semester system) are eligible to apply for direct admission into the 5th semester of the BS Physics, in accordance with HEC guidelines and the university's admission policy. 2. All other students, including those with an ADP in Physics or other equivalent 14-year degrees (such as B.A./B.Sc.), are required to complete 15 credit hours of deficiency courses in a bridge semester 3. After completing the bridge semester with a minimum CGPA of 2.0, students will join the regular fifth semester of their degree program
Master of Philosophy in Physics	The Department of Physical Sciences will allow admission with 2.0 CGPA and with at least 50% marks in the annual system as a basic minimum criterion for admission in MPhil Physics. Passing university test or GAT with 50% marks and interview is required.



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Multiple Choice Questions

Physics (50 Questions)

All questions are compulsory. Each question has 2 marks.

1. When vapors of a substance are cooled and changes into liquid, it is called
 - A) conduction
 - B) condensation
 - C) convection
 - D) evaporation
2. The conductivity of semiconductor materials can be greatly changed by
 - A) Doping
 - B) Temperature
 - C) Both doping & temperature
 - D) Fermi energy level
3. If we increase the temperature of the black body, the wavelength of the maximum intensity
 - A) Increases
 - B) Decreases
 - C) Remains unchanged
 - D) All options incorrect
4. A set of maximum possible numbers of linearly independent vectors is known as
 - A) Dimension
 - B) Basis
 - C) Base vectors
 - D) Incorrect options
5. Which of the following gives the total spin quantum number of the electrons in the ground state of neutral nitrogen ($= 7$)?
 - A) $1/2$
 - B) 1
 - C) $3/2$
 - D) $5/2$
6. Commutator of two Hermitian operators are
 - A) Hermitian
 - B) Anti-Hermitian
 - C) Skew-Hermitian
 - D) All options are incorrect
7. Electromagnetic radiation emitted from the nucleus is most likely to be in the form of



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- A) Gamma rays
- B) Microwaves
- C) Visible light
- D) Infrared radiation

8. Which of the following lattice exhibits maximum packing fraction

- A) Body centered cubic (BCC)
- B) Face centered cubic (FCC)
- C) Hexagonal closed-packed structure (HCP)
- D) Both (FCC) & (BCC)

9. Net charge on the heavily doped N-type semiconductor is -----

- A) Positive
- B) Negative
- C) Zero
- D) Positive and Negative co-exists

10. To change the K.E we must change the Force, the Force will be

- A) Constant
- B) Variable
- C) Total Force
- D) None

11. A uniform solid disk starts from rest and rolls down an inclined plane without slipping. After some time, what fraction of the disk's total kinetic energy is rotational kinetic energy?

- A) $1/4$
- B) $1/3$
- C) $2/3$
- D) $3/4$

12. How many degrees of freedom for A rigid body having three fixed non-collinear points

- A) 6
- B) 9
- C) 3
- D) None

13. The negative muon has properties most similar to which of the following?

- A) Quark
- B) Boson
- C) Electron
- D) Photon



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14. Change in Position does not depend upon

- A) Internal Force
- B) External Force
- C) Both
- D) None

15. Which of the following is not a physical component of an electronic circuit?

- A) Capacitor
- B) Inductor
- C) Diode
- D) Temperature

16. Debye is the unit used to measure

- A) Permittivity
- B) Electric dipole moment
- C) Magnetic dipole moment
- D) Susceptibility

17. Which of the following is wrong about solar cell electronic devices?

- A) Solar cell responsivity is directly proportional to the wavelength of light
- B) It produces dark current
- C) It is a photovoltaic cell
- D) No external voltage is applied

18. Which of the following semiconductors are mostly used to construct electronic circuits?

- A) Silicon
- B) Germanium
- C) Selenium
- D) Tin

19. In free space, the Poisson equation becomes

- A) Maxwell equation
- B) Ampere equation
- C) Laplace equation
- D) Steady state equation

20. The sign of charge carriers in a doped semiconductor can be deduced by measuring which of the following properties?

- A) Specific heat



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- B) Thermal conductivity
- C) Electrical resistivity
- D) Hall coefficient

21. In which of the following cases a mass is converted into energy according to Einstein mass-energy relationship.

- A) Pair-production
- B) Pair inhalation
- C) Compton's effect
- D) Particle moving with velocity of light

22. The continuity equation is a combination of which of the two laws?

- A) Ohm's law and Gauss law
- B) Ampere law and Gauss law
- C) Ohm's law and Ampere law
- D) Maxwell law and Ampere law

23. Electric field intensity due to infinite sheet of charge σ is

- A) Zero
- B) Unity
- C) σ/ϵ
- D) $\sigma/2\epsilon$

24. Wave nature of particle was confirmed by

- A) Davisson-Germer experiment
- B) Thomas experiment
- C) deBroglie wavelength
- D) All options are correct

25. Photoelectric effect is the evidence of

- A) Wave nature of light
- B) Particle nature of light
- C) Dual nature of light
- D) All options are correct

26. When a graph of one quantity versus another in a straight line, the quantities are

- A) Directly proportional
- B) Constant
- C) Inversely proportional
- D) Independent of each other

27. Time is an example of:



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- A) Scalar
- B) Vector
- C) Scalar or vector
- D) Neither scalar nor vector

28. A shopping cart weighing 12 kg moves with a speed of 5m/s. A 3kg food container falls in the shopping cart. What is the speed of shopping cart after the container falls?

- A) 1m/s
- B) 4m/s
- C) 3m/s
- D) 2m/s

29. A soccer ball is kicked vertically from the ground level with a speed of 20m/s. At what height is the gravitational potential energy of the ball maximum?

- A) 5m
- B) 10m
- C) 15m
- D) 20m

30. The capacitance of a material refers to

- A) Ability of the material to store magnetic field
- B) Ability of the material to store electromagnetic field
- C) Ability of the material to store electric field
- D) Potential between two charged plates

31. Which of the following techniques can't be used for generating electron-hole pairs in electronic devices?

- A) Thermal excitation
- B) Impact ionization
- C) Photo excitation
- D) Impurity injection

32. Which of the following types of transistors is preferred in digital and analog electronic circuits?

- A) BJT
- B) JFET
- C) MOSFET
- D) FET



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33. If A, B and C are the operators, then $[AB, C] =$ -----

- A) $[A, B]C + B[A, C]$
- B) $[A, B]C + [A, C]B$
- C) $A[B, C] + [A, C]B$
- D) $A[B, C] + B[A, C]$

34. Probability of finding the electron is one-half at the -----

- A) Conduction band edge
- B) Valance band edge
- C) Fermi-level
- D) Within the band gap

35. Classical theory of free electrons predicted that

- A) Electrical resistivity is inversely proportional to temperature
- B) Electrical resistivity is directly proportional to square root of temperature
- C) Electrical resistivity is inversely proportional to square root of temperature
- D) Electrical resistivity is directly proportional to temperature

36. For a test charge placed at infinity, the electric field will be

- A) Unity
- B) $+\infty$
- C) Zero
- D) $-\infty$

37. Which of the following is the correct expression of current in an intrinsic semiconductor electronic circuit?

- A) $I_{\text{Total}} = I_e + I_h$
- B) $I_{\text{Total}} = I_e - I_h$
- C) $I_{\text{Total}} = I_e + 2I_h$
- D) $I_{\text{Total}} = 2I_e + I_h$

38. The Dot product of $\vec{F} \cdot \vec{F} =$

- A) 0
- B) 1
- C) -1
- D) None

39. The vectors i, j and k in three-dimensional Euclidean space are

- A) Orthogonal
- B) Orthonormal
- C) Linearly independent
- D) Orthonormal and independent



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40. Virtual displacement is valid for

- A) Static body
- B) Moving uniformly
- C) Both
- D) None

41. The electrostatic energy in an electric field does not depend on which of the following?

- A) Magnitude of charges
- B) Permittivity
- C) Applied electric field
- D) Flux lines

42. An object of mass 2 kg has a linear momentum of $6\text{ kg}\cdot\text{m/s}$. What is objects' kinetic energy?

- A) 3J
- B) 6J
- C) 12J
- D) 18J

43. A box with a mass of 2 kg accelerates in a straight line from 4 to 8 m/s due to the application of a force whose duration is 0.5 s. Find the force.

- A) 2N
- B) 4N
- C) 8N
- D) 12N

44. If the distance between two positive point charges is tripled, then the strength of the electrostatic repulsion between them will decrease by a factor of

- A) 3
- B) 6
- C) 8
- D) 12

45. Redshift of distant galaxies is evidence for which of the following?

- A) Expansion of universe
- B) Uncertainty principle
- C) Black holes
- D) Dark matter



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- 46.** Which of the following is wrong about solar cell electronic devices?
- A) Solar cell responsivity is directly proportional to the wavelength of light
 - B) It produces dark current
 - C) It is a photovoltaic cell
 - D) No external voltage is applied
- 47.** Crystals do not possess ----- fold rotational symmetry
- A) 3
 - B) 5
 - C) 9
 - D) 5 and 9
- 48.** If we increase the temperature of the black body, the wavelength of the maximum intensity
- A) Increases
 - B) Decreases
 - C) Remains unchanged
 - D) All options incorrect
- 49.** The volume of ideal gas is reduced to half its original volume. The density of gas
- A) Remains same
 - B) Half
 - C) Doubled
 - D) Tripled
- 50.** The first law of thermodynamics is restatement of
- A) The principle of entropy
 - B) The principle of Enthalpy
 - C) Conservation of energy
 - D) Avogadro's hypothesis