



**SWAMY VIVEKANANDA RURAL PRE-UNIVERSITY COLLEGE  
CHANDAPURA**

**II PUC II MONTHLY TEST, JULY-2019**

**DURATION: 1hr**

**PHYSICS**

**MAX.MARKS: 25**

- I. Answer all the following questions : 5 X 1 = 5**
1. What is the electrostatic potential at any point on equatorial plane of a dipole?
  2. Mention the equation for potential energy of a dipole in a uniform electric field.
  3. Give the value of least distance of distinct vision for normal human eye.
  4. What is the minimum intensity produced when two waves of coherent sources of equal amplitude superimpose?
  5. Define wave front.
- II. Answer any two of the following questions : 2 X 2 = 4**
6. What is meant by equipotential surface? Draw equipotential surface for a point charge.
  7. State Huygens's principle.
  8. What is hypermetropia? Name the lens used to correct it.
- III. Answer any two of the following questions : 2 X 3 = 6**
9. Obtain the relation the relation between electric field and electric potential with neat diagram.
  10. Draw the ray diagram of a compound microscope.
  11. Using Huygens's principle, explain refraction of a plane wave at a plane refracting surface.
- IV. Answer any one of the following questions : 1 X 5 = 5**
12. Obtain the expression for fringe width in Young's double slit experiment.
  13. Define electric potential. Derive an expression for electric potential at a point due to a point charge.
- V. Answer any one of the following questions : 1 X 5 = 5**
14. In Young's double slit experiment source of light of wave length  $4200\text{\AA}$  is used to get fringes of width  $0.006\text{m}$ . Calculate the wave length of light of another source to get fringes of width  $0.0042\text{m}$  wide if the distance between the slit and the screen is reduced to half the value.
  15. Two charges  $5 \times 10^{-8}\text{C}$  and  $-3 \times 10^{-8}\text{C}$  are located  $16\text{cm}$  apart. At what points on line joining the two charges is the electric potential is zero?

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II PUC QUARTERLY EXAMINATION, AUGUST-2019

DURATION: 1:10 Mins

PHYSICS

MAX. MARKS: 50



PART - A

- I. Answer all the following questions : 5 X 1 = 5
1. What happens to the force between two charged bodies change when a dielectric is introduced between them?
  2. Define mobility of electrons.
  3. What is the nature of final image formed in a compound microscope?
  4. Mention any one application of Polaroid?
  5. How does the photoelectric current vary with the intensity of incident radiation?

PART - B

- II. Answer any five of the following questions : 5 X 2 = 10
6. What is electric dipole moment? Mention its S I unit?
  7. Mention any two factors on which capacitance of a parallel plate capacitor depends.
  8. What are the resistance values of standard resistors with the following colour code?  
(a) Yellow, violet, Brown, gold  
(b) Red, red, orange
  9. Define critical angle? Write the relation between critical angle and refractive index.
  10. State Brewster's law? Mention its expression for polarization by reflection?
  11. Define (a) Threshold frequency (b) Stopping potential

PART - C

- III. Answer any five of the following questions : 5 X 3 = 15
12. Show that in a uniform electric field a dipole experiences only a torque and no net force. Derive an expression for torque.
  13. Obtain expression for energy stored in a capacitor?
  14. Mention any three limitations of Ohm's law.
  15. Obtain the expression for focal length of combination of two thin lenses in contact?
  16. Obtain the expression for width of central maximum in diffraction of light?
  17. Mention any three types of electron emission from metal surface.

PART - D

- IV. Answer any one of the following questions : 1 X 5 = 5
18. Obtain the expression for electric field intensity at a point on the equatorial line.
  19. Derive an expression for electrical conductivity.

V. Answer any one of the following questions :

1 X 5 = 5

20. Obtain the expression for the refractive index of the material of the prism in terms of the angle of the prism and the angle of minimum deviation?
21. Explain the laws of photoelectric effect using Einstein's photoelectric equation?

PART - E

VI. Answer any two of the following questions :

2 X 5 = 10

22. When two capacitors in series connected across 4kV line, the energy stored in the system is 8J. The capacitors, if connected in parallel across the same line, the energy stored is 36J. Find the individual capacitance.
23. A small bulb is placed at the bottom of a tank containing water to a depth of 80cm. What is the area of the surface of water through which light from the bulb can emerge out? Refractive index of water is 1.33.  
(consider the bulb to be a point source)
24. The work function of cesium metal is 2.14eV. When light of frequency  $6 \times 10^{14}$  Hz is incident on the metal surface photoemission of electrons occurs. Find
  - (a) Energy of incident photons.
  - (b) Maximum kinetic energy of photoelectrons

Given,  $h = 6.63 \times 10^{-34}$  Js  
 $1\text{eV} = 1.6 \times 10^{-19}$  J

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II PUC MIDTERM EXAMINATION, OCTOBER-2019

DURATION: 3Hr 15 Mins

PHYSICS

MAX.MARKS: 70

PART- A

I. Answer all the following questions :

1. Does Coulomb's law of electric force obey Newton's third law?
2. What is the SI unit of potential difference?
3. In homes, electrical devices are connected in parallel. Why?
4. What is emf?
5. What is the nature of image formed by a concave lens?
6. Will ultrasonic waves show any polarisation?
7. What is the threshold frequency for photoelectric emission?
8. What is the energy required to ionise the electron from the ground level of an atom?
9. What is mass defect?
10. What is binding energy?

PART-B

II. Answer any five of the following questions :

5 X 2 =10

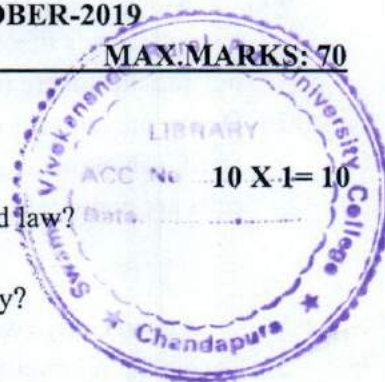
11. Write any two properties of electric field lines
12. Give the examples of (i) non polar dielectrics (ii) polar dielectrics
13. The colour code of a carbon resistors are (a) Brown – Violet – Red – White and (b) Orange – Black – Yellow – Silver. What are their resistance?
14. How will you distinguish between a compound microscope and a telescope just by seeing them?
15. How do you represent schematically plane polarised and un-polarised light?
16. Define thermionic emission and field emission.
17. Write the expression for Rydberg's constant and mention its variables
18. What are isotopes and isobars?

PART - C

III. Answer any five of the following questions :

5 X 3 = 15

19. State and explain coulomb's law in vector form
20. Derive an expression for parallel plate capacitor
21. Derive an expression for effective resistance of two resistors are connected in series
22. State Kirchoff's laws of electrical network
23. Write three differences between interference and diffraction.
24. Write three characteristics of photon
25. The number of ejected photoelectrons increases with increase in intensity of light but not with the increase in frequency of light. Why?
26. Two nuclei have mass numbers in the ratio 8: 125. Calculate the ratio of their nuclear radii



### PART - D

**IV. Answer any two of the following question :** **5 X 2=10**

27. Using Gauss's theorem derive an expression for electric field intensity at a point (a) outside the sphere (b) inside the sphere due to uniformly charged solid sphere
28. Derive an expression for energy stored in a capacitor
29. Derive an expression for equivalent e m f and equivalent internal resistance when two cells are connected in parallel.

**V. Answer any two of the following question :** **5 X 2 =10**

30. Derive the relation between  $n, u, v$  and  $R$  for refraction at a spherical surface, where the symbols have their usual meanings
31. Discuss the experimental observation of photoelectric effect with necessary graphs.
32. Assuming the expression for radius of  $n^{\text{th}}$  orbit, derive an expression for total energy of an electron for  $n^{\text{th}}$  orbit of hydrogen atom.

### PART - E

**VI. Answer any three of the following question:** **5 X 3 =15**

33. A charge of  $8\text{mC}$  is located at the origin. Calculate the work done in taking a small charge of  $-2 \times 10^{-9}\text{C}$  from a point  $P(0,0,3\text{cm})$  to a point  $Q(0,4\text{cm},0)$  via a point  $R(0,6\text{cm},9\text{cm})$ .
34. Three resistors of  $3\text{ ohm}$ ,  $4\text{ ohm}$  and  $6\text{ ohm}$  are connected in parallel. The combination is connected in series with a resistance of  $1\text{ ohm}$  and a cell of emf  $2\text{ V}$  having an internal resistance of  $2\text{ ohm}$ . Find the current through the resistances.
35. In young's double slit experiment, the width of the bright fringes obtained with light of wavelength  $600\text{nm}$  is  $0.4\text{mm}$ . Find the fringe width, if the entire apparatus is immersed in water of refractive index  $4/3$ .
36. What is the de-Broglie wavelength of (a) a bullet of mass  $0.040\text{kg}$  travelling at the speed of  $1.0\text{km s}^{-1}$ . (b) a ball of mass  $0.060\text{kg}$  moving at a speed of  $1.0\text{ms}^{-1}$  and (c) a dust particle of mass  $1.0 \times 10^{-9}\text{ kg}$  drifting with a speed of  $2.2\text{ ms}^{-1}$ ?  
(Given  $h = 6.636 \times 10^{-34}\text{ Js}$ )
37. Calculate the value of longest wavelength and shortest wavelength in Balmer series.  
Rydberg constant =  $1.097 \times 10^7$  per meter.

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II PUC FIRST PREPARATORY EXAMINATION, DECEMBER-2019

DURATION: 3Hr 15 Mins

PHYSICS

MAX.MARKS: 70

PART- A

I Answer all the following questions

1. What is the net force on an electric dipole placed in a uniform electric field?
2. How does the resistance of a conductor depend on length of a conductor?
3. Mention the expression for the magnetic force experienced by moving charge?
4. How does the time period of oscillations of small magnetic needle in a uniform magnetic field depends on the strength of the external magnetic field?
5. For which magnetic material, the susceptibility is positive and small?
6. What are eddy currents?
7. Mention the expression for magnification in case of a compound microscope?
8. Define the SI unit of activity?
9. Define depletion region of a junction diode?
10. Write the circuit symbol for LED.

PART- B

II Answer any five of the following questions

5 X 2 = 10

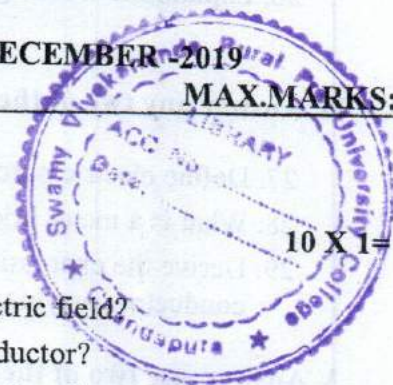
11. Mention the factors on which the capacitance of a parallel plate capacitor depends.
12. Mention the expression for force experienced by a current carrying conductor kept in a uniform magnetic field and explain the terms?
13. State Curie's law for ferromagnetic substance and define Curie's temperature?
14. State and explain the Faraday's laws of electromagnetic induction?
15. Give the diagrammatical representation of polarized and unpolarised light.
16. Write Einstein's photoelectric equation and explain the terms?
17. Write any two differences between p -type and n - type semiconductors?
18. Mention any two applications of photodiode?

PART- C

III Answer any five of the following questions

5 X 3 = 15

19. Obtain the expression for torque experienced by a dipole kept in a uniform electric field?
20. What are ohmic devices? Mention any two limitations of ohmic devices?
21. Explain with circuit diagram how to convert galvanometer into voltmeter.
22. Mention any three differences between diamagnetic substance and ferromagnetic substance.
23. Explain briefly the coil and magnet experiment to demonstrate electromagnetic induction.
24. Write a neat diagram of binding energy curve and explain?



25. Classify the conductors, insulators and semiconductors on the basis of band theory of solids.  
26. Explain the working of Zener diode as a voltage regulator?

**PART- D**

**IV Answer any two of the following questions**

**5 X 2 = 10**

27. Define electric potential? Obtain the expression for potential due to a point charge?  
28. What is a meter bridge? Obtain the balancing condition for balanced whetstone network?  
29. Derive the expression for magnitude of the magnetic field at a point along the axis of the circular conductor carrying current.

**V Answer any two of the following question**

**5 X 2 = 10**

30. Obtain the expression for refractive index of the material of the prism in terms of angle of prism and angle of minimum deviation.  
31. State and explain the Bohr's postulates? Mention the demerits of Bohr's atomic theory.  
32. What is a rectifier? Explain the construction and working of full wave rectifier with input and output waveforms.

**PART- E**

**VI Answer any three of the following questions**

**5 X 3 = 15**

33. PQRS is a square of side 1m. Charges +10nC, +20nC & +30nC are placed at the corners PQR respectively. Calculate the electric field at the corner S of the square?  
34. When two resistors are connected in series with a cell of emf 2 V and negligible internal resistance, a current of 2/5 A flows in the circuit. When the resistors are connected in parallel the main current is 5/3 A. calculate the individual resistances?  
35. In a Young's double slit experiment, fringes of certain width are produced on the screen kept at a certain distance from the slits. When the screen is moved away from the slits by 0.1 m, fringe width increases by  $6 \times 10^{-5}$  m. The separation between the slits is 1 mm. Calculate the wavelength of light used.  
36. A photon of wavelength 540 nm is incident on a metal of threshold wavelength 600 nm. Calculate (a) maximum kinetic energy of photoelectrons (b) stopping potential (c) maximum velocity of photoelectrons.  
37. A given coin has a mass of 3.0 g, calculate the nuclear energy that would be required to separate all the neutrons and protons from each other. For simplicity assume that the coin is entirely made of  $^{63}\text{Cu}_{29}$  atoms of mass 62.92960 u. (Given  $m_p = 1.007025$  u,  $m_n = 1.008665$ u)

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II PUC II PREPARATORY EXAMINATION JAN-2020

TIME: 3:15 min

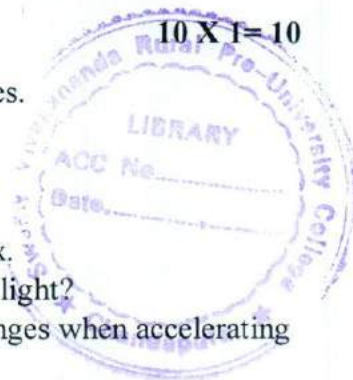
SUB: PHYSICS

MARKS: 70

PART- A

I Answer all the following questions

1. Draw the electric field lines for a system of two positive charges.
2. Name the charge carriers in metallic conductors.
3. Name the law which gives the polarity of the induced emf.
4. Write the expression for displacement current.
5. Mention the relation between critical angle and refractive index.
6. What type of a wave front is observed from a distant source of light?
7. How does the de-Broglie wavelength of a charged particle changes when accelerating potential increases?
8. What is the outcome of Davisson and Germer experiment?
9. How does nuclear radius of an atom depend on its mass number?
10. The output of OR gate is connected to the input of NOT gate. Name the equivalent logic gate.



PART- B

II Answer any five of the following questions

5 X 2 = 10

11. State and explain Coulomb's law.
12. What is electrostatic shielding? Mention one application of electrostatic shielding.
13. What are the limitations of Ohm's law?
14. Mention two applications of cyclotron.
15. Define the terms magnetic declination and dip at a place.
16. Give two applications of eddy current.
17. Mention the principle behind the working of a transformer. Can a transformer be used to step up a dc voltage?
18. Mention any two applications of X-rays.

PART- C

III Answer any five of the following questions

5 X 3 = 15

19. Derive the relation between electric potential and electric field.
20. Obtain the expression for capacitance of a parallel plate capacitor without dielectric medium between the plates.
21. Write the expression for the force acting on a charge moving in a uniform magnetic field. Mention the nature of a trajectory of the charged particle which is moving (i) parallel and (ii) perpendicular to the magnetic field.
22. Obtain the expression for the magnetic energy stored in a coil.
23. Derive the relation  $f = R/2$  in case of a concave mirror.
24. Derive the expression for resultant displacement and amplitude when two waves having same amplitude and a phase difference  $\phi$  superpose.
25. Mention three experimental observation of photoelectric effect.
26. Explain the forward biasing of a p-n junction diode with necessary graphs.



**PART- D**

**IV Answer any two of the following questions**

**5 X 2=10**

27. Obtain the expression for effective emf and effective internal resistance when two different cells are connected in parallel.
28. Use Biot-savart law to derive the expression for magnetic field on the axis of circular current loop.
29. What are ferromagnetic materials? Mention their characteristics properties.

**V Answer any two of the following question**

**5 X 2 =10**

30. Obtain the relation between  $n$ ,  $u$ ,  $v$  and  $R$  for refraction at a spherical surface, where the symbols have their usual meaning.
31. What are nuclear forces? Mention their properties.
32. Classify metals, semiconductors and insulators on basis of energy band diagram.

**PART- E**

**VI Answer any three of the following questions**

**5 X 3 =15**

33. Two point charges  $q_A = 3 \mu\text{C}$  and  $q_B = -3 \mu\text{C}$  are located 20 cm apart in vacuum.  
(a) What is the electric field at the midpoint O of the line AB joining the two charges?  
(b) If a negative test charge of magnitude  $1.5 \times 10^{-9} \text{ C}$  is placed at this point, what is the force experienced by the test charge?
34. (a.) Three resistors of resistances  $2 \Omega$ ,  $3 \Omega$  and  $4 \Omega$  are combined in series. What is the total resistance of the combination? (b). If this combination is connected to a battery of emf 10 V and negligible internal resistance, obtain the potential drop across each resistor.
35. A source of alternating emf 220v-50Hz is connected in series with resistance of  $220 \Omega$ , an inductance of 100 mH and a capacitance of  $30 \mu\text{F}$ . Does the current lead or lag the voltage and by what angle?
36. A beam light consisting of two wave lengths  $4200 \text{ \AA}$  and  $5600 \text{ \AA}$  is used to obtained interference fringes in Young's double slit experiment. The distance between the slit is 0.3mm and the distance between the screen is 1.4 m. Compute the least distance of the point from the central maximum, where the bright fringes due to both the wavelength coincide.
37. The first member of the Balmer series of hydrogen atom has wavelength of  $6563 \text{ \AA}$ . Calculate the wavelength and frequency of the second member of the series.  
Given:  $C=3 \times 10^8 \text{ ms}^{-1}$ .