

SS

2038

## ANNUAL EXAMINATION SYSTEM

## PHYSICS (Theory)

(Common for Science and Agriculture Groups)

(Punjabi, Hindi and English Versions)

(Evening Session)

Time allowed : Three hours

Maximum marks : 70

(Punjabi Version)

- ਨੋਟ : (i) ਆਪਣੀ ਉੱਤਰ-ਪੱਤਰੀ ਦੇ ਟਾਈਟਲ ਪੰਨੇ 'ਤੇ ਵਿਸ਼ਾ-ਕੋਡ/ਪੇਪਰ-ਕੋਡ ਵਾਲੇ ਖਾਨੇ ਵਿੱਚ ਵਿਸ਼ਾ-ਕੋਡ/ਪੇਪਰ-ਕੋਡ 052/C ਜ਼ਰੂਰ ਦਰਜ ਕਰੋ ਜੀ ।
- (ii) ਉੱਤਰ-ਪੱਤਰੀ ਲੈਂਦੇ ਹੀ ਇਸ ਦੇ ਪੰਨੇ ਗਿਣ ਕੇ ਦੇਖ ਲਓ ਕਿ ਇਸ ਵਿੱਚ ਟਾਈਟਲ ਸਹਿਤ 30 ਪੰਨੇ ਹਨ ਅਤੇ ਠੀਕ ਕ੍ਰਮਵਾਰ ਹਨ ।
- (iii) ਉੱਤਰ-ਪੱਤਰੀ ਵਿੱਚ ਖਾਲੀ ਪੰਨਾ/ਪੰਨੇ ਛੱਡਣ ਤੋਂ ਬਾਅਦ ਹੱਲ ਕੀਤੇ ਗਏ ਪ੍ਰਸ਼ਨ/ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਮੁਲਾਂਕਣ ਨਹੀਂ ਕੀਤਾ ਜਾਵੇਗਾ ।
- (iv) ਪ੍ਰੋਗਰਾਮਾਂ ਤੋਂ ਬਿਨਾਂ ਗਣਨਯੰਤਰ/ਲੌਗ ਟੇਬਲਾਂ ਵਰਤਣ ਦੀ ਆਗਿਆ ਹੈ ।
- (v) ਉੱਤਰ ਢੁਕਵਾਂ ਹੋਣਾਂ ਚਾਹੀਦਾ ਹੈ ਅਤੇ ਸਬੰਧਤ ਸੂਤਰਾਂ/ਨਿਯਮ/ਸਿਧਾਂਤ/ਚਿੱਤਰ ਰਾਹੀਂ ਸਮਰਥਤ ਹੋਣਾਂ ਚਾਹੀਦਾ ਹੈ ।
- (vi) ਪ੍ਰਸ਼ਨ ਨੰਬਰ 1 ਤੋਂ 8 ਤੱਕ ਇੱਕ-ਇੱਕ ਅੰਕ ਦੇ ਹਨ ।
- (vii) ਪ੍ਰਸ਼ਨ ਨੰਬਰ 9 ਤੋਂ 16 ਤੱਕ ਦੋ-ਦੋ ਅੰਕਾਂ ਦੇ ਹਨ ।
- (viii) ਪ੍ਰਸ਼ਨ ਨੰਬਰ 17 ਤੋਂ 23 ਤੱਕ ਚਾਰ-ਚਾਰ ਅੰਕਾਂ ਦੇ ਹਨ । ਕਿਸੀ ਵੀ ਦੋ ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਅੰਦਰੂਨੀ ਛੋਟ ਹੋਵੇਗੀ ।
- (ix) ਪ੍ਰਸ਼ਨ ਨੰਬਰ 24 ਤੋਂ 26 ਤੱਕ ਛੇ-ਛੇ ਅੰਕਾਂ ਦੇ ਹਨ । ਇਨ੍ਹਾਂ ਵਿੱਚ ਅੰਦਰੂਨੀ ਛੋਟ ਹੋਵੇਗੀ ।
- (x) ਪੰਜਾਬੀ ਅਤੇ ਹਿੰਦੀ ਵਿੱਚ ਪ੍ਰਸ਼ਨ ਅੰਗ੍ਰੇਜ਼ੀ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਅਨੁਵਾਦ ਹਨ । ਕਿਉਂਕਿ ਅਨੁਵਾਦ ਅਨੁਮਾਨ 'ਤੇ ਅਧਾਰਿਤ ਹੁੰਦਾ ਹੈ ਇਸਲਈ ਕਿਸੇ ਭਰਮ ਦੀ ਸਥਿਤੀ ਵਿੱਚ ਅੰਗ੍ਰੇਜ਼ੀ ਵਿੱਚ ਪ੍ਰਸ਼ਨ ਨੂੰ ਹੀ ਸਹੀ ਮੰਨਿਆਂ ਜਾਵੇ ।

1. 25V ਦੇ ਪੁਟੈਂਸ਼ਲ ਅੰਤਰ ਤੇ ਤਵਰਿਤ ਕਿਸੇ ਇਲੈਕਟ੍ਰਾਨ ਬੀਮ ਨਾਲ ਸੰਬੰਧਤ ਡੀ-ਬਰੋਗਲੀ ਵੇਵਲੈਂਥ ਕੀ ਹੈ ? 1
2. ਪ੍ਰਤੀਉੱਥਕੀ ਪਦਾਰਥ ਕੀ ਹਨ ? 1
3. ਮਿਸ਼ਰਤ ਧਾਤੂਆਂ ਲਈ ਪ੍ਰਤੀਰੋਧਕਤਾ ਤਾਪ-ਗੁਣਾਂਕ ਦਾ ਮੁੱਲ ਬਹੁਤ ਜ਼ਿਆਦਾ ਹੁੰਦਾ ਹੈ । (ਸਹੀ/ਗਲਤ) 1



## (English Version)

- Note :**
- (i) You must write the subject-code/paper-code **052/C** in the box provided on the title page of your answer-book.
  - (ii) Make sure that the answer-book contains 30 pages (including title page) and are properly serialied as soon as you receive it.
  - (iii) Question/s attempted after leaving blank page/s in the answer-book would not be evaluated.
  - (iv) Use of unprogrammable calculator / log tables is allowed.
  - (v) Answer should be to the point and supported by relevant formulas / law / principle/ diagram.
  - (vi) Question Nos. 1 to 8 are of one mark each.
  - (vii) Question Nos. 9 to 16 are of two marks each.
  - (viii) Question Nos. 17 to 23 are of four marks each. There will be internal choice in any two questions.
  - (ix) Question Nos. 24 to 26 are of six marks each. There will be internal choice in them.
  - (x) Punjabi and Hindi versions of questions are translations of English version. Since translation is based on approximations, so in the case of any confusion consider English version to be correct.

1. What is the de-Broglie wavelength of an electron beam accelerated through a potential difference of 25V ? 1
2. What are diamagnetic substances ? 1
3. For alloys the value of temperature coefficient of resistance is very high. (True / False) 1
4. One atomic mass unit is equal to  $1.67 \times 10^{-27}$  g. (Yes / No) 1
5. Give the basic function of antenna. 1
6. Choose the correct option :  
Electrical conductivity of a semi conductor –  
  - (i) decreases with rise in its temperature.
  - (ii) increases with rise in its temperature.
  - (iii) does not changes with temperature.
  - (iv) first decreases and then increases with rise in temperature. 1



7. \_\_\_\_\_ was the first scientist who produced electromagnetic waves in a laboratory. 1
8. Define resonant frequency of LCR series circuit. 1
9. Why does the thickness of depletion layer of pn-junction increases in reverse biasing? Draw the circuit diagram of reverse biasing. 2
10. What is total internal reflection of light? What are the two essential conditions for total internal reflection to take place? 1, 1/2, 1/2
11. How the eye of a person suffering from myopia can be corrected? Explain with the help of ray diagram. 2
12. Explain ground wave propagation. 2
13. A solenoid of length 50cm, having 100 turns carries a current of 2.5A. Find the magnetic field (B), (a) in the interior of the solenoid, (b) at one end of the solenoid. Given  $\mu_0 = 4\pi \times 10^{-7} \text{ Wb A}^{-1} \text{ m}^{-1}$ . 2
14. Write two uses of infrared rays. 2
15. A capacitor of unknown value and an inductor of 0.1H and a resistor of  $10\Omega$  are connected in series to a 220V, 50Hz ac source. It is found that the power factor of circuit is unity. Calculate the capacitance of capacitor and maximum amplitude of current. 2
16. A wire with an area of cross-section as  $10\text{mm}^2$  has a resistance of  $5\Omega$ , when a potential difference across its ends is 25V. Calculate the drift velocity of electrons. Given the number density of electrons as  $5 \times 10^{20}$  electrons per cubic meter ( $\text{e/m}^3$ ). 2
17. (a) State the laws of photo electric effect.  
(b) Name a phenomenon which illustrates the particle nature of light. 3,1
18. With the help of ray diagram, describe the construction, working of a compound microscope when the final image is formed at least distance of distinct vision ( $D = 25\text{cm}$ ). Derive an expression for its magnifying power (m). 1,1,1,1
- or
- (a) Two lenses of powers  $+15\text{D}$  and  $-5\text{D}$  are in contact with each other. What is the focal length of combination?
- (b) In the Young's double slit experiment, two slits  $0.125\text{mm}$  apart are illuminated by light of wavelength  $4500\text{\AA}$ . The screen is  $1\text{m}$  away from the plane of the slits. Find the separation between second bright fringes on both sides of central maxima. 1,3



19. Derive an expression for the energy stored in a capacitor. In what form is the energy stored in a charged capacitor ? 3,1
20. (a) Write the truth table of AND gate. 1  
 (b) What is rectifier ? Explain the working of p-n junction diode as a full-wave rectifier with the help of suitable circuit diagram. 1,1,1
- or
- (a) A common emitter (CE) transistor has a current gain of 100. If emitter current is 8.08 mA, find the base and collector current. 2  
 (b) In a sample of semi conductor mobilities of electrons and holes are  $24 \times 10^3 \text{ cm}^2 \text{ V}^{-1} \text{ S}^{-1}$  and  $0.2 \times 10^3 \text{ cm}^2 \text{ V}^{-1} \text{ S}^{-1}$  respectively. If the density of electrons is  $0.8 \times 10^{14} \text{ cm}^{-3}$  and that of holes is  $0.4 \times 10^{14} \text{ cm}^{-3}$ . Find the nature of semi-conductor and its conductivity. 2
21. What is radioactivity ? State radioactive decay law and show that it is exponential in nature. 1,1,2
22. With the help of labelled diagram, describe the principle, construction and working of a transformer. 1,1,1,1
23. Define e.m.f. of a cell. How can you compare the emf of two cells using potentiometer ? 1,3
24. (a) What is the essential condition for diffraction of light to occur ? 1  
 (b) What is polarisation of light ? Explain polarisation of light by reflection with the suitable diagram and hence derive Brewster's law. 1,2,2
- or
- (a) Why does the sky appear blue ? 1  
 (b) With the help of suitable diagram, sign conventions and assumptions, derive Lens Maker's formula for a convex lens. 1,1,1,2
25. (a) Why two electric lines of force/field cannot intersect each other ? 1  
 (b) State Coulomb's law, explain its vector form and define S.I unit of electric charge. State two limitations of Coulomb's law. 1,2,1,1

(11)

or

- (a) What is the shape of equipotential surface for a given point charge  $q$ . 1
- (b) State Gauss's theorem. With the help of diagram, derive an expression for the electric field intensity due to uniformly charged thin spherical shell at a point (i) outside (ii) inside (iii) on the surface of the spherical shell. 1,4

26. (a) Write SI unit of magnetic dipole moment. 1
- (b) What is magnetic dipole? Derive an expression for magnetic field intensity at a point on the equatorial line of a bar magnet. 1,4

or

- (a) How can a galvanometer be converted into an ammeter? 1
- (b) Derive an expression for the force acting on a current carrying straight conductor kept in a uniform magnetic field. Name the rule used to determine the direction of this force. Under what condition this force is maximum and zero? 3,1,1