

Roll No. ....

Total No. of Questions : 26 ]

**052/A**

[Total No. of Printed Pages : 4

SS

2067

**ANNUAL EXAMINATION SYSTEM**

**PHYSICS (Theory)**

**(Common for Science & Agriculture Groups)**

**(English Version)**

**(Evening Session)**

Time allowed : Three hours

Maximum marks : 70

- Note :**
- (i) You must write the subject-code/paper-code **052/A** 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) **All questions are compulsory.**
  - (v) Use of unprogrammable calculator/log tables is allowed.
  - (vi) Answers should be to the point and supported by relevant formulas / law / principle/ diagram.
  - (vii) Question no. 1 to 8 will be of one mark each.
  - (viii) Question no. 9 to 16 will be of two marks each.
  - (ix) Question no. 17 to 23 will be of four marks each. There will be internal choice in any **two** questions.
  - (x) Question no. 24 to 26 will be of six marks each. There will be internal choice in them.

1. Select the correct option :

Which out of the following is used to make standard resistances :

- (a) Carbon      (b) Copper      (c) Silicon      (d) Constanton      (1)

2. Select the correct option :

The mass of photon at rest is

- (a) 1 amu      (b) 0      (c)  $1.6 \times 10^{-27}$ kg      (d)  $9.1 \times 10^{-31}$  kg      (1)

## 3. Select the correct option

For a circuit at resonance, voltage applied is  $E = E_0 \sin \omega t$  and current is  $I = I_0 \sin \omega t$ , then power consumption in the circuit is :

(a)  $\frac{E_0 I_0}{2}$       (b)  $\frac{E_0 I_0}{\sqrt{2}}$       (c)  $\sqrt{2} E_0 I_0$       (d) 0      (1)

4. "The resistance of voltmeter is less than galvanometer". Is the statement true or false? (1)

5. What do you mean by displacement current? (1)

6. Write the region of energy in which energy of Paschen series corresponding to hydrogen spectrum lies. (1)

7. What is extrinsic semi conductor? (1)

8. What is the maximum frequency which can be transmitted by ground waves? (1)

9. What should be the length of dipole antenna for a carrier wave of frequency  $6 \times 10^8$  Hz? (2)

10. What is AND gate? Give its symbol, Boolean expression and truth table. (2)

11. If amplitudes of two lights from coherent sources in Young's double slit experiment are in the ratio 2 : 5, then find the ratio of intensity at the maxima to the intensity at minima in interference pattern. (2)

12. Explain why danger signals are made of red colour? (2)

13. What are X-rays? Give their two uses. (2)

14. Current changes from 10A to 0A in 2 seconds in a coil of self inductance 2H. Find the induced emf in the coil. (2)

15. State and prove Ampere Circuital law. (2)

16. Give two differences between emf and terminal potential difference. (2)

17. Derive an expression for electric potential at general point of an electric dipole. (4)

18. Write principle, construction, working and theory of ac generator. (4)

(3)

19. Discuss graphical variation of photoelectric current with potential difference in photoelectric cell and explain what information do you get from this graph ? (4)
20. What do you mean by nuclear forces and give their four properties. (4)
21. Discuss the working of n-p-n transistor as an amplifier in common base mode. (4)
22. Explain with the help of a diagram, how will you compare emf's of two cells using potentiometer ? (4)

or

Three identical cells of emf 4V each and unknown internal resistances are connected in parallel. The combination is connected to 10 ohm resistor. If terminal voltage across the cells is 2V, find internal resistance of each cell. (4)

23. Derive the relation  $\frac{\mu_2}{v} - \frac{\mu_1}{u} = \frac{\mu_2 - \mu_1}{R}$  when light undergoes refraction from optically rarer to optically denser medium at curved surface. (4)

or

An object of size 5 cm is placed at distance 25 cm in front of a concave mirror of focal length 20cm. Find the size and nature of image formed ? Also find distance of image from the mirror. (4)

24. (a) What is the principle of capacitor ? (1)
- (b) Derive an expression for the capacitance of parallel plate capacitor with dielectric slab inside the plates. (5)

or

- (a) Explain quantisation of charge. (1)
- (b) Using Gauss theorem, derive an expression for the electric field due to a charged spherical shell at different points. (5)

(4)

25. Write assumptions and sign conventions and then derive mirror formula for concave mirror. (1,5)

or

Discuss compound microscope when image is formed at least distance of distinct vision with well labelled, neat and clean diagram and derive an expression for its magnifying power. (6)

26. (a) Write Biot-Savart's law. (1)  
(b) Derive an expression for the magnetic field on the axis of current carrying circular coil. (5)

or

- (a) How will you convert galvanometer into voltmeter? (3)  
(b) How will you convert galvanometer into ammeter? (3)