

**SY-524**

Reg. No. : .....

Name : .....

**SECOND YEAR HIGHER SECONDARY EXAMINATION, MARCH – 2024**

Part – III

Time : 2 Hours

**PHYSICS**

Cool-off time : 15 Minutes

Maximum : 60 Scores

**General Instructions to Candidates :**

- There is a 'Cool-off time' of 15 minutes in addition to the writing time.
- Use the 'Cool-off time' to get familiar with questions and to plan your answers.
- Read questions carefully before answering.
- Read the instructions carefully.
- Calculations, figures and graphs should be shown in the answer sheet itself.
- Malayalam version of the questions is also provided.
- Give equations wherever necessary.
- Electronic devices except non-programmable calculators are not allowed in the Examination Hall.

**വിദ്യാർത്ഥികൾക്കുള്ള പ്രൊപ്പോസിഷൻസെഷൻ :**

- നിർദ്ദിഷ്ട സമയത്തിന് പുറമെ 15 മിനിറ്റ് 'കൂൾ ഓഫ് ടൈം' ഉണ്ടായിരിക്കും.
- 'കൂൾ ഓഫ് ടൈം' ചോദ്യങ്ങൾ പരിചയപ്പെടാനും ഉത്തരങ്ങൾ ആസൂത്രണം ചെയ്യാനും ഉപയോഗിക്കുക.
- ഉത്തരങ്ങൾ എഴുതുന്നതിന് മുമ്പ് ചോദ്യങ്ങൾ ശ്രദ്ധാപൂർവ്വം വായിക്കണം.
- നിർദ്ദേശങ്ങൾ മുഴുവനും ശ്രദ്ധാപൂർവ്വം വായിക്കണം.
- കണക്ക് കൂട്ടലുകൾ, ചിത്രങ്ങൾ, ഗ്രാഫുകൾ, എന്നിവ ഉത്തരപേപ്പറിൽ തന്നെ ഉണ്ടായിരിക്കണം.
- ചോദ്യങ്ങൾ മലയാളത്തിലും നൽകിയിട്ടുണ്ട്.
- ആവശ്യമുള്ള സ്ഥലത്ത് സമവാക്യങ്ങൾ കൊടുക്കണം.
- പ്രോഗ്രാമുകൾ ചെയ്യാനാകാത്ത കാൽക്കുലേറ്ററുകൾ ഒഴികെയുള്ള ഒരു ഇലക്ട്രോണിക് ഉപകരണവും പരിക്ഷാഹാളിൽ ഉപയോഗിക്കുവാൻ പാടില്ല.

(5 × 1 = 5)

Answer any 5 questions from 1 to 7. Each carries 1 score.

1. The SI unit of electric flux  
(a)  $\text{NC}^{-1}$  (b)  $\text{NmC}$   
(c)  $\text{Nm}^2\text{C}^{-1}$  (d)  $\text{Nm}^2\text{C}$
2. The net electric field inside a conductor when placed in an external electric field is  
(a) Zero (b) Half  
(c) Two times (d) Four times
3. The SI unit of power of lens  
(a) N (b) J  
(c) W (d) D
4. "The locus of points which have the same phase is called a wave front" the statement is True/False
5. The expression for de Broglie wavelength associated with a particle is \_\_\_\_\_.
6. Which element in the periodic table shows maximum binding energy per nucleon ?
7. What is an intrinsic semiconductor ?

Answer any 5 questions from 8 to 14. Each carries 2 scores.

(5 × 2 = 10)

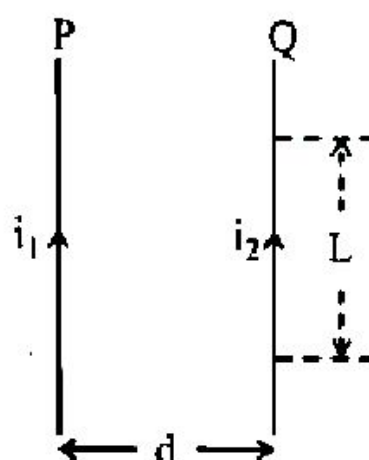
8. What is an equipotential surface ? Give an example.
9. Define drift velocity, give its equation.
10. State Gauss's law in magnetism.
11. What is magnetic flux and how is it measured ?
12. The household line voltage of ac measured is 220 V, calculate its peak voltage.
13. What is stopping potential ?
14. What is nuclear fission ? Give one example.

Answer any 6 questions from 15 to 21. Each carries 3 scores.

(6 × 3 = 18)

15. State and explain the force between electric charges.

16. Figure shows the two current carrying conductors. Derive the expression for force between the conductors.



17. Compare dia, para and ferromagnetic substances with suitable examples.

18. What is self-induction and define the expression for self-inductance of a solenoid.

19. Briefly explain the electromagnetic spectrum.

20. Write the postulates of Bohr's atom model.

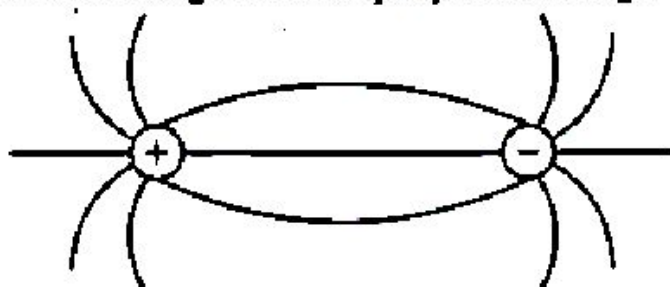
21. What is a rectifier ? Draw the circuit diagram and input, output wave forms of a full wave rectifier.

Answer any 3 questions from 22 to 25. Each carries 4 scores.

(3 × 4 = 12)

22. (a) Complete the diagram with proper marking of direction.

(1)



(b) Derive the expression for electric field intensity at a point from an infinitely long straight conductor carrying charge.

(3)

23. (a) State Ohm's law.

(1)

(b) Derive Wheatstone's network principle.

(3)

24. (a) State Snell's law of refraction.

(1)

(b) Explain critical angle and total internal reflection.

(1½ + 1½)

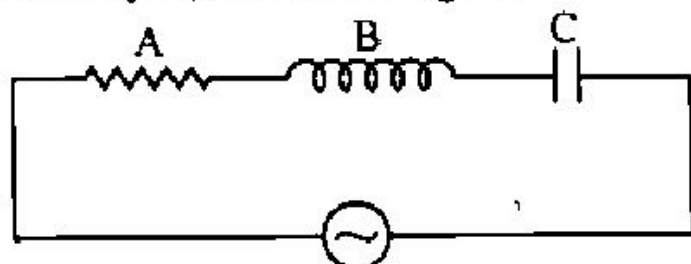
25. (a) What are coherent sources ? (1)
- (b) In Young's double slit experiment, interference pattern is observed at 5 cm from the slits with a fringe width of 1 mm. Calculate the separation between the slits. ( $\lambda = 5000 \text{ \AA}$ ) (3)

Answer any 3 questions from 26 to 29. Each carries 5 scores. (3 × 5 = 15)

26. (a) What is the principle of a capacitor? (1)
- (b) Derive the expression for capacitance of a parallel plate capacitor. (2)
- (c) A 12 pF capacitor is connected to 50 V battery. How much electrostatic energy is stored in the capacitor ? (2)

27. (a) The direction of magnetic field around a current carrying conductor is given by \_\_\_\_\_ (1)
- (b) State Biot-Savart law. (1)
- (c) Derive the expression for magnetic field on the axis of a circular coil carrying current. (3)

28. (a) Write the expression for instantaneous emf of a.c. (1)
- (b) Identify A, B and C in figure. (1)



- (c) Draw the phasor diagram of the above circuit and write the expression for impedance in the circuit, then mention the terms. (3)
29. (a) Derive lens maker's formula. (3)
- (b) Draw the image formation in a simple microscope. (1)
- (c) Write the value of least distance of distinct vision. (1)