MODEL QUESTION PAPER - 4BRIKS ACADEMY PADMANABHANAGARA2023-24

II PUC - PHYSICS (33)

Time: 3 hours 15

General Instructions:

- 1. All parts are compulsory.
- 2. For Part A questions, first written-answer will be considered for awarding marks.
- 3. Answers without relevant diagram / figure / circuit wherever necessary will not carry any marks.
- 4. Direct answers to numerical problems without detailed solutions will not carry any marks.

PART-A

I. Pick the correct option among the four given options for <u>ALL</u> of the following questions: $15 \times 1= 15$

1.	The force of repulsion between two point charges is F. If the distance between them is							
	increased four times, then the new force is							
	a) $\frac{F}{4}$	b) $\frac{F}{16}$	c) 4F		d) 16F			
2.	Constantan wire is used for manufacturing resistance coils because it has							
	a) high specific resi	stance	b) low	w specific resistance				
	c)high melting poin	t	d) low	v temperature co-efficient of resistance				
3.	'he relaxation time in conductor							
	a) increases with in	crease in temperatu	ıre	b) decreases with increase in temperature				
	c) it is independent of temperature							
	d) increases linearly upto critical temperature and then decreases exponentially							
4.	A galvanometer can be converted into an ammeter by connecting							
	a) a low resistance	in series		b) a high resistance	e in parallel			
	c) a low resistance	in parallel		d) a high resistance	e in series			
5.	The dimensions of magnetic intensity is same as							
	a) Magnetization	o) magnetic moment	c) n	nagnetic field d)	magnetic susceptibility			
6.	When north pole of a magnet is moved towards a closed coil, the direction of induced current							
	with respect magnet is							
	a) clockwise			b) anticlockwise				
	c) clockwise only if the speed is very less		SS	d) clockwise only if the speed is high				
7.	Self inductance plays the role of in mechanics							
	a) linear momentur	n b) energy		c) force	d) inertia			
8.	In case of pure indu	uctor						
	a) current and volt	age are in phase	b) current leads the current by 90°					

min. Max Marks: 70

	c) current lags current by 90°				d) current lags voltage by 45°					
9.	The dimensions of E/B is same as that of									
	a) charge	a) charge b) current		c) vel	c) velocity		d) acceleration			
10.	The linea	r magnificat	ion produced b	y a conca	concave mirror is -1, the object is placed at					
	a) center	a) center of curvature of the mirror b) principal focus of the mirror								
	c) infinity d) between principal focus and center						center of curvature			
11.	11. In Huygen's wave theory, a surface of constant phase is called									
	a) ray	b) beam c)	waveleng	th	d) wavefron	t			
12.	12. In an experiment on photoelectric emission, the magnitude of saturation current depends upor									
	a) freque	ency b) intensity	c) wo	rk function	d) sto	opping potential			
13.	3. The negative sign in the expression for total energy of an electron signifies that									
	a) atom is in the excited state									
	b) the atom is unstable									
	c) the electron is bound with the nucleus									
	d) the electron is at infinite distance from the nucleus									
14.	4. The source of energy in the interior of stars is									
	a) nuclea	r fission	b) nuclea:	r fusion	c) radioactiv	ity	d) chain reaction			
15.	.5. In p-n junction is reverse biased, the resistance offered is									
	a) inf	finity	b) zero		c) low		d) high			

II.Fill in the blanks by choosing appropriate answer given in the brackets for <u>ALL</u> the following questions: 5×1=5

(Decreases, uniform, zero, directly, helium)

- **16.** The magnetic field inside the solenoid is ______ proportional to the length of wire.
- 17. A transformers when connected to a DC voltage source records secondary voltage as _____
- **18.** In the case of interference of light, the fringe width obtained is ______ throughout.
- **19.** During α-decay, the nucleus emitted is _____.
- **20.** When p-n junction is forward biased, the width of depletion region _____.

PART -B

III. Answerany<u>FIVE</u>ofthefollowingquestions:

- **21.** State and explain Gauss law in electrostatics.
- 22. Differentiate between polar and non-polar dielectrics.
- 23. Define magnetic dipole moment. Mention its SI unit.
- 24. Mention the expression for magnetic potential energy and the meaning of their symbols.
- **25.** A pair of adjacent coils have a mutual inductance of 0.25 H. If the current in the primary changes from zero to 2 A in 0.05 s, what is the average induced emf in the secondary?
- **26.** Mention the energy losses in the transformers.

5 ×2=10

- **27.** What is displacement current? Mention its expression.
- **28.** What are coherent sources? Give one example.
- 29. What is doping? Which type of dopant is used in p-type semiconductor?

IV. Answer any <u>FIVE</u> of the following questions:

- **30.** Derive an expression of torque experienced by an electric dipole placed in an external electric field.
- 31. What are equipotential surfaces? Draw the equipotential surfaces fora) positive point charge b) uniform electric field
- **32.** Derive the relation $j = \sigma E$.
- **33.** Derive the expression for radius and frequency of charged particle describing uniform circular motion in magnetic field.
- 34. Mention the properties of magnetic field lines.
- **35.** Derive the expression for motional emf.
- 36. Explain the Cartesian sign conventions for an image formation in a spherical mirror.
- **37.** Give the de-Broglie explanation of Bohr's II postulate.
- **38.** Explain Binding energy curve.

PART-D

V. Answer any <u>THREE</u> of the following questions:

- 39. Define capacitance. Derive an expression for capacitance of parallel plate capacitor.
- 40. Derive an condition for a balanced wheat stone network.
- **41.** Derive an expression for force between two parallel current carrying conductors and hence define ampere.
- 42. A) Mention any two applications of polarizer.
 - B) Give the Einstein's explanation of photoelectric effect.
- 43. Explain the working of half wave rectifier.

VI. Answer any \underline{TWO} of the following questions:

- **44.** Three point charges equal to +4 nC are placed at the three corners of a square of side 2 cm. Find the electric field at the fourth corner.
- **45.** Two cells of emf 2V and 4V and internal resistance 1 Ω and 2 Ω are connected parallel so as to send the current in the same direction through an external resistance of 10 Ω . Find the potential difference across 10 Ω resistor.
- 46. A source of alternating emf of 220V-50 Hz is connected in series with a resistance of 200 Ω , an inductor of inductance 100 mH and a capacitor of capacitance 30 μ F. Does the current lead or lag the voltage and by what angle?

PART-C

3×5=15

2×5=10

5×3=15

47. A convex lens of focal length 0.24 m and of RI 1.5 is completely immersed in water of RI 1.33. Find the change in focal length of the lens.