PHYSICS 2016

Time: 3 Hours |

Class: 12th

I M. M.: 75

Instructions-

- (i) All questions are compulsory. Internal options are given in each question from question nos. 5 to 18.
- (ii) Each question from question nos. 1 to 4 carry 5 marks and each subquestion carries 1 mark.
- (iii) Each question from question nos. 5 to 8 carry 2 marks and word limit for each answer is approx 30 words.
- (iv) Each quesdion from question nos. 9 to 13 carry 4 marks and word limit for each answer is approx 75 words.
- (v) Each question from question nos. 14 to 16 carry 5 marks and word limit for each answer is approx 120 words.
- (vi) Each question from question nos. 17 to 18 carry 6 marks and word limit for each answer is approx 150 words.
- (vii) Draw neat and labelled diagrams wherever necessary.
- Q. 1. Select and write the correct option from the options given in each question: $5 \times 1 = 5$
 - (a) Two point charges, each of q, are placed at a separation of 2a, the electric potential at their midpoint will be:
 - (i) Zero

(ii) $\frac{q}{2\pi\epsilon_0 a}$

(iii) $\frac{q}{8\pi\epsilon_0 a}$

- (iv) $\frac{q}{2\pi\epsilon_a^2}$
- (b) Unit of specific resistance is:
 - (i) ohm

(ii) ohm-1

(iii) ohm metre

- (iv) ohm-1 metre-1
- (c) For measuring the current in a circuit, the instrument used is:
 - (i) Voltmeter

- (ii) Ammeter
- (iii) Galvanometer
- (iv) Voltameter

	(d) The device which converts the mechanical energy				
		tric energy is:			
		(i) D.C. motor	(ii) a.c. dynamo		
		(iii) transformer	(iv) starter		
	(e)	The ozonosphere absorbs the:			
		(i) visible light	(ii) microwaves		
		(iii) Infrared radiations	(iv) ultraviolet radiations.		
Q. 2.	Fill in the blanks: $5 \times 1 = 5$				
	(a)	The distance from pole of sp	herical mirror to its focus is called		
		of that mirror.	•		
	(b)	Resolving limit of a healthy	eye is		
	(c)	1 eV = Joule			
	(d)	The use of zener diode is as	S		
	(e)	The frequency of optical wa	ives is of the order of		
Q. 3.	column 'B' for each statement of				
	colu	mn 'A' and match the correct p	pair: $5 \times 1 = 5$		
		Column 'A'	Column 'B'		
	(a)	Unit of currnet density	(i) Ammeter		
	(b)	refractive index	(ii) amp per square metre		
	(c)	Shunted galvanometer	(iii) a physical medium		
			Real depth		
	(b)	Communication channel	(iv) Real depth Apparent depth		
	(0)	Minimum energy for electron			
	(e)	emission	(1) convex tonoc		
		Citiission	(vi) Power of lense		
			(vii) Work function		
Q. 4.	Give	answer in one sentence each:	5 × 1 = 5		
₹. ⁴.	(a)	What is the value of specific	charge of an electron?		
	(b)				
•	 (c) Write down the relation between α & β related to ampl 				
	(d) Who invented the television transmission?				
	(e)				
. 5.	Write the name of the radiations of shortest and longest wavelength				
. J.	in the electromagnetic spectrum.				
ND)		is greenhouse effect? Explain	e Y		
OR)	wilat	is greetinouse erret.	¥		

2.6.	What is reflection? Write the laws of reflection.				
OR)	What is meant by magnification of a lens? Write its expression.				
).7.		is photoelectric effect?	2		
OR)	What are de-Broglie waves? Establish the de-Broglie wavelength				
	equat	0.000	-		
). 8.	What	is meant by 'LASER'? State its two uses.	2		
OR)	What is demodulation?				
).9.	State	tate Biot-Savart's law? Define the unit of current. 4			
OR)	Derive expression for the intensity of magnetic field at a point in end				
i.	on position due to a short bar magnet.				
. 10.	Derive expression for the self inductance of a solenoid. What fac-				
	tors a	affect it?	4		
OR)	Obta	in expression for an a.c. circuit-			
	$P_{av} =$	$V_{rms} \times I_{rms} Cos\phi$			
.41.	A T.V. antenna is of height h metre. Show that it can be used				
	trans	mit the signal up to the distance $d = \sqrt{2hR}$ on the earth surface	ce,		
	where R is the radius of earth.				
OR)	Write	e down four differences between interference and diffraction	•		
). 12.	Describe the astronomical telescope on the basis of the following				
	point	ts:	4		
	(i)	Labelled ray diagram			
	(ii)	Derivation of formula for magnifying power, when final in	m-		
		age is formed at the least distance of distinct vision.			
(OR)	Describe the compound microscope on the following headings:				
	(i)	Labelled ray diagram of formation of image.	in		
	(ii)	Magnifying power when final image is formed at least d	12-		
3/ 27 ¹		tance of distinct vision.	4		
Q. 13.	Diffe	Differentiate analog signal and digital signal with diag.			
(OR)	What is light emitting diode (LED)? Explain its working prin				
	and state factors on which the colour of light emitted by it depends. Describe Van-de Graaff generator under the following points: 5				
Q . 14.	2015 1217				
	(i)	Labelled diagram			
	(ii)	Principle	**		
	(iii)	Uses (any two)			
	(iv)	Disadvantage			

- (OR) Prove that the electric potential at a point in broad side on position due to an electric dipole is zero.
- Q. 15. The self inductance of two coils P and S are L_1 and L_2 . The coupling between them is ideal. Show that the mutual inductance between these coils is $M = \sqrt{L_1 L_2}$
- (OR) Deduce expressions for the resultant potential difference, impedance and current in a L-R alternating circuit. Draw graph to show the phase difference between the current and voltage.
- Q. 16. Explain the use of P-N junction diode as full wave recitifier on the basis of the following points.
 - (i) Labelled circuit diagram
 - (ii) Working method
 - (iii) Graph between input and output potential with the variation of time.
- (OR) How will you obtain OR, AND gates from the NAND and NOR gates? Write symbol, Boolean formula and truth table.
- Q. 17. Describe experiment to compare the e.m.f.'s of two Cells by potentiometer under the following headings:

 (i) circuit diagram

 (ii) formula
 - (iii) observation table (iv) two precautions.
- (OR) With the help of Kirchhoff's Law explain the wheatstone's bridge principle.
- Q. 18. Establish the refraction formula for a thin lens:

$$\frac{1}{1} = (\mu - 1) \left(\frac{1}{R_1} - \frac{1}{R_2} \right)$$

- (OR)

 1) cribe the displacement method to determine focal length of Convex Lense under the following headings:
 - (i) ray diagram
 - (ii) formula derivation
 - (iii) Why the distance between two pins should be greater than 4f?