12th PHYSICS KEY ANSWERS MARCH-2016

PART-I

Q.NO	A-TYPE		Q.NO	B-TYPE	
1	c	AB	1	c	A plane surface passing through the centre of the electric dipole and perpendicular to the axis of the electric dipole
2	b	$_{15}P^{32}$	2	d	Zero
3	b	$2.6X10^{-15}$m	3	d	Infinite resistance
4	c	$Sin^{-1}(1/\sqrt{3})$	4	b	Twice the signal freqency
5	c	$\frac{10.1}{0.6931}$ minutes	5	b	Power is transmitted in a direction perpendicular to both the fields
6	b	Twice the signal freqency	6	c	1000 W
7	a	downwards	7	c	AB
8	b	Room heater	8	c	$Sin^{-1}(1/\sqrt{3})$
9	c	0.25	9	b	Zero and maximum
10	b	Electric field decreases	10	d	Conservation of energy
11	b	5.7 V	11	c	$\frac{10.1}{0.6931}$ minutes
12	b	Power is transmitted in a direction perpendicular to both the fields	12	a	Phenomenon of conversion of radiation into kinetic energy
13	c	1 m	13	c	Sommerfeld
14	a	Collision	14	c	0.25
15	a	Pure line spectrum	15	a	Pure line spectrum
16	b	Absorbs green light	16	c	Ionospheric propagation
17	b	A to B till the potentials become equal	17	b	$_{15}P^{32}$
18	c	Ionospheric propagation	18	c	1 m
19	a	Phenomenon of conversion of radiation into kinetic energy	19	a	Downwards
20	c	A plane surface passing through the centre of the electric dipole and perpendicular to the axis of the electric dipole	20	b	A to B till the potentials become equal
21	c	27.93 MeV	21	b	Electric field decreases
22	d	Infinite resistance	22	a	Collision
23	c	1000 W	23	b	Room heater
24	c	Sommerfeld	24	c	3600 J
25	a	$C^2N^{-1}m^{-2}$	25	a	Zero
26	d	Zero	26	b	$2.6X10^{-15}$m
27	a	Zero	27	a	$C^2N^{-1}m^{-2}$
28	c	3600 J	28	b	Absorbs green light
29	b	Zero and maximum	29	b	5.7 V
30	d	Conservation of energy	30	c	27.93 MeV

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Important Note:

1. For answers in Part – II , Part-III, and Part- IV like reasoning , explanation, narration,description and listing the points, students may write in their own words but without changing the concepts and without skipping any point.
2. Answers written only in BLACK or BLUE should be evaluated.
3. For graphical representation, X and Y variables must be mentioned . If not , reduce ½ mark.
4. Marks should be given to the unit, only if the answer is correct for problems.

PART-II

Q.No	Descrbtion	MARK	TOTAL
31	Gauss's law – Correct definition (or) $\phi=\frac{q}{\varepsilon o}$	3 1	3
32	Lines of force – Any 3 properties (3x1)	3	3
33	Mobility – correct definition Unit : $m^2V^{-1}s^{-1}$	2 1	3
34	$r=(\frac{E-V}{V})R$ substitution r= 0.101Ω (correct answer +unit)	1 1 ½ +½	3
35	Temperature Co-effienct of Resistance- Correct definition	3	3
36	$B = \frac{\mu o I}{2\pi a}$ substitution B = $2x10^{-5}$ T (correct answer +unit)	1 1 ½ +½	3
37	Three methods of producing induce emf(3x1)	3	3
38	e = -Blv substitution e =-0.0164 V (correct answer +unit)	1 1 ½ +½	3
39	Write any 3 differences between interference and diffraction (3x1)	3	3
40	Any 3 uses of polaroids (3x1)	3	3
41	Moseley's law – correct definition Equation : $\nu \alpha Z^2$	2 1	3
42	Eq = mg (or) q = $\frac{mgd}{V}$ q=ne substitution q = $62.72x10^{-20}$C and n=4 (correct answer +unit)	1/2 1/2 1 ½ +½	3
43	Any 3 uses of Electron microscope (3x1)	3	3
44	β – decay – correct definition example	2 1	3
45	Any 3 uses of Nuclear reactor(3x1)	3	3
46	Proper circuit diagram for voltage regulator (without labeling only 2 marks)	3	3

47	$A_f = \frac{A}{1+A\beta}$ substitution β = 0.02 (correct answer +unit)	1 1 ½ +½	3
48	Correct statement	3	3
49	Any uses of ICs (3x1)	3	3
50	Skip distance – correct statement If sky wave propagation and fixed frequency – not mentioned reduce 1 mark (½ +½)	3	3

PART-III

51	a) $C = \frac{\varepsilon o A}{d}$ Substitution $C = 3.186\times10^{-11}$F $U = \frac{1}{2}CV^2$ Substitution $U = 2.55\times10^{-6}$ J (or) b) $U = \frac{1}{4\pi\varepsilon or}(q_1q_2+q_2q_3+q_3q_1)$ Substitution U = - 0.255 J (correct answer +unit)	1 ½ 1 1 ½ 1 2 2 ½ +½	5
52	Any 5 applications of Superconductors (5x1)	5	5
53	Diagram Law Explanation $\frac{m1}{m2} = \frac{I1}{I2}$ $\frac{m3}{m4} = \frac{t1}{t2}$ m α It (or) m α q	1 1 1 ½ ½ 1	5
54	Any 5 special features of Magnetic Lorentz force (5x1)	5	5
55	Circuit diagram e = Eo sinωt e = iR upto i = Io sinωt To mention the phase angle between the voltage and the current	1 ½ ½ 2 1	5
56	$\frac{I1}{I2} = \frac{(a1)^2}{(a2)^2}$ $\frac{Imax}{Imin} = \frac{(a1+a2)^2}{(a1-a2)^2}$ Substitution Imax : Imin : : 81 : 49	1 1 2 1	5
57	Any 5 properties of Canal rays (5x1)	5	5
58	Photo electric effect – definition Four laws (4x1)	1 4	5

59	**Time Dilation:** Explanation t = $\frac{to}{\sqrt{1-\frac{v^2}{c^2}}}$ t > to lengthened factor $\frac{1}{\sqrt{1-\frac{v^2}{c^2}}}$ Example	 1 1 1 1 1	5
60	Mass of reactant = 7.023791 amu Mass of product = 7.018653 amu Mass defect = 0.005138 amu 1 amu = 931 MeV Energy released = 4.783 MeV	1 1 1 1 1	5
61	**Half wave Rectifier** Circuit diagram Explanation Waves diagram Unidirectional pulsating output is obtained Efficiency definiftion Efficiency 40.6 %	 1 1 1 1 ½ 1/2	5
62	Optical fibre If not mentioned coherent light and Principle : Total internal reflection reduce ½ mark for each Advantages (4x1)	1 4	5

PART - IV

63	**Electricfield – Axial line** Electric dipole definition Diagram Explanation $E_1 = \frac{q}{4\pi\varepsilon o\,(r-d)^2}$ (along BP) $E_2 = \frac{q}{4\pi\varepsilon o\,(r+d)^2}$ (along PA) $E = E_1 + (-E_2)$ Upto $E = \frac{1}{4\pi\varepsilon o}\,\frac{2p}{r^3}$ (along BP) P =q x 2d E acts in the direction dipolemoment	 1 1 1 1 1 1 2 1 1	10
64	**Cyclotron** Diagram	 2	10

	Principle Construction Working $BqV = mv^2 / r$ $T = 2\pi m / Bq$ (or) $v = Bq / 2\pi m$ Limitations (any 2)	1 1½ 1½ 1 1 2	
65	**AC Generator – single phase** Diagram Principle Explanation of 4 parts – (4x1/2) (mere mentioning the parts – 1 mark Direction of induced current given by Flemming Right Hand rule First half cycle Second half cycle $e = E_o \sin\omega t$; $E_o = NBA\omega$ Output sine wave form	 2 1 2 1 1 1 1 1	10
66	**Raman effect** Raman effect – explanation Diagram (3x1) Explanation of stoke's and Anti-stoke's lines with respect to frequency Explanation of Raman effect (3x1) Explanation for $\Delta v = v_o - v_s$ Δv is positive for stoke line Δv is negative for Anti-stoke line Intensity of stoke line is always greater than antistoke line	 1 3 1 3 1 1	10
67	**J.J Thomson Experiment** Diagram Explanation Derivation upto $V = \frac{E}{B}$ $t = \frac{l}{v}$ $y_1 = \frac{1}{2}\frac{Ee}{m}(l/v)^2$ $Y = k\, y_1$ $\frac{e}{m} = \frac{2yE}{Kl^2\ B^2}$	2 1 2 1 2 1 1	10
68	**BainBridge Mass Spectrometer** Diagram Accurate determination of atomic masses Description $Eq = BqV$ (or) $V = \frac{E}{B}$ Explanation of effect of magnetic field B' in the chamber $B'qV = mv^2 / r$ $m = \frac{BB'qR}{E}$ and Measurement of R	 2 1 2 1 1 1 1+1	10
69	**Non-Inverting Operational Amplifier** Operational Amplifier – correct definition	 1	10

	Diagram Explanation $A_v = \frac{Vout}{VA}$ $V_A = \frac{Rin}{Rf+Rin} Vout$ (or) $\frac{Vout}{VA} = = \frac{Rf+Rin}{Rin}$ $\frac{Vout}{VA} = 1 + \frac{Rf}{Rin}$ (or) $A_v = 1 + \frac{Rf}{Rin}$ $Vout = (1 + \frac{Rf}{Rin})$ Vin Input and output voltages are Inphase	2 2 1 1 1 1 1	
70	**Monochrome TV Transmitter** Block diagram (10 x ½) Explanation	5 5	10

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