+2 Physics - Answers for 200 one mark questions - 2014 - Page -1

Q.No	Option	Answer	Q.No	Option	Answer
1	a	$N\ m^2\ C^{-1}$	26	c	Hg
2	d	electric potential	27	d	ceramic
3	d	1 cm	28	a	5%
4	c	2.56×10^{-14} J	29	b	Ω m
5	b	16×10^{-29} C m	30	b	negative
6	a	$E = \sigma / \varepsilon_0$	31	c	36×10^{5} J
7	b	$q^2 / 2C$	32	d	2400 W
8	b	50 N	33	a	kg C^{-1}
9	c	F / ε_r	34	d	will remain the same
10	d	5	35	d	2 Ω
11	d	1.129×10^5	36	c	1 : 2
12	b	q / ε_0	37	a	per ^0C
13	a	9×10^9 N m^2 C^{-2}	38	b	nR
14	d	none of the above	39	d	$mL / nAe^2\tau$
15	c	farad	40	a	1.08 volt
16	b	10 V	41	a	I^2Rt
17	a	opposite to E_0	42	c	63% and 37%
18	d	$q_1q_2 / 4\pi\varepsilon_0 r$	43	b	Pt
19	c	3 pF	44	a	volt / ohm
20	a	zero	45	a	maximum
21	c	current density	46	b	parallel
22	a	$m^2 V^{-1} s^{-1}$	47	b	8.8×10^{10} C kg^{-1}
23	d	at constant temperature	48	d	changes sign,then increases
24	d	ℓ / RA	49	a	9.27×10^{-24} A m^2
25	a	zero	50	b	M = I A

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+2 Physics - Answers for 200 one mark questions - 2014 - Page -2

Q.No	Option	Answer	Q.No	Option	Answer
51	a	490 ^{0} C	76	d	5000 W
52	b	2.4 X 10 $^{-13}$ N	77	d	all of these
53	a	0^o	78	c	120^o
54	d	Is maximum when $\theta = 90^0$	79	c	ohm
55	b	attractive	80	d	energy
56	c	end rule	81	d	$1 / \sqrt{(\mu_o \varepsilon_0)}$
57	d	mass varies at high velocities	82	a	5 X 10^7 Hz
58	d	1 : 4	83	a	rarer medium
59	d	small couple per unit twist	84	c	scattering
60	d	infinite resistance	85	a	2 X 10^8 m s^{-1}
61	c	weber	86	b	destructive
62	c	electromagnetic energy	87	b	interference
63	d	transformer	88	c	comparable with λ
64	c	input power	89	b	115^o
65	b	< input current	90	d	all these
66	b	a thick wire	91	c	both (a) and (b)
67	a	0.707 E_o	92	d	sugar
68	a	AC only	93	b	1 : 3
69	d	$1 / 2\pi \sqrt{(LC)}$	94	a	Stoke's line
70	a	AC only	95	c	60^o
71	c	zero	96	d	10
72	d	$\sqrt{\{R^2 + 1/\omega^2C^2\}}$	97	a	0^o
73	c	50 Hz	98	c	5 X 10^5
74	c	7.07 A	99	b	band
75	d	zero	100	d	plane

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Q.No	Option	Answer	Q.No	Option	Answer
101	c	10 mm	126	a	are independent of one another
102	c	Thomson	127	c	$t > t_o$
103	a	10000	128	b	$E = mc^2$
104	b	2.12 A^o	129	d	infinity
105	b	-3.4 eV	130	b	27 X 10^{16} J
106	a	m^{-1}	131	d	$(m - m_o)c^2$
107	b	13.6 V	132	b	inertial frames
108	d	Stark effect	133	c	all frames
109	d	de acceleration of electron	134	b	eV_o
110	c	filament current	135	d	1 : 2√2
111	b	10^{-8} m	136	b	high vacuum
112	a	K_α	137	a	go slower than the clocks on the earth
113	c	30^o	138	b	60000 V
114	c	2 → 1	139	a	2 A^o
115	c	50	140	b	pv / 2
116	a	1 : 2	141	c	isotones
117	b	2,1,0	142	c	1.816 X 10^{17} kg m^{-3}
118	c	10^5 V m^{-1}	143	a	9.6 X 10^{-19} C
119	d	1 : 4 : 9	144	d	931 MeV
120	b	10^{-3} s	145	c	mesons
121	c	voltage between the anode and cathode	146	b	decreases by 3
122	c	$E^{-½}$	147	d	anti neutrino
123	c	6.135 A^o	148	d	infinity
124	a	n λ	149	a	GeV
125	b	charge X potential	150	b	0.85 MeV

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+2 Physics - Answers for 200 one mark questions - 2014 - Page -4

Q.No	Option	Answer	Q.No	Option	Answer
151	b	controlled fission chain reaction	176	a	collision
152	b	hydrogen bomb	177	c	180^o
153	b	lepton	178	b	transistor
154	c	0.025 eV	179	c	sign changer
155	a	α - particle	180	a	an amplifier with positive feedback
156	c	93.75%	181	d	modulation
157	c	2.5	182	c	both (a) and (b)
158	d	1 : 8	183	a	high frequency radio waves
159	b	I^{131}	184	d	20 Hz to 20 kHz
160	b	mean life	185	b	sound signal to electrical signal
161	c	1.1 eV	186	c	loud speaker
162	d	intrinsic semi conductor	187	b	m > 1
163	b	0.3 V	188	b	twice the signal frequency
164	c	minority carriers	189	c	electromagnetic energy
165	a	diode	190	a	carrier wave
166	c	Zener diodes	191	a	Diode
167	b	$(1/\alpha) = 1 + (1/\beta)$	192	b	10.7 MHz
168	a	in phase	193	b	frequency modulated
169	a	0.3 volt	194	d	control grid of electron gun
170	a	infinity	195	c	Blanking pulse
171	c	$AC + \bar{A}B$	196	b	64 μ s
172	d	sinusoidal wave	197	c	both modulation and demodulation
173	d	semiconductor material	198	a	total internal reflection
174	b	NOR	199	a	36,000 km
175	c	1 mA	200	c	flicker

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+2 Physics One mark Test - 200 Questions (Year: 2014)

Solution for Problems

Q-No: 3

Electric field $E = \frac{V}{d} = \frac{100}{10^4}$

$= 10^{-2}$ m $= 1$ cm

Q-No: 4

Electric Potential energy $U = \frac{1}{4\pi\varepsilon_0} \cdot \frac{q_1 q_2}{r^2}$

$= \frac{9 \times 10^9 \times 1.6 \times 10^{-19} \times 1.6 \times 10^{-19}}{9 \times 10^{-15}}$

$= 2.56 \times 10^{-14}$ joule

Q-No: 5

Electric Diploe moment $P = q \times 2d$

$= 1.6 \times 10^{-19} \times 10 \times 10^{-10}$

$= 1.6 \times 10^{-29}$ Cm

Q-No: 16

Electric Potential $V = \frac{W}{q} = \frac{200}{20}$

$= 10$ volt

Q-No: 19

$$\frac{1}{C_s} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}$$

$$= \frac{1}{9} + \frac{1}{9} + \frac{1}{9} = \frac{3}{9}$$

Effective Capacitance $C_s = 3$ pF

Q-No: 32

Power $P = \frac{V^2}{R}$

$= \frac{240 \times 240}{24}$

$= 2400$ watt

Q-No: 36

$$R_1 = \frac{\rho \ell_1}{A_1} \text{ and } R_2 = \frac{\rho \ell_2}{A_2}$$

$$R_1 = \frac{\rho \ell_1}{\pi r_1^2} \text{ and } R_2 = \frac{\rho \ell_2}{\pi r_2^2}$$

Here, $R_1 = R_2$ Hence, $\frac{\rho \ell_1}{\pi r_1^2} = \frac{\rho \ell_2}{\pi r_2^2}$

$$\frac{r_1^2}{r_2^2} = \frac{\ell_1}{\ell_2} = \frac{2}{8}$$

$$\frac{r_1}{r_2} = \frac{1}{2}$$

Q-No: 44

Unit of reduction factor is ampere.

Current $= \frac{\text{Potential difference}}{\text{Resistance}}$

Hence, ampere = volt / ohm

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Q-No: 51

Temperature of inversion $\theta_i = 2\theta_n - \theta_c$

$= 2 \times 250 - 10$

$= 490^{o}C$

Q-No: 52

Force $F = Bev$

$F = 0.5 \times 1.6 \times 10^{-19} \times 3 \times 10^{6}$

$F = 2.4 \times 10^{-13} N$

Q-N0: 58

$R_p = R/2$

$R_s = 2R$

For a given Potential, $H = \frac{V^2 t}{R}$

$\frac{H_s}{H_p} = \frac{R_p}{R_s}$

$= \frac{R/2}{2R} = 1 : 4$

Q.No: 74

Peak value of the current $I_o = I_{rms} \times \sqrt{2}$

$= 5 \times 1.414$

$= 7.07 A$

Q.No: 76

$I = \frac{P}{V} = 11000 / 220$

$= 50 A$

Power $= I^2 R$

$= 2500 \times 2$

$= 5000$ watt

Q.No: 85

Refractive Index $= \frac{C_a}{C_m} = 3/2$

Hence, $C_m = \frac{3 \times 10^8 \times 2}{3}$

$= 2 \times 10^8 \ m\,s^{-1}$

Q-No: 93

$r_n = \sqrt{nR\lambda}$

$\frac{r_1}{r_9} = \sqrt{\frac{1 \times R\lambda}{9 \times R\lambda}}$

$= 1 : 3$

Q-No: 96

$\frac{r^2_{m+n}}{r^2_m} = \frac{(m+4)\,R\lambda}{m\,R\lambda} = \frac{(\sqrt{7})^2}{(\sqrt{5})^2}$

$\frac{(m+4)}{m} = \frac{7}{5}$

$7m = 5m + 20$

$2m = 20$ Hence, $m = 10$

Q.No: 98

$N = \frac{1}{(a+b)}$

$= \frac{1}{2 \times 10^{-6}}$

$= 5 \times 10^5$

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Q.No: 103

$$\frac{\text{Diameter of the atom}}{\text{Diameter of the nucleus}} = \frac{10^{-10}}{10^{-14}}$$

$$= 10^{4} = 10000$$

Q-No: 104

$$r_n = n^2 r_1$$

The radius of the first excited state(n=2) $\} r_2 = 2^2 \times 0.53\ A^{o}$

$$= 2.12\ A^{o}$$

Q-No: 105

$$E_n = \frac{-13.6\ eV}{n^2} = \frac{-13.6\ eV}{4}$$

Energy of the second orbit $= -3.4\ eV$

Q-No: 113

Bragg's law is

$$2d \sin\theta = n\lambda$$

Here, $d = \lambda$, $n = 1$

Hence, $\sin\theta = 1/2$

$$\theta = 30^{o}$$

Q.No: 115

Total Charge $q = ne$

$$q = \frac{8 \times 10^{-18}}{1.6 \times 10^{-19}}$$

$$= 50$$

Q.No: 116

For $_2He^4$ $e/m = 2/4 = 1/2$

For $_1H^1$, $e/m = 1/1$

$$\frac{(e/m)_{\alpha}}{(e/m)_{p}} = 1 : 2$$

Q-No: 118

$$E = \frac{V}{d} = \frac{5000}{5 \times 10^{-2}}$$

Electric field $E = 10^{5}\ V\ m^{-1}$

Q-No: 123

$$\lambda = \frac{12.27\ A^{o}}{\sqrt{V}}$$

$$= \frac{12.27\ A^{o}}{\sqrt{4}}$$

$$= \frac{12.27\ A^{o}}{2}$$

de Broglie Wavelength of the electron $\} \lambda = 6.135\ A^{o}$

Q-No: 130

Energy $E = m c^2$

$$= 3 \times (3 \times 10^{8})^2$$

$$= 27 \times 10^{16}\ \text{joule}$$

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Q-No: 135

$$\lambda = \frac{h}{\sqrt{2meV}}$$

$$\lambda_\alpha = \frac{h}{\sqrt{2 \times 4m \times 2e \times V}}$$

$$\lambda_p = \frac{h}{\sqrt{2 \times m \times e \times V}}$$

$$\frac{\lambda_\alpha}{\lambda_p} = \sqrt{\frac{2}{16}} = 1 : 2\sqrt{2}$$

Q-No: 139

$$\lambda = \frac{h}{mV}$$

$$\lambda = \frac{6.6 \times 10^{-34}}{3.3 \times 10^{-24}} = 2 \times 10^{-10} m$$

de Brolie Wavelength $= 2 A^{o}$

Q-No: 143

For ${}_6C^{12}$, $q = 6e$

$= 6 \times 1.6 \times 10^{-19}$

Charge $= 9.6 \times 10^{-19}$ C

Q-No: 150

$$\frac{BE}{A} = \frac{200}{235} \text{ MeV}$$

$= 0.85$ MeV

Q-No: 156

Half life period (HLP) = 5 minutes

In 20 minutes, there are 4 HLP.

Remaining Part $= \left(\frac{1}{2}\right)^4 = 6.25\ \%$

Decaved Part $= 93.75\ \%$

Q-No: 158

Nuclear radius $R = r_o A^{1/3}$

$$\frac{R_1}{R_2} = \left(\frac{A_1}{A_2}\right)^{1/3} = \frac{1}{2}$$

Hence, $\frac{A_1}{A_2} = \left(\frac{1}{2}\right)^3 = 1 : 8$

Q-No: 175

Current gain $\beta = \frac{I_C}{I_B}$

Hence,

collector current $I_C = \beta \times I_B$

$= 40 \times 25 \times 10^{-6}$

$= 1000 \times 10^{-6} A$

$= 1$ mA

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