حل البنك المؤقت لبحث الالكترونيات والجسم الصلب

قسم الفيزياء مع التمنيات بالتوفيق

C (1	A (2	D (3
B (4	B (5	A (6
A (7	C (8	C (9
C (10	B (11	C (12
C (13	D (14	A (15
B (16	A (17	D (18
C (19	D (20	B (21
A (22	A (23	C (24
B (25	D (26	A (27
C (28		
(29		

$$\Delta E = hf = h\frac{c}{\lambda}$$

$$\lambda = \frac{hc}{\Delta E} = \frac{hc}{E_3 - E_2}$$

$$\lambda = \frac{6.6\times10^{-34}\times3\times10^{8}}{\left[(-1.51)-(-3.4)\right]\times1.6\times10^{-19}}$$

$$\lambda = \frac{19.8\times10^{-26}}{3.024\times10^{-19}} \simeq 6.6\times10^{-7}\ m$$ الجواب (D)

A (30

(31

$E_0 = -13.6\ eV$

$E = hf = 6.6\times10^{-34}\times2.91\times10^{15}$ طاقة الفوتون

$= 19.206\times10^{-19}\ J$

$$E_t = \left[19.206\times10^{-19}\right] + \left[-13.6\times1.6\times10^{-19}\right]$$

$$\simeq -2.56\times10^{-19}\ J$$ الجواب (C)

قسم انتزاع الالكترونات وتسريعها

B (1	D (2	C (3
D (4	B (5	B (6
A (7	B (8	A (9
D (10	B (11	D (12
C (13	C (14	A (15
B (16	A (17	D (18
(19		

$$\Delta E_K = \Sigma \vec{w}_{\vec{F}}$$

$$E_{K_2} - E_{K_1} = F.d = eEd = eU$$

$$\frac{1}{2}mv^2 = eU \Rightarrow v = \sqrt{\frac{2eU}{m}}$$

$$v^2 - v_0^2 = 2a(x - x_0)$$

$$\frac{2eU}{m} = 2ad \Rightarrow a = \frac{eU}{md}$$

$$a = \frac{1.6\times10^{-19}\times120}{9\times10^{-31}\times2\times10^{-2}} = 64\times10^{14}\ ms^{-2}$$ الجواب (B)

(20

$$F = ma \Rightarrow a = \frac{F}{m} = \frac{eE}{m}$$

$$a = \frac{1.6\times10^{-19}\times200}{9\times10^{-31}} = 3.55\times10^{13}\ ms^{-2}$$ الجواب (C)

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(21

$$F = eE = e\frac{U}{d} = 1.6\times10^{-19}\times\frac{900}{2\times10^{-2}}$$

$$F = 72\times10^{-6}\ N$$ الجواب (A)

(22 بعد دخلته مركبة السرعة الالكترون على المحور السيني

بأنه مسار المسار تكون

$$y = \frac{eU}{2mdv^2}x^2$$

$$y = \frac{1.6\times10^{-19}\times900}{2\times9\times10^{-31}\times2\times10^{-2}\times16\times10^{14}}x^2$$

$$y = \frac{5}{2}x^2$$ الجواب (C)

(23

F = F كهربائية
مغناطيسية

$$eE = evB\sin\theta$$

$$B = \frac{E}{v} = \frac{\frac{U}{d}}{v}$$

$$B = \frac{U}{vd} = \frac{900}{4\times10^{7}\times2\times10^{-2}}$$

$$B = 11.25\times10^{-4}\ T$$ الجواب (D)

الأشعة الضوئية

C (1 A (2 B (3

D (4 C (5 B (6

B (7 B (8

(9

$$E_k = \frac{1}{2}mv^2$$

$$v = \sqrt{\frac{2E_k}{m}}$$

(10 B (11 A (12

D (13

الفيزياء الحرارية

D (1 B (2 D (3

A (4 C (5 B (6

C (7 D (8 C (9

B (10 C (11 B (12

D (13 A (14 A (15

(16

عدد الالكترونات $I = \frac{q}{\Delta t} = \frac{Ne}{\Delta t}$

$$N = \frac{I.\Delta t}{e} = \frac{10\times10^{-6}\times30}{1.6\times10^{-19}}$$

$N = 187.5\times10^{13}$ الالكترون

الطاقة الحركية $= N\times E_k$

$$= 187.5\times10^{13}\times9.6\times10^{-16}$$

$$= 1.8\ J$$ الجواب (D)

2/

$$v = \sqrt{\frac{2\times18\times10^{-19}}{9\times10^{-31}}} = 2\times10^{6}\ ms^{-1}$$

الجواب (B)

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B (1
D (2
C (3
D (4
A (5
C (6
A (7
C (8
B (9
B (10
B (11
A (12
C (13
C (14
C (15

(16

$$I = \frac{q}{\Delta t} = \frac{Ne}{\Delta t} \rightarrow N = \frac{I\,\Delta t}{e}$$

$$N = \frac{16\times10^{-3}\times1}{1.6\times10^{-19}} = 10^{17}$$ عدد الإلكترونات (C)

(17

$$E_k = eV = 1.6\times10^{-19}\times180$$

$$= 288\times10^{-19}\ J$$ (D)

B (19
B (20
C (18
C (21

(22

$$E_k = E - E_s = hf - E_s$$

$$E_k = \left[6.6\times10^{-34}\times7.5\times10^{14}\right] - 3.2\times10^{-19}$$

$$= 1.618\times10^{-19}\ J$$ الجواب (C)

(23

$$E_s = hf_s = h\frac{c}{\lambda_s}$$

$$\lambda_s = \frac{hc}{E_s} = \frac{6.6\times10^{-34}\times3\times10^{8}}{33\times10^{-20}}$$

$$= 6\times10^{-7}\ m$$ الجواب (B)

(24

$$E_k = E - E_s = hf - E_s$$

$$E_k = h\frac{c}{\lambda} - E_s$$

$$E_k = \left[6.6\times10^{-34}\frac{3\times10^{8}}{0.3\times10^{-6}}\right] - 33\times10^{-20}$$

$$= 6.6\times10^{-20}\ J$$ الجواب (C)

(25

$$E_s = hf_s = h\frac{c}{\lambda_s}$$

$$E_s = 6.6\times10^{-34}\frac{3\times10^{8}}{66\times10^{-8}} = 3\times10^{-19}\ J$$

الجواب (D)

(26

$$P = \frac{h}{\lambda} = \frac{6.6\times10^{-34}}{44\times10^{-8}} = 1.5\times10^{-27}$$

$kg\ m\ s^{-1}$

الجواب (A)

(27

$$E_k = E - E_s$$

$$= hf - hf_s = hc\left(\frac{1}{\lambda} - \frac{1}{\lambda_s}\right)$$

$$= 6.6\times10^{-34}\times3\times10^{8}\left(\frac{1}{44\times10^{-8}} - \frac{1}{66\times10^{-8}}\right)$$

$$= 1.5\times10^{-19}\ J$$

$$V_0 = \frac{E_k}{e} = \frac{1.5\times10^{-19}}{1.6\times10^{-19}} = 0.9375\ V$$

الجواب (D)

(28

$$E_k = E - E_s = hf - E_s = h\frac{c}{\lambda} - E_s$$

$$E_k = \left[6.6\times10^{-34}\frac{3\times10^{8}}{5\times10^{-7}}\right] - 3\times10^{-19}$$

$$= 0.96\times10^{-19}\ J$$ الجواب (B)

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الأسئلة السينية

C (1	A (2	D (3
D (4	B (5	B (6
A (7	C (8	B (9
B (10	B (11	D (12
C (13		

(14

$E_k = eV = 1.6 \times 10^{-19} \times 8 \times 10^4$

$= 128 \times 10^{-16}$ J الجواب (C)

(15

$\lambda_{min} = \frac{hc}{eV} = \frac{6.6 \times 10^{-34} \times 3 \times 10^8}{1.6 \times 10^{-19} \times 8 \times 10^4}$

$\lambda_{min} = 0.1547 \times 10^{-10}$ m

الجواب (A)

(16

$\lambda_{min} = \frac{hc}{eV} \Rightarrow \frac{c}{f_{max}} = \frac{hc}{eV} \Rightarrow$

$f_{max} = \frac{eV}{h} = \frac{1.6 \times 10^{-19} \times 3 \times 10^8}{6.6 \times 10^{-34}}$

$f_{max} = 12375$ V الجواب (A)

أسئلة الليزر

D (1	B (2	C (3
B (4	C (5	A (6
C (7	A (8	B (9
A (10	D (11	C (12