2018 Y4 FE Physics Exam

Answers

Qn 1	Qn 2	Qn 3	Qn 4	Qn 5	Qn 6	Qn 7	Qn 8	Qn 9	Qn 10
Α	Α	В	Α	D	С	Α	С	С	С
Qn 11	Qn 12	Qn 13	Qn 14	Qn 15	Qn 16	Qn 17	Qn 18	Qn 19	Qn 20
В	Α	D	D	D	В	D	D	Α	В
B Qn 21	A Qn 22	D Qn 23	D Qn 24	D Qn 25	B Qn 26	D Qn 27	D Qn 28	A Qn 29	B Qn 30

Qn	Suggested Answers
31(a)	There is a change in displacement of 19 m in a duration of 1 second
51(4)	OR
	The rate of change of displacement with respect to time is 10 m s ⁻¹
	The <u>face of change of displacement with respect to time</u> is <u>19 m s</u> .
31(b)	Acceleration = $(25 - 20) / [(6 - 3) \times 60]$
	= <u>0.0278 m s⁻²</u>
31(c)	The car is <u>slowing down</u> at a <u>decreasing rate</u> .
31(d)	At t = 3.00 min, v = 20.0 m s ⁻¹
	acceleration = 0.0278 m s^{-2} (from 31 (b) – ecf)
	F _{resultant} = F _{engine} – Friction - F _{air}
	Fair = Fengine - Friction - Fresultant
	= 1050 - 200 - 1800 x (0.027777778)
	= <u>800 N</u>
31(e)	From t = 6.00 min to 15.0 min, terminal velocity (v = 25.0 m s ⁻¹) is reached as a = 0
	m s ⁻²
	$F_{resultant} = F_{engine} - Friction - F_{air}$
	F _{air} = F _{engine} - Friction - F _{resultant}



	hammer to always stay at its new position when tilted by any angle from its					
	original position.					
	OR					
	Position of C.G neither rise or fall.					
33(b)	$KE_{2m} = mg^{*}(3-2) = 0.20^{*}9.81$					
	= 1.96 J					
34(a)	Wavelength = 0.02 m					
	Period T = 3.0 s					
	$v_{deep} = f \lambda = 1/3.0 * (0.02) = 6.67 \times 10^{-3} \text{ m s}^{-1}$					
34(b)	Frequency remains constant.					
	Wavelength decreases.					
35	1) Gradient of 1 st line steeper					
	2) New t_1 less than half the original t_1					
	3) Duration bet. t_1 and t_2 exactly halved.					
36	Electrons on the near side of the rod are repelled to the far end.					
	The attractive force between unlike charges are stronger than the repulsive force					
	between like charges because of the smaller distance apart.					
37(a)	$R_{\rm L} = 3.0 / 2.5$					
	= 1.2 Ω					
37(b)	1.50 A					
38(a)	$R_1 = 12^2 / 24$					
	= 6.0 Ω					
38(b)	$I_3 = (2/3) (2.0)$					
	= 1.33 A (3 s.f.)					
	fuse rating = 2 or 3 A					
38(c)	$P_4 = (2.0^2) (2.0)$					
	= 8.0 W					

38(d)	$P_2 = 4.0^2 / 6.0, P_3 = 8.0^2 / 6.0$
	= 2.7 W = 10.7 W
	L_2 , L_4 and L_3
38(e)	across YZ
00(0)	
39a	North
	North
39bi	X is between P and Q
39bii	upwards
390	Neutral point shifts to right
330	Magnetia field of the colonaid without the iron core is much weaker
	Magnetic field of the solehold without the from core is much weaker
	1 mark if student has "shifts to right"
40a	Solenoid experiences a change in flux linkage /
	Cutting of field lines by the solenoid
40b	Drop the magnet at greater height / throw the magnet through the coil /
	increase the number of turns per unit length/ use a stronger magnet
40c	Induced voltage on both sides
	The second peak is higher than the first peak
	The time taken for the second neak is less than that of first neak
	The time taken for the second peak is less than that of hist peak
44(-)	her re-1 e-2
41(a)	kg m · s −
(b)(i)	$E = v^{2} \times \rho = (5000)^{2} \times 8000$
	= $2.0 \times 10^{11} \text{ kg m}^{-1} \text{ s}^{-2}$ (e.c.f for wrong units in 41(a))

(b)(ii)	$v = f\lambda$
	$\lambda = (5 \times 10^3) / (3 \times 10^6)$
	= 1.67 x 10 ⁻³ m
(c)(i)	time = (6.5 div)(0.5) = 3.25 µs
	thickness = (3.25 x 10 ⁻⁶) /2 x 5000 = 0.00813 m (to 3 s.f.)
(c)(ii)	Decrease y-gain setting.
	Higher energy or intensity or louder ultrasound source.
	Reduce attenuation of source by using a waveguide.
	Any two of the above.
(d)	draw and label source and detector on opposite sides of the steel sample