

وزارة التربية والتعليم



مركز القياس والتقويم التربوي
The Center for Educational Assessment and Measurement (CEAM)

امتحان دبلوم التعليم العام
لكلية الحرس السلطاني العماني التقنية (ثنائية اللغة)
الفصل الدراسي الأول - الدور الأول - للعام الدراسي ١٤٤٨/١٤٤٧ هـ - ٢٠٢٥ / ٢٠٢٦ م

تنبيه:
- المادة: الفيزياء.
- الأسئلة في (١٤) صفحة.
- زمن الإجابة: ثلاث ساعات.
- الإجابة في الورقة نفسها.

تعليمات مهمة:

- يجب الحضور إلى قاعة الامتحان قبل عشر دقائق على الأقل من بدء زمن الامتحان.
- يجب إحضار أصل ما يثبت الهوية وإبرازها للعاملين بالامتحانات.
- يجب الالتزام بالزي (الدشداشة البيضاء والمصر أو الكمة للذكور) والزي المدرسي للطالبات ، ويستثنى من ذلك الدارسون من غير العمانيين بشرط الالتزام بالذوق العام، ويمنع على جميع المتقدمات ارتداء النقاب داخل المركز وقاعات الامتحان.
- يحظر على الممتحنين اصطحاب الهواتف النقالة وأجهزة النداء الآلي وآلات التصوير والحواسيب الشخصية والساعات الرقمية الذكية والآلات الحاسبة ذات الصفة التخزينية والمجلات والصحف والكتب الدراسية والدفاتر والمذكرات والحقائب اليدوية والآلات الحادة أو الأسلحة أياً كان نوعها وأي شيء له علاقة بالامتحان.
- يجب على الممتحن الامتثال لإجراءات التفتيش داخل المركز طوال أيام الامتحان.
- يجب على الممتحن التأكد من استلام دفتر امتحانه، مغلفاً بغلاف بلاستيكي شفاف وغير ممزق ، وهو مسؤول عنه حتى يسلمه لمراقبي اللجنة بعد الانتهاء من الإجابة.
- يجب الالتزام بضوابط إدارة امتحانات دبلوم التعليم العام وما في مستواه وأية مخالفة لهذه الضوابط تعرضك للتدابير والإجراءات والعقوبات المنصوص عليها بالقرار الوزاري رقم ٥٨٨ / ٢٠١٥.
- يقوم المتقدم بالإجابة عن أسئلة الامتحان المقالية بقلم الحبر (الأزرق أو الأسود).
- يقوم المتقدم بالإجابة عن أسئلة الاختيار من متعدد بتظليل الشكل (▭) وفق النموذج الآتي:

س – عاصمة سلطنة عمان هي:

▭ القاهرة ▭ الدوحة
■ مسقط ▭ أبوظبي

ملاحظة: يتم تظليل الشكل (■) باستخدام القلم الرصاص وعند الخطأ، امسح بعناية لإجراء التغيير.

صحيح ■ **غير صحيح** ▭ ◉ ◒ ⊠ ☑

مُسَوَّدَة، لا يتم تصحيحها

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1) An electric current of (0.700 A) passes through a lamp for (3.00 minutes).

a. Define the electric current.

_____ [1]

b. Calculate the amount of charges that pass through the lamp.

_____

_____

_____

Q = _____ C [3]

c. State one factor that is directly proportional to the amount of the electric charge that passes through a point.

_____ [1]

2) **Figure 2-1** shows part of an electric circuit.

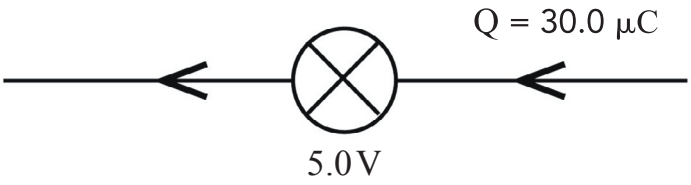


Figure 2-1

a. Calculate the electrical energy consumed by the lamp.

_____

_____

_____

W=_____ J [3]

b. What is the equivalent unit of potential difference?

(Shade in the bubble (○) next to the correct answer)

○ J C ○ J C^{-1}

○ J^{-1} C ○ J^{-1} C^{-1} [1]

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3) **Figure 3-1** shows a diode which is connected to three different circuits A, B and C.

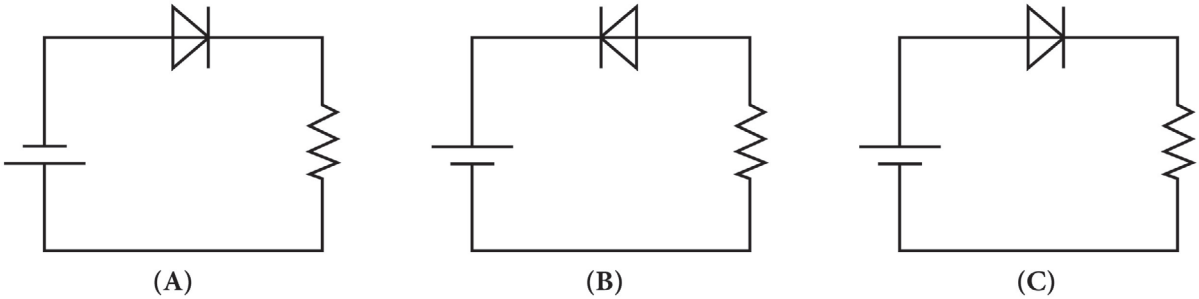


Figure 3-1

Which of the following represents the correct type of diode connection?

(Shade in the bubble (○) next to the correct answer)

	Forward bias	Reverse bias
○	A	C
○	B	A
○	C	B
○	B	C

[1]

4) **Figure 4-1** shows a copper wire with a resistivity of (1.7×10^{-8} Ωm).

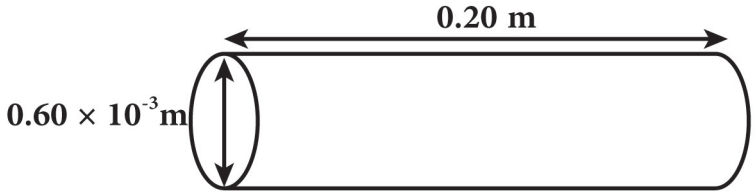


Figure 4-1

What is the value of the resistance of the copper wire?

R= _____ Ω [5]

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5) Derive the equation (I = Anvq) using $\left(I = \frac{Q}{t} \right)$.

_____

_____

_____ [2]

6) **Figure 6-1** shows three graphs of a current against a potential difference for devices A, B and C.

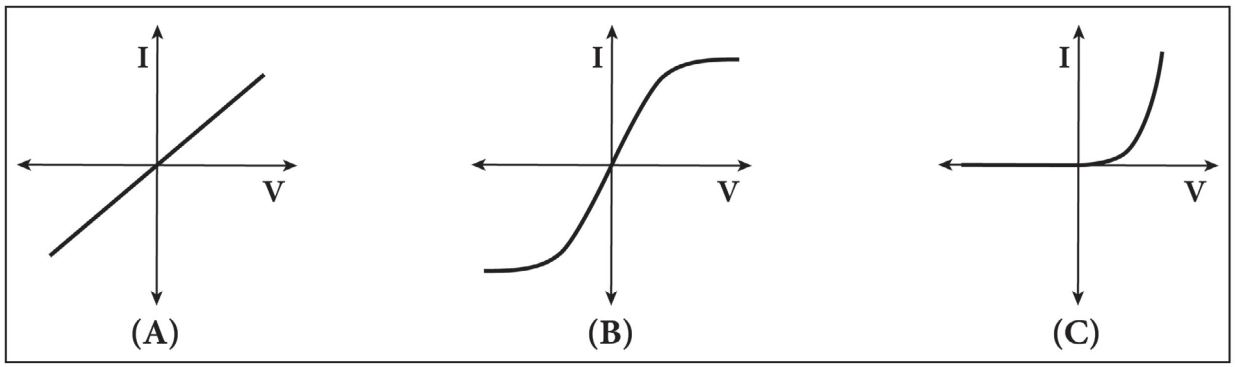


Figure 6-1

Choose the correct answer which represents the correct devices.

(Shade in the bubble (⬭) next to the correct answer)

	Ohmic conductor	Filament lamp	Diode
⬭	B	A	C
⬭	B	C	A
⬭	A	C	B
⬭	A	B	C

[1]

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7) **Figure 7-1** shows an electric circuit.

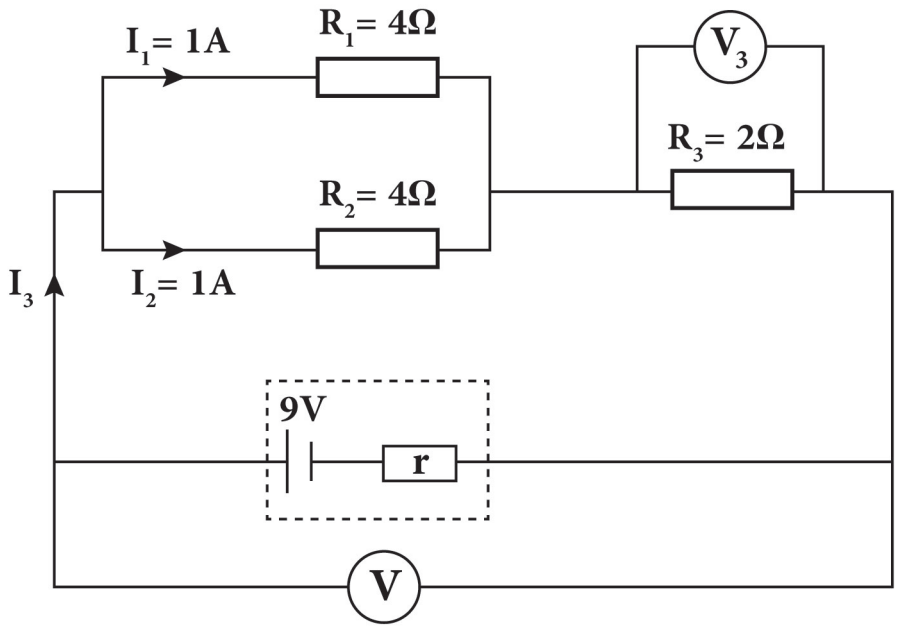


Figure 7-1

a. What is the voltage reading of the voltmeter (V_3)?

V_3= _____ V [2]

b. What is the equivalent resistance resulting from the combination of resistors (R_1) and (R_2)?

(Shade in the bubble (○) next to the correct answer)

○ 1 Ω ○ 2 Ω

○ 4 Ω ○ 8 Ω [1]

c. What is the internal resistance value of power source (r), given that the voltmeter reading (V) after closing the circuit is (8 V).

r= _____ Ω [1]

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d. State one change in a factor that can increase the voltmeter reading (V) shown in **Figure 7-1**.

_____ [1]

e. State Kirchhoff's first law.

_____

_____ [1]

8) **Figure 8-1** shows an electric circuit.

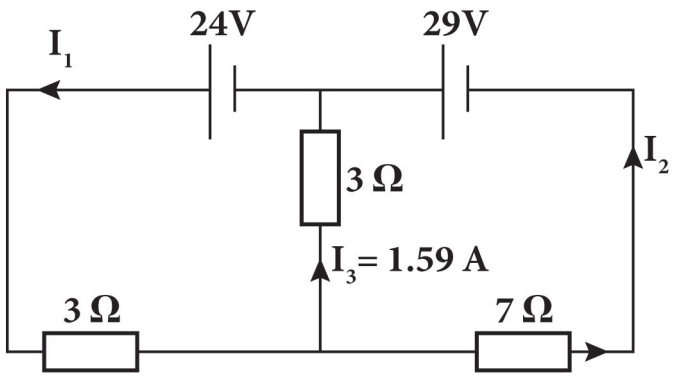


Figure 8-1

a. Calculate the magnitudes of currents I_1 and I_2.

I_1= _____ A I_2= _____ A [4]

b. State Kirchhoff's second law.

_____

_____

_____ [1]

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Do not write in this space

9) **Figure 9-1** shows an electric circuit.

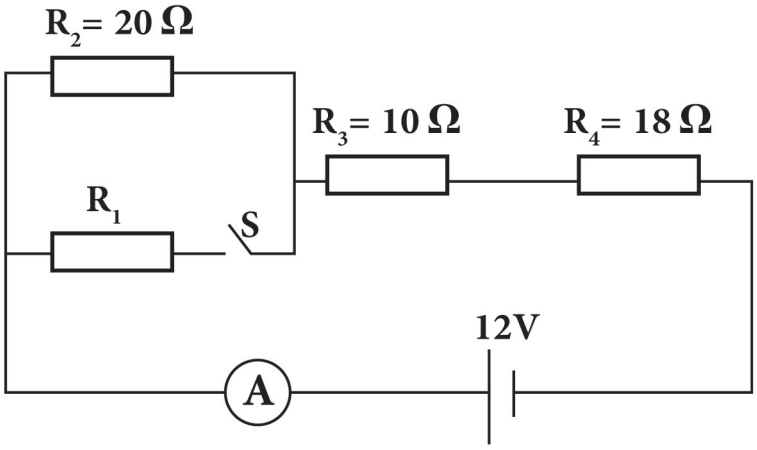


Figure 9-1

a. When switch (S) is closed, the ammeter reading is (0.3 A).

What is the value of (R_1)?

(Shade in the bubble (○) next to the correct answer)

○ 8 Ω ○ 30 Ω

○ 40 Ω ○ 50 Ω [1]

b. If switch (S) is opened, what would happen to the value of the ammeter reading?

(Shade in the bubble (○) next to the correct answer)

○ Increase. ○ Decrease.

Explain your answer.

_____

_____ [1]

10) **Figure 10-1** shows a graph of potential difference against time for a capacitor discharge in a R-C circuit.

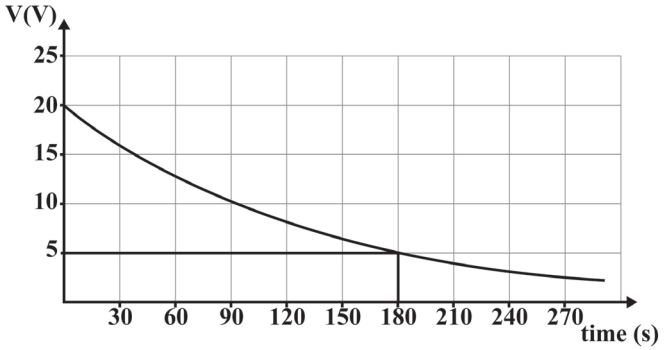


Figure 10-1

a. Determine the initial electric potential difference across the capacitor plates before discharge.

V_o= _____ V [1]

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b. Calculate the time constant (CR) of the circuit.

CR= _____ s [3]

11) **Figure 11-1** shows an electric circuit.

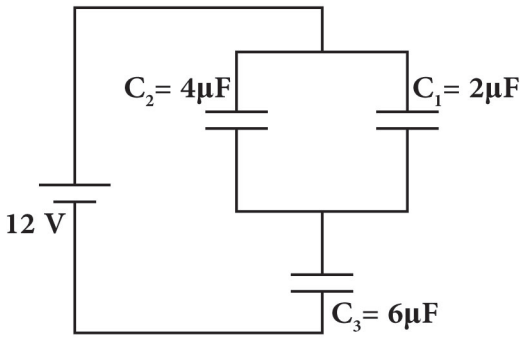


Figure 11-1

a. Calculate the total charge stored in the circuit.

Q_{total}= _____ C [4]

b. Define Farad.

_____ [1]

c. Which of the following represents the charge stored in capacitor (C_2) and its corresponding potential difference?

(Shade in the bubble (⬭) next to the correct answer)

	The charge Q_2 (μC)	The potential difference V_2 (V)
⬭	12	6
⬭	24	6
⬭	24	12
⬭	12	12

[1]

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12) **Figure 12-1** shows a graph of the charge stored on a capacitor as a function of voltage across the capacitor plates.

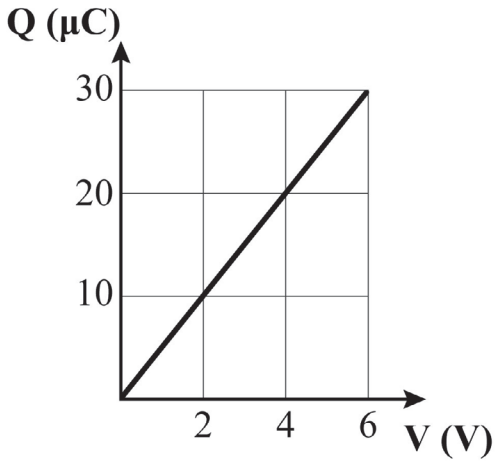


Figure 12-1

a. What does the area under a potential-charge graph represent?

_____ [1]

b. What is the total amount of energy stored in the capacitor?

(Shade in the bubble (○) next to the correct answer)

○ 0.2 μJ ○ 5 μJ

○ 90 μJ ○ 180 μJ [1]

13) **Figure 13-1** shows a displacement-time graph for a transverse wave at (t=0 s).

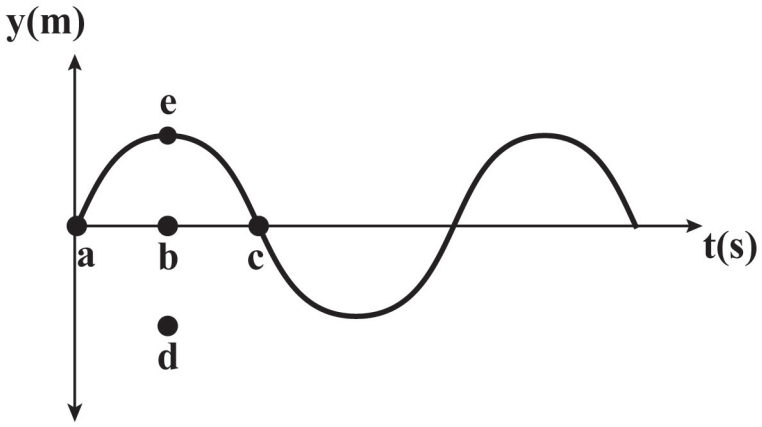


Figure 13-1

What is the position of particle (e) after a quarter period?

(Shade in the bubble (○) next to the correct answer)

○ a ○ b

○ c ○ d [1]

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14) **Figure 14-1** shows two waves (A) and (B).

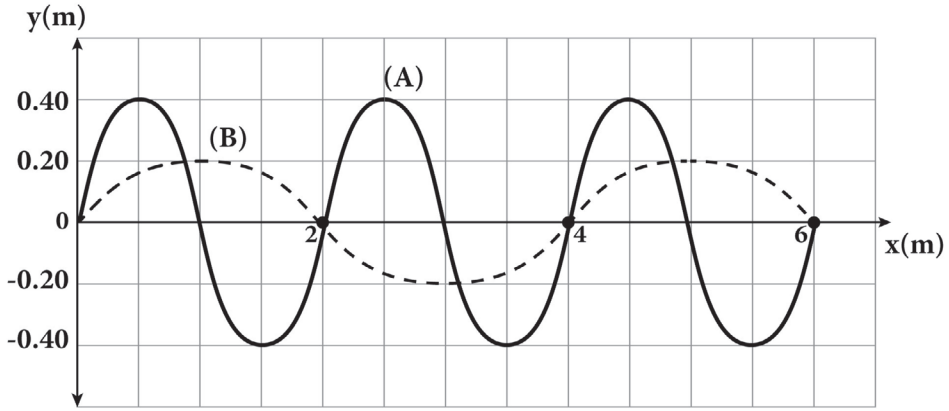


Figure 14-1

What is the intensity (I_B) of wave (B) in terms of the intensity (I_A) of wave (A)?

(Shade in the bubble (○) next to the correct answer)

○ $I_B = \frac{1}{2} I_A$ ○ $I_B = \frac{1}{4} I_A$

○ $I_B = 2 I_A$ ○ $I_B = 4 I_A$ [1]

15) Define Amplitude.

_____

_____ [1]

16) **Figure 16-1** shows two waves (C) and (D).

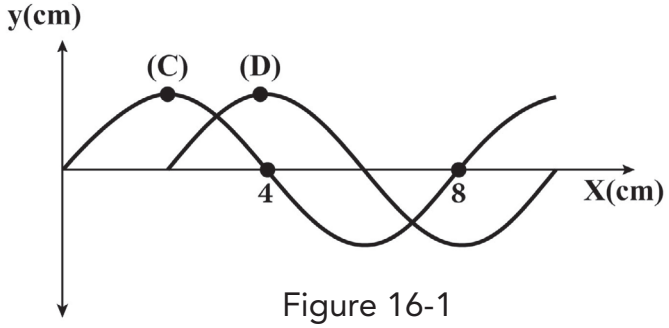


Figure 16-1

Find the values of:

a. The wavelength of wave (C).

_____ [1]

b. The phase difference between the two waves.

_____ [1]

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17) **Figure 17-1** shows a sound wave.

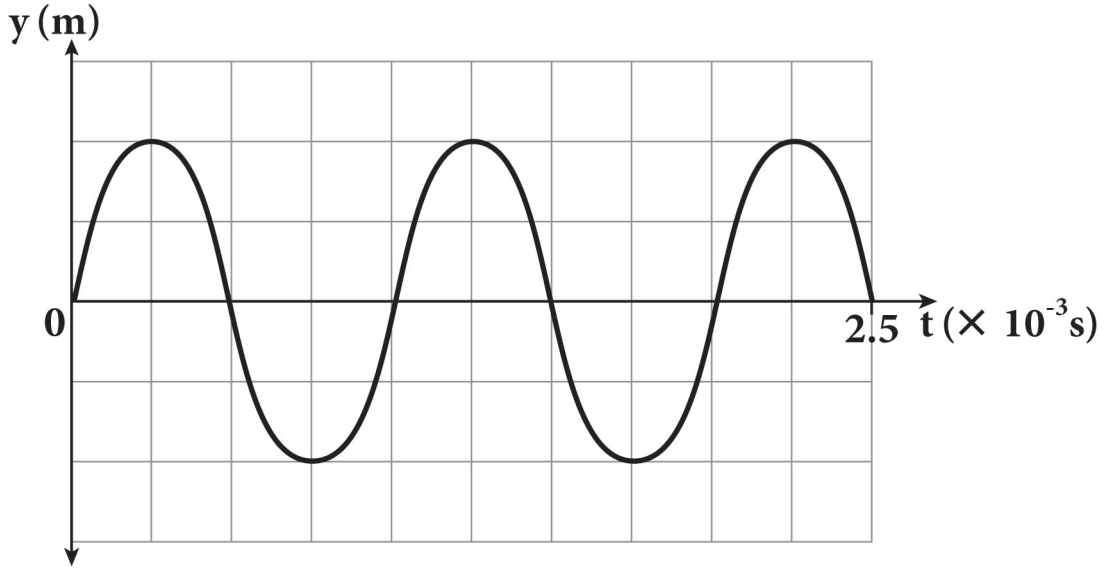


Figure 17-1

a. Calculate its period.

T= _____ s [2]

b. Calculate the wavelength of the sound wave when the speed of this wave is (340 m/s).

λ = _____ m [2]

18) An ambulance makes a sound of (200 Hz) and moves at a speed of (v_s).A stationary observer hears the sound at a frequency of (212.5 Hz).

a. Is the ambulance moving towards the observer?

(Shade in the bubble (⬭) next to the correct answer)

⬭ Yes ⬭ No

Explain your answer.

_____ [1]

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b. Calculate the speed of the ambulance (v_s).

$v_s =$ _____ m/s [3]

19) What do we call the spreading out of waves after they pass through a narrow gap?

(Shade in the bubble (⬭) next to the correct answer)

⬭ Reflection ⬭ Refraction

⬭ Diffraction ⬭ Interference [1]

20) A monochromatic light is normally incident on a diffraction grating of (3000 lines per centimetre). The diffraction angle of the first order maximum is (10.0°).

What is the wavelength of the incident light?

(Shade in the bubble (⬭) next to the correct answer)

⬭ 500 nm ⬭ 579 nm

⬭ 600 nm ⬭ 650 nm [1]

21) A white light is used in a diffraction grating experiment. Complete **Table 21-1** and compare between a red and a blue light in terms of wavelength and diffraction angle.

	Wavelength (Longer/shorter)	Diffraction angle (Larger/smaller)
Red		
Blue		

[2]

Table 21-1

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22) **Figure 22-1** shows two waves of the same frequency.

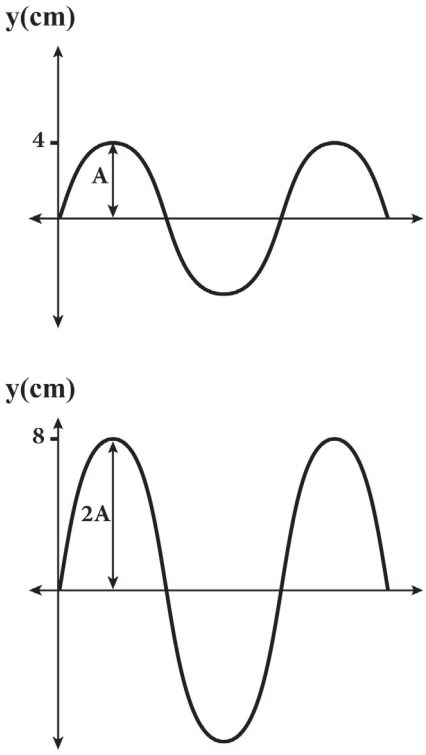
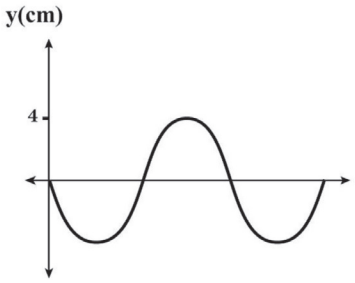
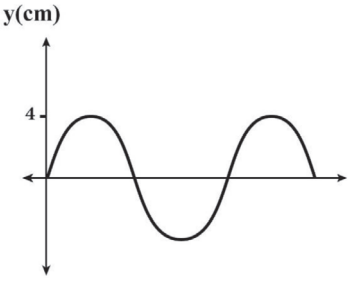


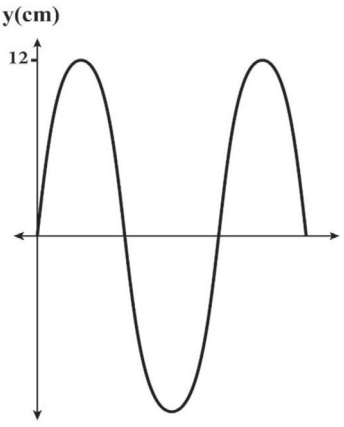
Figure 22-1

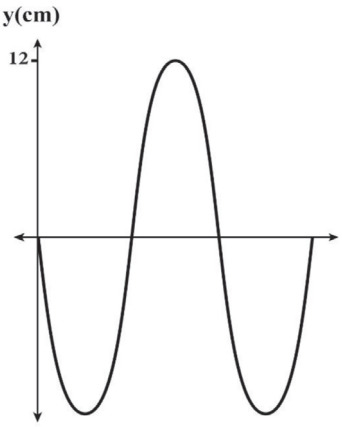
What is the resultant of the combination of the two waves?

(Shade in the bubble (⬭) next to the correct answer)

⬭ 

⬭ 

⬭ 

⬭ 

[1]

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23) State the principle of the superposition of waves.

_____

_____

_____ [1]

24) **Figure 24-1** shows Young's double – slit experiment.

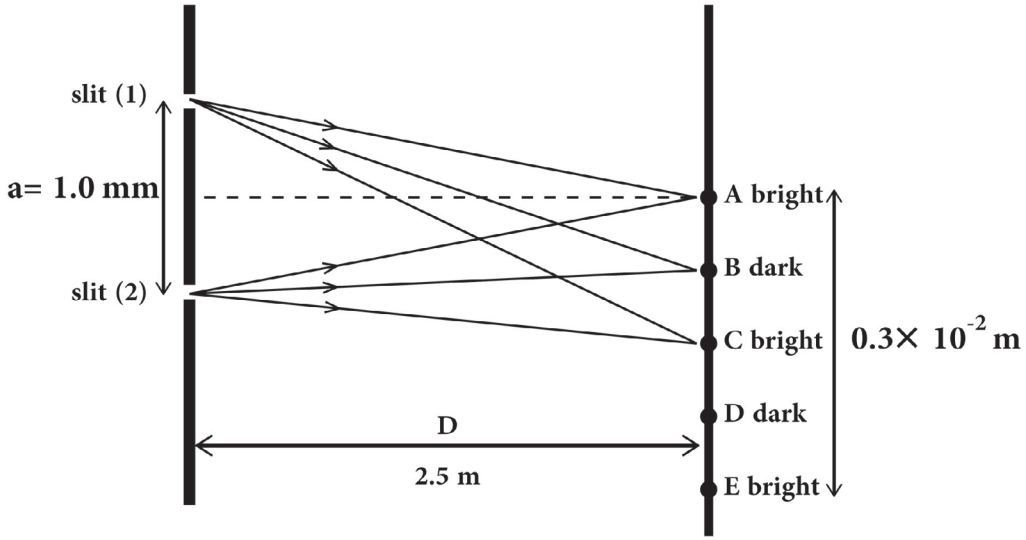


Figure 24-1

a. Calculate the wavelength of light used in the experiment.

_____

_____

_____

_____

λ = _____ m [3]

b. What will happen to the distance between fringes (x) when the distance between the two slits (a) is reduced? (Shade in the bubble (○) next to the correct answer)

○ Increase ○ Decrease

Explain your answer.

_____

_____ [1]

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25) **Figure 25-1** shows the relationship between the (sin θ) of the interference maximum order (n) and the reciprocal of the distance $\left(\frac{1}{d}\right)$ of a diffraction grating.

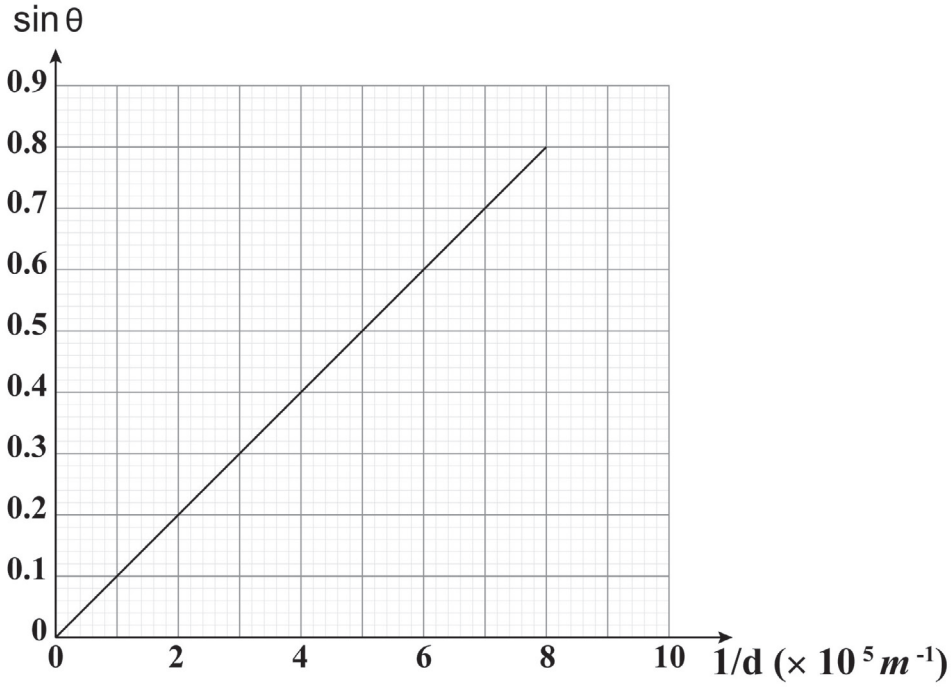


Figure 25-1

Find the path difference between two adjacent lines.

_____ [1]

26) Light is normally incident on a diffraction grating of (10000 lines per 1.3 cm). A first order maximum is observed at an angle of diffraction (22°).

Calculate the wavelength of the incident light.

_____

_____

_____

λ = _____ m [3]

[End of Examination]

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Formulas and constants

Electricity				
$Q = It$	$Q = Ne$	$emf = IR + Ir$	$V = IR$	$R = \frac{\rho L}{A}$
$V = \frac{W}{Q}$	$P = \frac{V^2}{R}$	$P = I^2R$	$P = VI$	$P = \frac{W}{t}$
$\sum I_{in} = \sum I_{out}$		$\sum \Delta V_{closed\ loop} = 0$		$I = Anvq$
Capacitance				
$x = x_o e^{\frac{-t}{CR}}$		$W = \frac{1}{2} CV^2$	$W = \frac{1}{2}\frac{Q^2}{C}$	$W = \frac{1}{2} QV$
$\tau = RC$		$\ln(x) = \ln(x_0) - \frac{t}{\tau}$		$C = \frac{Q}{V}$
waves				
Phase difference = $(\frac{s}{\lambda})\times 360^o$			$f_o = \frac{f_s v}{(v \mp v_s)}$	
Phase difference = $(\frac{\Delta t}{T})\times 360^o$		$v = \frac{\lambda}{T}$	$v = \lambda f$	
Superposition of waves				
Constants				
Speed of sound in air =340 m s^{-1}		$e = 1.6\times 10^{-19}\ C$		
$\lambda = \frac{ax}{D}$		$d \sin\theta = n\lambda$		

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The Center for Educational Assessment and Measurement (CEAM)

نموذج إجابة امتحان مادة الفيزياء للصف : الثاني عشر
دبلوم التعليم العام لكلية الحرس العماني التقنية (ثنائي اللغة)
الفصل الدراسي الأول - الدور الأول
للعام الدراسي ١٤٤٧/١٤٤٨هـ - ٢٠٢٥/٢٠٢٦م

وزارة التربية والتعليم

Note: the marking guide in (14) pages **Full marks: (70)**

Item		Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
1	a	The rate of flow of the charge carriers.	1	Accept correct similar answer. Formula is not accepted.	1	5	1.1A	AO1
	b	$t = 3 \times 60 = 180\ s$ $Q = 0.700 \times (180)$ $Q = 126\ C$	1 1 1	1 mark for converting to seconds 1 mark for the substitute 1 mark for the result	1	5	1.1B	AO1
	c	Time or Current	1	Give one mark for one correct factor	1	5	1.1B	AO1

Item		Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
2	a	$Q = 30.0 \times 10^{-6}\mu C$ $V = \frac{W}{Q} \longrightarrow W = VQ$ $W = 30.0 \times 10^{-6} \times 5.0$ $= 1.5 \times 10^{-4}\ J$	1 1 1	1 mark to convert (Q) 1 mark for the substitute 1 mark for the result	1	8	1.2B	AO2
	b	JC^{-1}	1	-	1	8	1.2A	AO1
3		☐ Forward bias. C; Reverse bias B	1	-	1	12	1.2I	AO2
4		$R = \frac{\rho L}{A}, r = \frac{0.60\times10^{-3}}{2} = 0.3 \times 10^{-3}\ m$ $A = \pi r^2 = \pi \times (0.3 \times 10^{-3})^2$ $A = 2.826 \times 10^{-7} m^2$ $R = \frac{\rho L}{A} = \frac{1.7 \times 10^{-8} \times 0.20}{2.826 \times 10^{-7}}$ $R = 0.012\ \Omega$	1 1 1 1 1	1 mark for the value of (r) 1 mark for substituting (A) 1 mark for the result of (A) 1 mark for substituting (R) 1 mark for the result of (R)	1	14	1.2L	AO2

Item	Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
5	$I = \frac{Q}{t}$ $I = \frac{Axnq}{t}$ $v = \frac{x}{t}$ $I = Axnq$	1 1	1 mark for: $I = \frac{Axnq}{t}$ 1 mark for: $v = \frac{x}{t}$	1	7	1.1D	AO2
6	☐ A: **Ohmic conductor**; B: **Filament lamp**; C: **Diode**	1	-	1	11	1.2H	AO2
7a	$I_3 = 1 + 1 = 2\ A$ $V_3 = I_3 R_3 = 2 \times 2 = 4V$	1 1	1 mark for calculating (I_3) 1 mark for calculating (V_3) <u>Another solution</u> 1 mark for: $V_1 = I_1 R_1 = 4\ V$ 1 mark for: $V_3 = 8 - 4 = 4\ V$	1	20	1.3H	AO2

Item		Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
7	b	$2\ \Omega$	1	-	1	22-24	1.3F	AO1
	c	$8 = 9 - 2r$ $r = 0.5\ \Omega$	1	1 mark for calculating (r)	1	34	1.4B	AO2
	d	Increase electromotive force (ε) Or decrease current (I) Or decrease internal resistance (r)	1	Accept one correct answer	1	31	1.4B	AO1
	e	The sum of all currents entering a node (a junction in a circuit) must equal the sum of all currents leaving that node.	1	at any node (junction) in an electrical circuit, the sum of currents flowing into that node is equal to the sum of currents flowing out of that node. or The algebraic sum of currents in a network of conductors meeting at a point is zero" Do not accept a formula	1	17	1.3A	AO1

Item		Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
8	a	$29 - 7I_2 + (1.59 \times 3) = 0$ $I_2 = 4.82\ A$ $I_1 = I_2 + I_3$ $I_1 = 4.82 + 1.59$ $I_1 = 6.42\ A$	1 1 1 1	1 mark for the correct closed loop 1 mark for finding the value of I_2 1 mark for applying Kirchhoff's first law 1 mark for finding the value of I_1 **Another solution** $24 - 3I_1 - (3 \times 1.59) = 0$ $I_1 = 6.41\ A$ $1.59 + I_2 = 6.41$ $I_2 = 4.82\ A$ **Another solution** $29 + 24 - 3I_1 - 7I_2 = 0$ $53 - 3I_1 - 7I_2 = 0 \quad (1)$ $I_1 = 1.59 + I_2 \quad (2)$ $53 - (3 \times 1.59) - (3I_2) - (7I_2) = 0$ $I_2 = 4.82\ A$ $I_1 = 1.59 + 4.82$ $I_1 = 6.41\ A$	1	24	1.3H	AO2

Item		Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
8	b	The sum of the electromotive forces in a closed circuit is equal to the sum of the potential differences.	1	The algebraic sum of all the potential differences (voltages) around any closed loop in a circuit is zero Or The sum of the voltages around a loop (or mesh) must equal 0V.	1	20	1.3B	AO1
9	a	30 Ω	1	-	1	21 - 24	1.3G	AO2
	b	Decrease If switch S was opened, the total resistance would increase. Then the total current would decrease.	1	Both parts must be correct to get 1 mark	1	22	1.3G	AO2

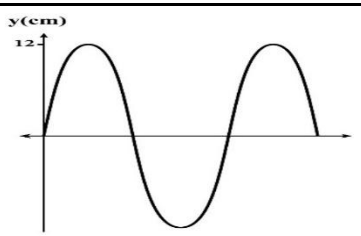
Item		Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
10	a	$V_0 = 20\ V$	1		2	57	2.1G	AO1
	b	$V = V_0\, e^{\frac{-t}{CR}}$ $5 = 20\, e^{-\frac{180}{CR}}$ $CR = \frac{-180}{\ln\left(\frac{5}{20}\right)}$ $CR = 129.8s \sim 130\ s$	1 1 1	1 mark for: $5 = 20e^{-\frac{180}{CR}}$ 1 mark for: $\frac{-180}{\ln\left(\frac{5}{20}\right)}$ 1 mark for: $CR = 129.8s \sim 130\ s$ **Another solution** $ln5 - ln20 = -\frac{180}{CR}$ $CR = \frac{-180}{-1.386}$ $CR = 129.8\ s$	2	57	2.1J	AO2
11	a	for parallel : $C_{12} = 2 + 4 = 6\ \mu F$ for series: $C_{total} = \frac{6 \times 6}{6 + 6} = 3\ \mu F$ $Q_{total} = C_{total} \times V_{total} = 3 \times 10^{-6} \times 12$ $Q_{total} = 36 \times 10^{-6}\ C$	1 1 1 1	1 mark for calculating (C_{12}) 1 mark for calculating (C_{total}) 1 mark for substituting (Q_{total}) 1 mark for calculating (Q_{total}) Another solution	2	52	2.1C 2.1E	AO2

				1 mark for: Since $C_{12} = C_3 = 6\mu F, then\ V_{12} = V_3 = \frac{12}{2} = 6\ V$ $$Q_{tot} = C_3 V_3$$ 1 mark for substituting Q_{tot} $$Q_{tot} = 6 \times 6 = 36\ \mu C$$ 1 mark for the final value of Q_{tot} $$Q_{tot} = 36 \times 10^{-6}\ C$$				

Item		Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
11	b	A capacitor has a capacitance of one Farad when a potential difference of one volt will charge it with one coulomb electricity charge for every volt applied across its terminals.	1	1 mark for the correct definition	2	44	2.1A	AO1
	c	☐ The charge Q_2 (μC): 24; The potential difference V_2 (V): 6	1	-	2	47	2.1C	AO2
12	a	Energy stored in the capacitor	1	-	2	47	2.1F	AO1
	b	90 µJ	1	-	2	47	2.1F	AO1

Item		Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
13		b	1	-	3	61	3.1A	AO1
14		$I_B = \frac{1}{4} I_A$	1	-	3	66	3.1H	AO2
15		The maximum displacement of a particle in the wave from its rest / equilibrium position.	1	Accept any similar correct answer	3	63	3.1D	AO1
16	a	wavelength $= 8\ cm$	1	1 mark for the final value	3	62	3.1C	AO1
	b	Phase difference$= 360 \times \frac{x}{\lambda}$ $= 360 \times \frac{2}{8} = 90^0$ or $\frac{\pi}{2}$ rad	1	1 mark for the final value	3	65	3.1D	AO2

Item		Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
17	a	$T = \frac{t}{n} = \frac{2.5 \times 10^{-3}}{2.5}$ $T = 1.0 \times 10^{-3}\ s$	1 1	1 mark for substituting (T) 1 mark for the result of (T) If a student did not convert to seconds reduce 1 mark only	3	63-64	3.1C	AO2
	b	$\lambda = v \times T$ $\lambda = 340 \times 1 \times 10^{-3}$ $\lambda = 0.34\ m$	1 1	1 mark for substituting λ 1 mark for the final answer (λ)	3	66-67	3.1F	AO1
18	a	Yes, because the frequency heard by the stationary observer is higher than the frequency of the ambulance car	1	Both parts of the answer must be correct. f_0 bigger than f_s $f_o > f_s$	3	71-73	3.2B	AO2
	b	$f_0 = \frac{v}{(v - v_s)} f_s$ $\frac{f_0}{f_s} = \frac{v}{v - v_s}$ $\frac{212.5}{200} = \frac{340}{340 - v_s}$ $v_s = 20\ ms^{-1}$	1 1 1	1 mark for the formula (sign) 1 mark for substituting (v_s) 1 mark for the final answer (v_s)	3	71-73	3.2C	AO2

Item	Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
19	Diffraction	1	-	4	84	4.2A	AO1
20	$579\ nm$	1	-	4	85-86	4.3B	AO2
21	<table><tr><th></th><th>Wavelength</th><th>Diffraction angle</th></tr><tr><td>Red</td><td>Longer</td><td>Larger</td></tr><tr><td>Blue</td><td>shorter</td><td>smaller</td></tr></table>	2	1 mark for each correct column	4	87	4.2C	AO1
22		1	-	4	76-77	4.1C	AO2
23	When two or more waves meet at a point, the resultant displacement at that point is equal to the sum of the displacement of the individual waves at that point.	1	Accept correct similar answer	4	77	4.1A	AO1

Item		Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
24	a	$x = \frac{0.3 \times 10^{-2}}{2} = 1.5 \times 10^{-3}\ m$ $\lambda = \frac{ax}{D}$ $\lambda = \frac{1.0 \times 10^{-3} \times 1.5 \times 10^{-3}}{2.5}$ $\lambda = 6.0 \times 10^{-7}\ m$	1 1 1	1 mark for calculating (x) 1 mark for substituting (λ) 1 mark for the result of (λ)	4	81-83	4.1I	AO2
	b	Increases, Because the distance (x) is inverse proportional to the distance between the slits (a) since $x = \frac{\lambda D}{a}$	1	Both the choice and the explanation must be correct	4	81-83	4.1I	AO1

Item	Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
25	$n\lambda = d\ sin\theta$ $slope = path\ difference = dsin\theta$ $slope = \frac{0.4 - 0}{4 \times 10^5}$ $slope = 1.0 \times 10^{-6}\ m$	1	Any two correct points 1 mark for: Slope $= 1.0 \times 10^{-6}\ m$	4	85	4.3B	AO2
26	$d = \frac{1.3 \times 10^{-2}}{10000} = 1.3 \times 10^{-6}$ $n\lambda = d\ sin\theta$ $\lambda = \frac{1.3 \times 10^{-6} \times sin22}{1}$ $\lambda = 4.87 \times 10^{-7}\ m \sim 4.9 \times 10^{-7}\ m$	1 1 1	1 mark for calculating (d) 1 mark for substituting (λ) 1 mark for the result of (λ)	4	84-86	4.3B	AO2

End of Marking Guide

وزارة التعليم

امتحان دبلوم التعليم العام

لكلية الحرس السلطاني العماني التقنية (ثنائية اللغة)

الفصل الدراسي الأول - الدور الثاني - للعام الدراسي ١٤٤٨/١٤٤٧ هـ - ٢٠٢٥ / ٢٠٢٦ م

تنبيه:
- المادة: الفيزياء.
- الأسئلة في (١٣) صفحة.
- زمن الإجابة: ثلاث ساعات.
- الإجابة في الورقة نفسها.

تعليمات مهمة:

- يجب الحضور إلى قاعة الامتحان قبل عشر دقائق على الأقل من بدء زمن الامتحان.
- يجب إحضار أصل ما يثبت الهوية وإبرازها للعاملين بالامتحانات.
- يجب الالتزام بالزي (الدشداشة البيضاء والمصر أو الكمة للذكور) والزي المدرسي للطالبات ، ويستثنى من ذلك الدارسون من غير العمانيين بشرط الالتزام بالذوق العام، ويمنع على جميع المتقدمات ارتداء النقاب داخل المركز وقاعات الامتحان.
- يحظر على الممتحنين اصطحاب الهواتف النقالة وأجهزة النداء الآلي وآلات التصوير والحواسيب الشخصية والساعات الرقمية الذكية والآلات الحاسبة ذات الصفة التخزينية والمجلات والصحف والكتب الدراسية والدفاتر والمذكرات والحقائب اليدوية والآلات الحادة أو الأسلحة أياً كان نوعها وأي شيء له علاقة بالامتحان.
- يجب على الممتحن الامتثال لإجراءات التفتيش داخل المركز طوال أيام الامتحان.
- يجب على الممتحن التأكد من استلام دفتر امتحانه، مغلفاً بغلاف بلاستيكي شفاف وغير ممزق ، وهو مسؤول عنه حتى يسلمه لمراقبي اللجنة بعد الانتهاء من الإجابة.
- يجب الالتزام بضوابط إدارة امتحانات دبلوم التعليم العام وما في مستواه وأية مخالفة لهذه الضوابط تعرضك للتدابير والإجراءات والعقوبات المنصوص عليها بالقرار الوزاري رقم ٥٨٨ / ٢٠١٥.
- يقوم المتقدم بالإجابة عن أسئلة الامتحان المقالية بقلم الحبر (الأزرق أو الأسود).
- يقوم المتقدم بالإجابة عن أسئلة الاختيار من متعدد بتظليل الشكل (▭) وفق النموذج الآتي:

س - عاصمة سلطنة عمان هي:

▭ القاهرة ▭ الدوحة

■ مسقط ▭ أبوظبي

ملاحظة: يتم تظليل الشكل (■) باستخدام القلم الرصاص وعند الخطأ، امسح بعناية لإجراء التغيير.

صحيح ■ **غير صحيح** ▭ ◉ ◒ ☒ ☑

مُسَوَّدَة، لا يتم تصحيحها

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1) Write **two** factors that affect the resistance of a wire in an electric circuit.

1- _____

2- _____ [2]

2) Which of the following material's resistance decreases very rapidly as its temperature increases? (Shade in the bubble (⬭) next to the correct answer)

⬭ Copper ⬭ Silicon

⬭ Iron ⬭ Gold [1]

3) **a.** Calculate the current (I) when a charge (100 C) passes a point in a circuit during (300 s).

_____

I = _____ A [1]

b. Calculate the potential difference across a lamp of resistance (40 Ω) when (0.350 A) passes through it.

_____

_____

_____

V = _____ V [2]

4) What is value of the electric current (I) that passes through a conductor when (2.00×10^{6} electrons) pass in (1.00 ms)?

(Shade in the bubble (⬭) next to the correct answer)

⬭ 3.2×10^{-10} A ⬭ 32.0×10^{-9} A

⬭ 320×10^{-9} A ⬭ 0.320×10^{-10} A [1]

5) A nichrome wire of (1.5×10^{3} m) length, has a (4.0×10^{-3} m) radius and (1.5×10^{-6} Ω.m) resistivity. How much power transfers to heat when (50.0 mA) passes through the wire?

_____

_____

_____

_____

_____

P = _____ W [5]

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6) **Figure 6-1** shows a metallic wire that has (5.9×10^{28}) free electrons per m^3.

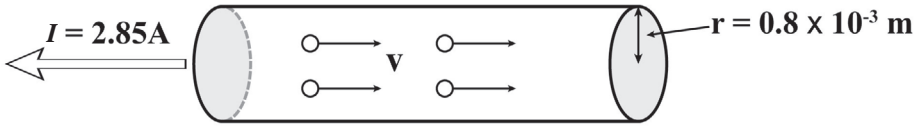


Figure 6-1

a. Calculate the average drift speed of the electrons (v).

$v =$ _____ ms^{-1} [4]

b. If the drift speed decreases, what will happen to the current?

(Shade in the bubble (⬭) next to the correct answer)

⬭ Increase ⬭ decrease ⬭ remain constant

Explain your answer.

_____ [1]

7) **Figure 7-1** shows a graph of current against the potential differences for a diode.

Which row correctly represents the points of the highest and lowest resistance of this diode? (Shade in the bubble (⬭) next to the correct answer)

	Lowest resistance	Highest resistance
⬭	P	T
⬭	T	P
⬭	P	S
⬭	T	Q

[1]

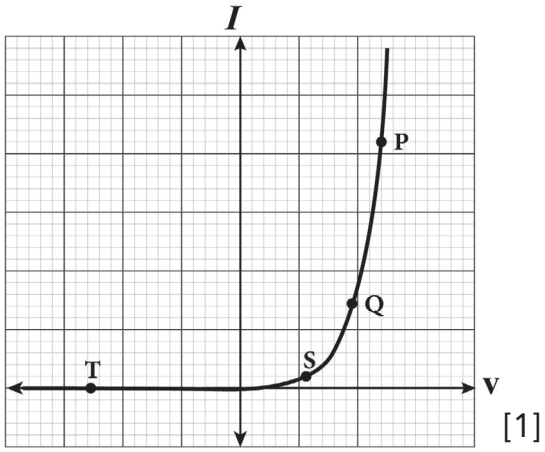


Figure 7-1

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8) **Figure 8-1** shows five resistances connected in an electric circuit.

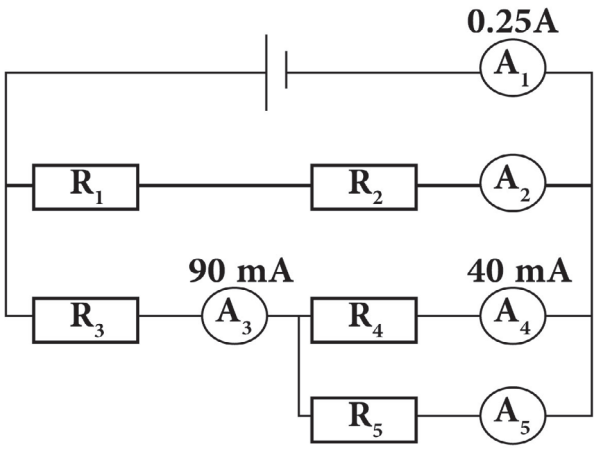


Figure 8-1

a. Complete **Table 8-1**.

	R_1 and R_2	R_4 and R_5
Type of connection (series/parallel)		
Combined resistance (increase/decrease)		

[2]

Table 8-1

b. Which row in the following table correctly shows the reading of ammeter (A_2) and (A_5)? (Shade in the bubble (○) next to the correct answer)

	Reading A_2 (mA)	Reading A_5 (mA)
○	160	130
○	160	50
○	340	50
○	340	130

[1]

c. The values of (R_4) and (R_5) are (10 Ω) and (8 Ω) respectively. Calculate their total resistance.

R = _____ Ω [1]

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9) **Figure 9-1** shows an electric circuit.

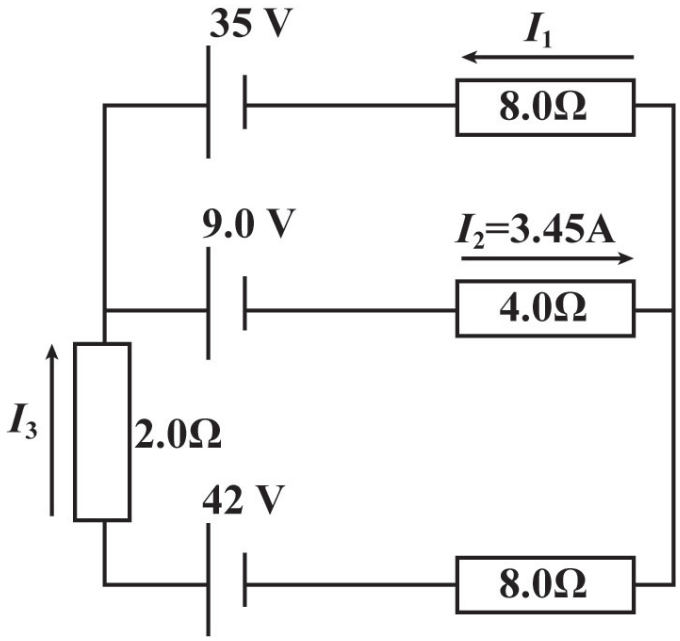


Figure 9-1

Apply Kirchhoff's laws to determine currents (I_1) and (I_3).

I_1= _____ A I_3= _____ A [4]

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10) **Figure 10-1** presents a graph of terminal potential difference (p.d.) plotted against current (I) which is powered by a battery using the circuit shown in **Figure 10-2**.

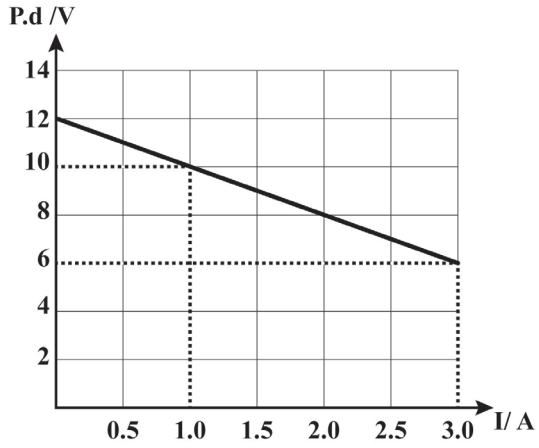


Figure 10-1

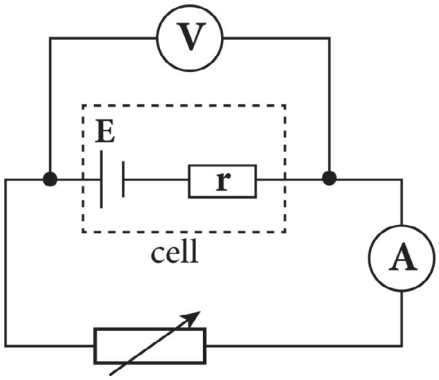


Figure 10-2

a. What is the value of the electromotive force (e.m.f) in volts?

(Shade in the bubble (○) next to the correct answer)

○ 10.0 V ○ 11.0 V

○ 12.0 V ○ 13.0 V [1]

b. Calculate the internal resistance of the power supply.

_____

_____

_____

r = _____ Ω [2]

c. If we add three lamps connected in series to the circuit shown in **Figure 10-2**, what will happen to the voltmeter reading (V)?

(Shade in the bubble (○) next to the correct answer)

○ Increase ○ decrease ○ stay the same

Explain your answer.

_____

_____ [1]

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11) **Figure 11-1** represents a model of a potentiometer electrical circuit. Given that the resistances are (R_1 = 2.0 Ω) and (R_2 = 4.0 Ω)

What is the voltameter reading?

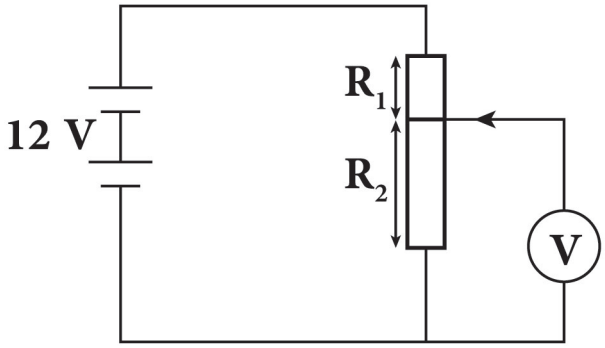


Figure 11-1

[1]

12) Plot (1) in **Figure 12-1** gives the charge (Q) that can be stored on capacitor (1) versus the electric potential (V) set up across it. Plots (2) and (3) are similar plots for capacitors (2) and (3), respectively. **Figure 12-2** shows a circuit with these three capacitors.

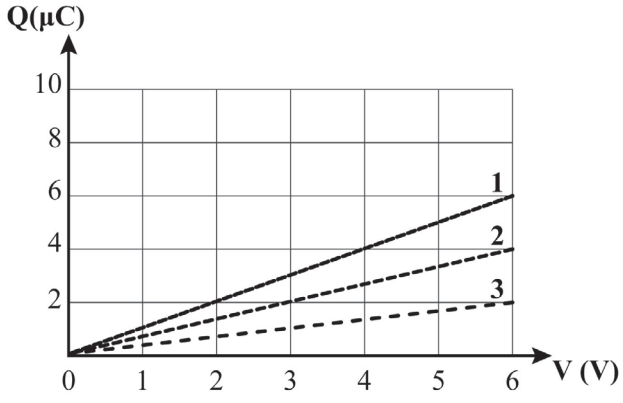


Figure 12-1

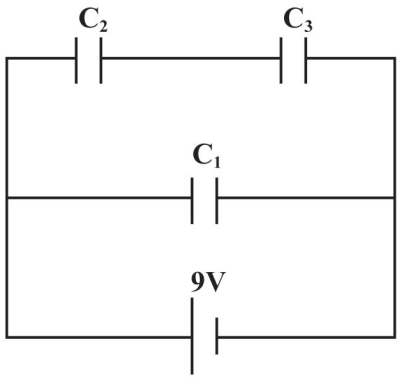


Figure 12-2

a. Which of the following options represents the capacitance values of the three capacitors?

(Shade in the bubble (⬭) next to the correct answer)

	C_1 (μF)	C_2 (μF)	C_3 (μF)
⬭	1	$\frac{2}{3}$	$\frac{1}{3}$
⬭	1	$\frac{1}{3}$	$\frac{2}{3}$
⬭	$\frac{2}{3}$	1	$\frac{1}{3}$
⬭	$\frac{2}{3}$	$\frac{1}{3}$	1

[1]

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Do not write in this space

b. Calculate the total capacitance of the circuit.

C_{total} = _____ μF [3]

c. What is the voltage (V_2) across the capacitor (C_2) in this circuit?

V_2 = _____ V [4]

13) State one use and one application of capacitors in electrical circuits.

Use: _____

Application: _____ [2]

14) A (3.0×10^{-4} F) capacitor is connected to a power supply and is then discharged through a (6.0×10^{5} Ω) resistor.

a. Calculate the time-constant (CR).

CR = _____ s [1]

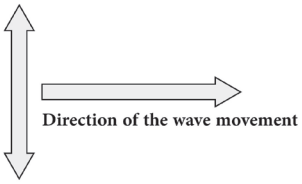
b. State one factor that can affect the rate of the discharge?

_____ [1]

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15) Complete **Table 15-1** by writing the type of wave according to the direction of the particles vibration during the movement of the wave.

Type of wave	Directions
_____	Vibrations of particles   Direction of the wave movement
_____	Vibrations of particles  Direction of the wave movement

[1]

Table 15-1

16) **Figure 16-1** shows a displacement-distance graph for a transverse wave.

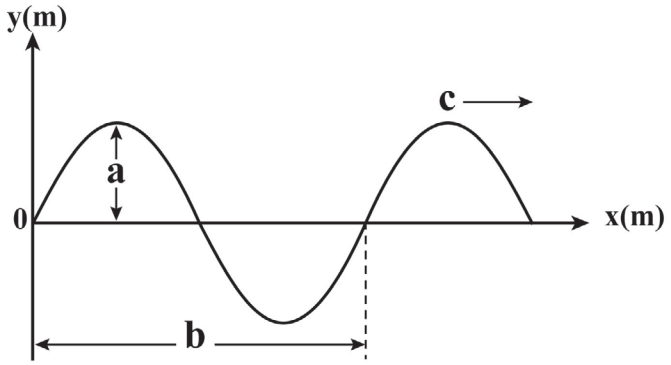


Figure 16-1

Which of the following represent (**a**), (**b**) and (**c**)?

(Shade in the bubble (🖵) next to the correct answer)

	a	b	c
🖵	Wavelength	Amplitude	Movement of energy
🖵	Amplitude	Wavelength	Movement of energy
🖵	Movement of energy	Amplitude	Wavelength
🖵	Wavelength	Movement of energy	Amplitude

[1]

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17) Two waves (A) and (B) have the same frequency with amplitudes (1.5 cm) and (3.0 cm) respectively. What is the ratio of their intensities $\left(\frac{I_A}{I_B}\right)$?

(Shade in the bubble (⬭) next to the correct answer)

⬭ 0.25 ⬭ 0.50

⬭ 2.0 ⬭ 3.0 [1]

18) Define frequency.

_____

_____ [1]

19) A train is moving towards a stationary observer at a speed of (25 ms^{-1}). When the train whistles, the observer was able to hear the sound with a frequency of (380 Hz). Calculate the actual frequency of the train whistle.

_____

_____

_____

_____

f_s= _____ Hz [3]

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20) **Figure 20-1** shows two waves (M) and (N) having the same frequency and the same amplitude with the same wavelength of (0.2 m).

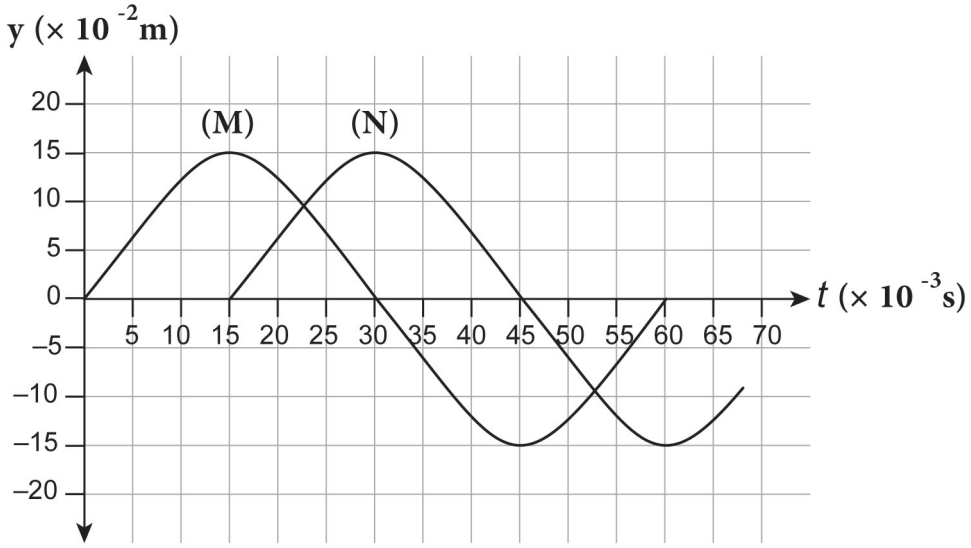


Figure 20-1

a. Find the values of the:

(i) Period.

_____ [1]

(ii) Amplitude.

_____ [1]

b. Calculate the speed of the wave.

_____

_____

_____

v = _____ ms^{-1} [2]

c. Calculate the phase difference between the two waves in degrees.

_____

_____

_____

The phase difference = _____ [2]

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21) In Young's double slit experiment, a light with a wavelength (500 nm) is used, the two slits are (2 m) away from the screen, and the fringes spacing is (4.0 mm). What is the distance between the two slits?

(Shade in the bubble (○) next to the correct answer)

○ 1.3×10^{-4} m ○ 1.6×10^{-2} m

○ 2.5×10^{-4} m ○ 1.0×10^{-9} m [1]

22) What is the distance between two adjacent lines in a diffraction grating containing (25×10^{4} lines per m)? (Shade in the bubble (○) next to the correct answer)

○ 4×10^{-9} m ○ 4×10^{-6} m

○ 4×10^{-5} m ○ 4×10^{-3} m [1]

23) State the principle of the superposition of waves.

_____

_____

_____ [1]

24) State the condition required for two waves to be coherent.

_____

_____ [1]

25) In Young's double slit experiment, a light of (500 nm) wavelength is used. The distance between the slits is (1.0 mm) and the first bright fringe appears at a distance (0.004 m) from the central fringe.

a. Calculate the distance between the screen and the two slits.

_____

_____

_____

D = _____ m [3]

b. State one change in one of the factors that can increase the distance (x) between the fringes?

_____ [1]

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26) **Figure 26-1** shows waves passing through a narrow gap.

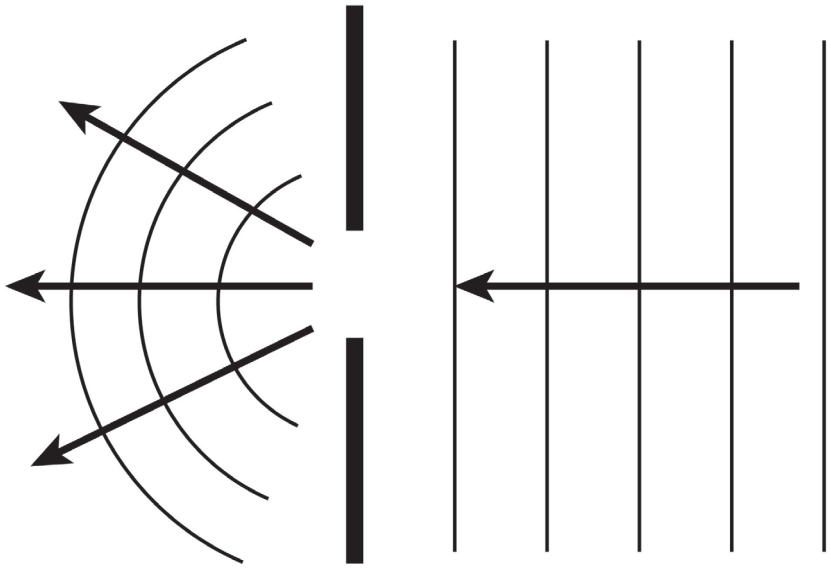


Figure 26-1

a. What do we call this phenomenon?

_____ [1]

b. What is the condition needed to get the most noticeable spread?

_____

_____ [1]

27) A monochromatic light of (600 nm) wavelength, is normally incident on a diffraction grating of (500 lines per cm). The screen is placed (2 m) away from the grating.

What is the distance between the central maximum and the first-order bright fringe?

(Shade in the bubble (⬭) next to the correct answer)

⬭ 0.06 m ⬭ 0.012 m

⬭ 0.024 m ⬭ 0.048 m [1]

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28) **Figure 28-1** shows points (**a**, **b**, **c** and **d**) in Young's double slit experiment.

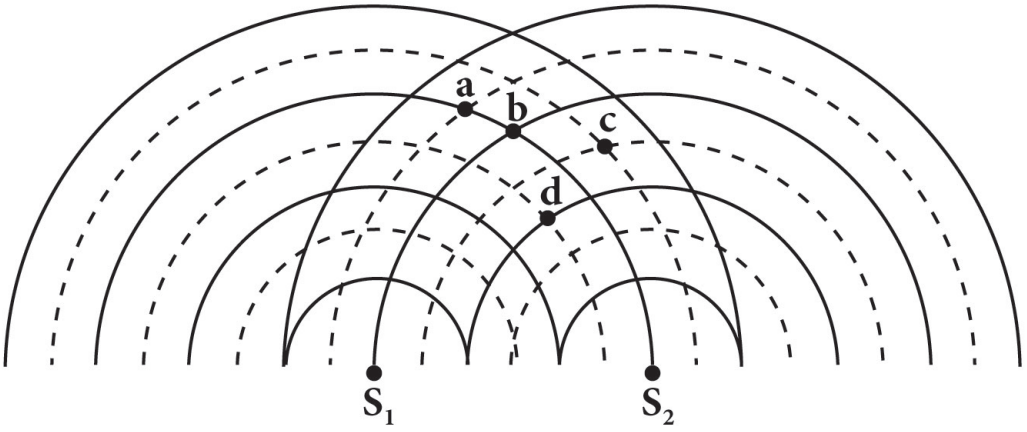


Figure 28-1

a. Complete the **Table 28-1** by choosing the type of interference.

Interference	a	b	c	d
Constructive or Destructive				

Table 28-1 [2]

b. What is the path difference in terms of (λ) at point (d)?

(Shade in the bubble (○) next to the correct answer)

○ $\frac{1}{2}\lambda$ ○ 1λ

○ $\frac{3}{2}\lambda$ ○ 2λ [1]

[End of Examination]

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Formulas and constants

Electricity				
$Q = It$	$Q = Ne$	$emf = IR + Ir$	$V = IR$	$R = \frac{\rho L}{A}$
$V = \frac{W}{Q}$	$P = \frac{V^2}{R}$	$P = I^2R$	$P = VI$	$P = \frac{W}{t}$
$\sum I_{in} = \sum I_{out}$		$\sum \Delta V_{closed\ loop} = 0$		$I = Anvq$
Capacitance				
$x = x_o e^{\frac{-t}{CR}}$		$W = \frac{1}{2} CV^2$	$W = \frac{1}{2} \frac{Q^2}{C}$	$W = \frac{1}{2} QV$
$\tau = RC$		$\ln(x) = \ln(x_0) - \frac{t}{\tau}$		$C = \frac{Q}{V}$
waves				
Phase difference = $(\frac{s}{\lambda}) \times 360^o$			$f_o = \frac{f_s v}{(v \mp v_s)}$	
Phase difference = $(\frac{\Delta t}{T}) \times 360^o$		$v = \frac{\lambda}{T}$	$v = \lambda f$	
Superposition of waves				
Constants				
Speed of sound in air =340 m s^{-1}		$e = 1.6 \times 10^{-19}\ C$		
$\lambda = \frac{ax}{D}$		$d \sin\theta = n\lambda$		

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Marking Guide of
General Education Diploma
The Royal Guard of Oman Technical College
First Semester – Second session
2025/2026

وزارة التعليم

The marking guide is in (12) pages **Subject: Physics** **Full marks: (70)**

Item		Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
1		1.Type of materials or resistivity 2.Length of wire. 3.Cross-section of wire 4.Temperature	1 1 1	1 mark for each correct factor Other answers: Radius or diameter volume	1	14	1.2K	AO1
2		☐ Material: Silicon	1	-	1	14	1.2J	AO1
3	a	$I = \frac{Q}{t} = \frac{100}{300} = 0.333\ A \sim 0.3\ A$	1	One mark for the final answer	1	5	1.1B	AO1
	b	$V = IR = 0.350 \times 40$ $V = 14\ V$	1 1	1 mark for substituting V 1 mark for the value of V	1	9	1.2G	AO1

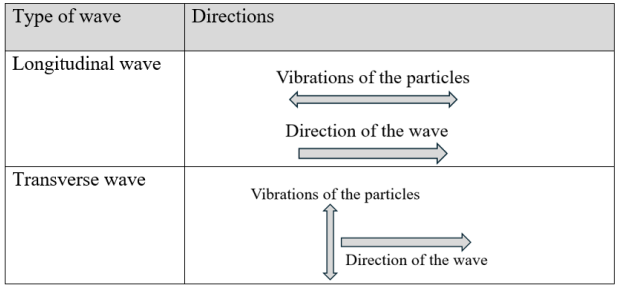
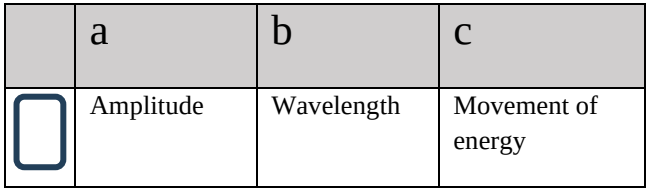
Item		Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
4		3.2×10^{-10}A	1	-	1	5	1.1B	AO2
5		$R = \frac{\rho L}{A}$ $A = \pi(4 \times 10^{-3})^2 = 5.0 \times 10^{-5}\ m^2$ $R = \frac{1.5 \times 10^{-6} \times 1.5 \times 10^{3}}{5.0 \times 10^{-5}}$ $R = 44.8\ \Omega$ $P = (50.0 \times 10^{-3})^2 \times 44.8$ $P = 0.112$ W	1 1 1 1 1	1 mark for the value of the Area 1 mark for substituting R 1 mark for the value of R 1 mark for substituting P 1 mark for the value of P	1	14 10	1.2L 1.2M	AO2
6	a	$A = \pi(0.8 \times 10^{-3})^2$ $= 2.01 \times 10^{-6}$ m^2 $v = \frac{I}{Anq}$ $v = \frac{2.85}{2.01 \times 10^{-6} \times 5.9 \times 10^{28} \times 1.6 \times 10^{-19}}$ $v = 1.5 \times 10^{-4}$ ms^{-1}	1 1 1 1	1 mark for calculating the area 1 mark for the value of the area 1 mark for the substitution for drift speed 1 mark for the value of drift speed	1	7	1.1E	AO2

Item		Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
6	b	Decrease According to the equation (I = Anvq), the current is directly proportional to the drift speed.	1	The student must choose the correct option with the correct explanation.	1	7	1.1E	AO2
7		<table><tr><td></td><td>lowest resistance</td><td>highest resistance</td></tr><tr><td>☐</td><td>P</td><td>T</td></tr></table>	1	-	1	12	1.2H	AO2
8	a	<table><tr><td></td><td>$R_1 and\ R_2$</td><td>$R_4 and\ R_5$</td></tr><tr><td>Type of connection (series\parallel)</td><td>series</td><td>parallel</td></tr><tr><td>combined resistance (increase\decrease)</td><td>increase</td><td>decrease</td></tr></table>	1 1	1 mark for each correct row	1	22-23	1.3G	AO1
	b	<table><tr><td></td><td>Reading A_2</td><td>Reading A_5</td></tr><tr><td>B</td><td>160</td><td>50</td></tr></table>	1	-	1	18	1.3h	AO2
	c	$R = \frac{(10\times8)}{(10+8)} = \frac{80}{18} = 4.4\ \Omega \sim 4\ \Omega$	1	1 mark for the final value of R **Another solution** $\frac{1}{R} = \frac{1}{10} + \frac{1}{8}, R = 4.4\ \Omega \sim 4\ \Omega$	1	23	1.3d	AO1
9		$35 - 9 - (4 \times 3.45) - 8I_1 = 0$ $I_1 = \frac{12.2}{8} = 1.525\ A \sim 1.5\ A$ $I_2 = I_1 + I_3,$ $I_3 = 3.45 - 1.525$ $I_3 = 1.925\ A \sim 1.9\ A$	1 1 1 1	1 mark for the closed loop 1 mark for the value of I_1 1 mark for the first Kirchhoff's law or choose another loop 1 mark for the value of I_3 **Another solution** $9 + 2I_3 - 42 + 8I_3 + (4 \times 3.45) = 0$ $I_3 = 1.92\ A$ $I_1 = 3.45 - 1.92 = 1.53A$	1	20-30	1.3h	AO2

Item		Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
10	a	12.0	1	-	1	32	1.4A	AO1
	b	$slope = -r = \frac{6-10}{3-1} = -2,$ $r = 2\Omega$	1 1	1 mark for the substitution 1 mark for the value of r **Another solution** $10 = 12 - r$ $r = 12 - 10 = 2\Omega$	1	32	1.4B	AO2
	c	Increase, Since $v = \varepsilon - Ir$ As more lamps are connected in series to the power supply, the current decreases and the p.d. across internal resistance decreases. Thus, the terminal potential difference will increase.	1	If students relate the connection of resistance leads to a decrease in the current or a decrease in (V_r), give the mark	1	35	1.4B	AO2
11		$V_{out} = \frac{VR_2}{R_1+R_2} = \frac{12\times4}{(4+2)} = 8V$	1	1 mark for the final value	1	38	1.4D	AO2

Item		Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
12	a	<table><tr><td></td><td>C_1</td><td>C_2</td><td>C_3</td></tr><tr><td>A</td><td>1</td><td>$\frac{2}{3}$</td><td>$\frac{1}{3}$</td></tr></table>	1	-	2	50-52	2.1D	AO2
	b	$C_{2,3} = \frac{(\frac{1}{3} \times \frac{2}{3})}{(\frac{1}{3} + \frac{2}{3})} = \frac{2}{9}\mu F$ $C_{total} = \frac{2}{9} + 1$ $C_{total} = \frac{11}{9}\mu F = 1.22\mu F$	1 1 1	1 mark for the result of the series connection 1 mark for the result of the parallel connection 1 mark for the total C **Another solution to get $C_{2,3}$** $\frac{1}{C_{2,3}} = \frac{1}{\frac{1}{3}} + \frac{1}{\frac{2}{3}}$ $C_{2,3} = \frac{2}{9}\mu F$	2	52	2.1D	AO2

Item		Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
12	c	$Q_{2,3} = C_{2,3}V = \frac{2}{9} \times 9$ $Q_2 = 2\mu C$ $V_2 = \frac{Q_2}{C_2} = \frac{2}{\left(\frac{2}{3}\right)}$ $V_2 = 3V$	1 1 1 1	1 mark for substituting $Q_{2,3}$ 1 mark for the value Q_2 1 mark for substituting V_2 1 mark for the value of V_2 **Another solution to get Q_2** $Q_{total} = \frac{11}{9} \times 9 = 11\mu C$ $Q_1 = 1 \times 9 = 9\mu C$ $Q_{2,3} = 11 - 9 = 2\mu C$ $Q_2 = 2\mu C$	2	50-52	2.1C	AO2
13		Use: Energy storage plication: Camera flash unit	1 1	-	2	49	2.1L	AO1
14	a	$\tau = RC = 3 \times 10^{-4} \times 6 \times 10^{5} = 180s$	1	1 mark for the value of the time constant	2	58	2.1H	AO1
	b	Resistance (R) or Capacitance (C)	1	1 mark for either R or C	2	57	2.1H	AO1

Item	Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
15		1	Both answers must be correct	3	62	3.1B	AO1
16		1	-	3	62	3.1D	AO1
17	0.25	1	-	3	66	3.1h	AO2
18	The number of oscillations per unit time.	1	Accept correct definition Number of cycles per second	3	64	3.1D	AO1

Item		Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
19		$f_s = \frac{f_0(v - v_s)}{v}$ $f_s = \frac{380\ (340 - 25)}{340}$ $f_s = 352\ HZ$	1 1 1	1 mark for the formula for f_s 1 mark for substituting f_s 1 mark for the value of f_s	3	72	3.2C	AO2
20	a	i) $60 \times 10^{-3} s$	1	-	3	63	3.1C	AO1
		ii) $15 \times 10^{-2}\ m$	1	-	3	65	3.1D	AO1
	b	$v = \frac{\lambda}{T}$ $v = \frac{20 \times 10^{-2}}{60 \times 10^{-3}}$ $v = 3.33\ ms^{-1}$	1 1	1 mark for the substitution 1 mark for the value of v **Another solution** $v = \lambda f = 0.2 \times \frac{1}{0.06}$ $v = 3.33\ ms^{-1}$	3	66	3.1E	AO2

Item		Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
20	c	$The\ phase\ difference = 360 \times \frac{t}{T}$ $The\ phase\ difference = 360 \times \frac{15}{60}$ $The\ phase\ difference = 90^0$	1 1	1 mark for the substitution for the phase difference formula. 1 mark for the value of the phase difference	3	65	3.1D	AO2

Item	Answer	Mark	Additional Information	Unit	Page	Learning Outcome	Assessment Objective
21	$2.5 \times 10^{-4}\ m$	1	-	4	82	4.1L	AO2
22	$4 \times 10^{-6}\ m$	1	-	4	86	4.3B	AO1
23	(When two or more waves meet at a point, the resultant displacement at that point is equal to the sum of the displacement of the individual waves at that point).	1	Do not accept drawings or formulas	4	77	4.1A	AO1
24	They have constant phase difference	1		4	80	4.1B	A01

25	a	$D = \frac{a\,x}{\lambda}$ $D = \frac{1 \times 10^{-3} \times 4 \times 10^{-3}}{500 \times 10^{-9}}$ $D = 8\,m$	1 1 1	1 mark for the correct conversion of the values into SI units 1 mark for substituting D 1 mark for the value of D If the units are not correct reduce 1 mark only	4	82	4.1I	AO2
	b	Increase (D) or Increase (λ) *or* Decrease (a)	1	1 mark for any of the correct statements.	4	83	4.1I	AO2
26	a	Diffraction	1	-	4	84	4.2B	AO1

وزارة التعليم
المديرية العامة للتوجيه التربوي
دائرة الامتحانات والاختبارات

<table>
<tr><th colspan="2">Item</th><th>Answer</th><th>Mark</th><th>Additional Information</th><th>Urit</th><th>Page</th><th>Learning Outcome</th><th>Assessment Objective</th></tr>
<tr><td>26</td><td>b</td><td>When the width of the gap is equal to the wavelength of the waves</td><td>1</td><td>-</td><td>4</td><td>84</td><td>4.2B</td><td>AO1</td></tr>
<tr><td colspan="2">27</td><td>$0.06\ m$</td><td>1</td><td>-</td><td>4</td><td>85</td><td>4.3B</td><td>AO2</td></tr>
<tr><td rowspan="2">28</td><td>a</td><td><table><tr><td>Points</td><td>a</td><td>b</td><td>c</td><td>d</td></tr><tr><td>Constructive\ destructive</td><td>destructive</td><td>constructive</td><td>constructive</td><td>Destructive</td></tr></table></td><td>2</td><td>2 marks for all points that are correct
1 mark for 3 or 2 points that are correct
0 mark for 1 or nothing</td><td>4</td><td>76</td><td>4.1C</td><td>AO2</td></tr>
<tr><td>b</td><td>$\frac{1}{2}\lambda$</td><td>1</td><td>-</td><td>4</td><td>78</td><td>4.1D</td><td>AO2</td></tr>
</table>

End of Marking Guide