تم تحميل هذا الملف من موقع المناهج الإماراتية

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حل أسئلة الامتحان النهائي منهج انسباير العام 2023-2024

موقع المناهج ⇦ المناهج الإماراتية ⇦ الصف العاشر المتقدم ⇦ فيزياء ⇦ الفصل الأول ⇦ حلول ⇦ الملف

تاريخ إضافة الملف على موقع المناهج: 2024-11-22 12:09:15

المزيد من مادة فيزياء:	ملفات ا كتب للمعلم ا كتب للطالب ا اختبارات الكترونية ا اختبارات ا حلول ا عروض بوربوينت ا أوراق عمل منهج انجليزي ا ملخصات وتقارير ا مذكرات وبنوك ا الامتحان النهائي ا للمدرس

التواصل الاجتماعي بحسب الصف العاشر المتقدم

صفحة المناهج الإماراتية على فيسبوك					
المواد على تلغرام	التربية الاسلامية	اللغة العربية	اللغة الانجليزية	الرياضيات	

المزيد من الملفات بحسب الصف العاشر المتقدم والمادة فيزياء في الفصل الأول

1	حل الكراسة التدريبية للاختبار النهائي وفق الهيكل الوزاري
2	الكراسة التدريبية للاختبار النهائي وفق الهيكل الوزاري
3	تجميعة أسئلة مراجعة وحدة الاهتزازات والأمواج وفق الهيكل الوزاري منهج انسباير
4	حل أسئلة الامتحان النهائي القسم الالكتروني
5	مراجعة نهائية جميع وحدات الفصل

10

امتحان نهاية الفصل الدراسي الأول 2023-2024

End of term 1 exam 2023-2024

اسم الطالب	
المدرسة	
الصف	
المسار	
المادة	

يملا هذا الجدول بدقة تامة من قبل لجنة التقدير					
رقم السؤال	الدرجة			اسم المقدر 1	اسم المقدر 2	اسم المراجع
	المقدر 1	المقدر 2	المراجع			
Q1						
Q2						
Q3						
Q4						
Q5						
Q6						

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$$F = -kx$$

$$P.E_{spring} = \frac{1}{2}kx^2$$

$$f = \frac{1}{\tau}$$

$$\tau = 2\pi\sqrt{\frac{l}{g}}$$

$$f_d = f_s\left(\frac{v - v_d}{v - v_s}\right)$$

$$v = \lambda f$$

Closed Pipe

$$f_1 = \frac{v}{4L}$$

$$f_3 = 3f_1$$

$$f_5 = 5f_1$$

Open Pipe

$$f_1 = \frac{v}{2L}$$

$$f_2 = 2f_1$$

$$f_3 = 3f_1$$

$$F = k\frac{q_1 q_2}{r^2}$$

$$E = \frac{F_{onq}}{q}, \qquad E = k\frac{q}{r^2}$$

$$\Delta V \equiv \frac{W_{onq}}{q}, \qquad \Delta V = Ed$$

$$q = ne$$

$$C = \frac{q}{\Delta V}$$

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G10 A	Physics – inspire	physics	2023-2024

Question	1

1. Which of the following expresses the maximum distance that a vibrating object moves from the equilibrium

- ❑ The period
- ❑ An amplitude
- ❑ The Frequency
- ❑ A complete oscillation

2. The period of a simple pendulum on earth is τ_{earth} . **What is the period of the same pendulum when it is moved to the moon τ_{moon} ? Given that** $g_{moon} = \frac{g_{earth}}{6}$

- ❑ $\tau_{moon} = 6\,\tau_{earth}$
- ❑ $\tau_{earth} = \sqrt{6}\,\tau_{moon}$
- ❑ $\tau_{moon} = \sqrt{6}\,\tau_{earth}$
- ❑ $\tau_{earth} = 6\,\tau_{moon}$

3. Which of the following factors does the period of a pendulum depend on ? (choose 2)

- ❑ The length of the pendulum
- ❑ The mass of the bob
- ❑ The gravitational field strength
- ❑ The mass of the oscillation

4. What will happen to the period of a pendulum if the length of a pendulum was to double?

- ❑ The period will double
- ❑ The period will increase by a factor of 1.4
- ❑ The period will become half its value
- ❑ The period will decrease by a factor of one fourth

5. On a certain planet the period of a 0.75 m long pendulum is 2 s. what is g for this planet ?

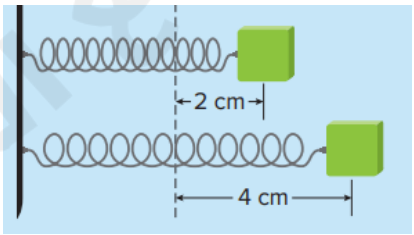
- ❑ 7.4 N/kg
- ❑ 1.6 N/kg
- ❑ 9.1 N/kg
- ❑ 9.8 N/kg

6. What is the spring constant of a spring that stretches 6 cm when an object weighing 12 N is hung from it ?

- ❑ 200 N/m
- ❑ 100 N/m
- ❑ 400 N/m
- ❑ 50 N/m

7. What happens to the elastic potential energy stored in a spring when its stretch doubles?

- ❑ PE doubles
- ❑ PE halves
- ❑ PE quadruples
- ❑ PE stays the same



8. What type of waves disturb the particles in the medium perpendicular to the direction of the wave's travel?

- ❑ Longitudinal
- ❑ transverse
- ❑ surface
- ❑ radioactive

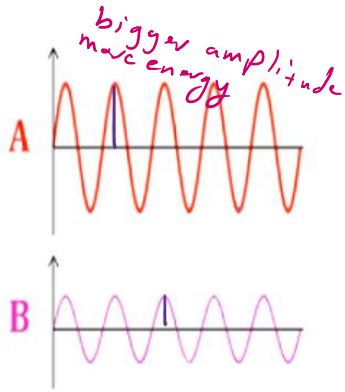
G10 A	Physics – inspire	physics	2023-2024

Question	1

9. What type of waves are sound waves?

- ❑ Longitudinal
- ❑ transverse
- ❑ surface
- ❑ radioactive

10. The figure shows two waves moving at the same speed. Which of the following is true



- ❑ Wave A has a greater frequency than wave B
- ❑ Wave A has a greater energy than wave B
- ❑ Wave A has less frequency than wave B
- ❑ Wave A has less energy than wave B

11. If the frequency of a wave doubles , while the amplitude stays the same. what happens to the following quantities ?

$T = \frac{1}{2f} \rightarrow T_{new} = \frac{1}{2} T_{old}$

$V = \lambda f$

- ❑ The period : ***halves***
- ❑ Velocity : ***stays the same***
- ❑ The wavelength : ***halves*** $\lambda = \frac{V}{2f}$ → $\lambda_{new} = \frac{1}{2}\lambda_{old}$
- ❑ Energy : ***stays the same*** since amplitude didn't change.

12. What is true about mechanical waves?

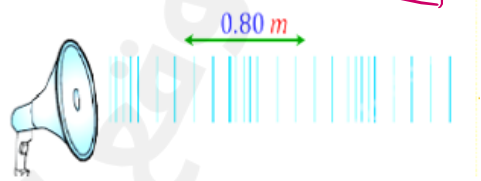
- ❑ It transfers matter
- ❑ It transfers energy
- ❑ It travels through vacuum
- ❑ It can only be transverse waves

13. A source of waves produces longitudinal wave of wavelength 20 m, with a frequency of 10 complete waves in a second. What is the speed of the wave?

$V = \lambda f$
$= 20 \times 10$
$= 200$

- ❑ 200 m/s
- ❑ 2.0 m/s
- ❑ 20.0 m/s
- ❑ 0.50 m/s

14. The figure shows a soundwave produced by a loud speaker, the sound propagates in the air at the speed of 336 m/s. the frequency of the sound wave is ?



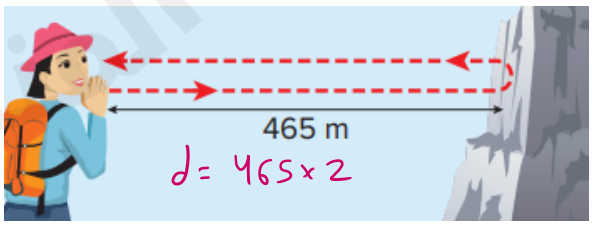
$f = \frac{V}{\lambda} = \frac{336}{0.8}$

- ❑ 500 Hz
- ❑ 300 Hz
- ❑ 420 Hz
- ❑ 212 Hz

15. A hiker shouts toward a vertical cliff as shown , the echo is heard 2.75 s later. What is the speed of sound of the hiker's voice in air? What is the frequency of the wave if the wavelength is 0.75 m

$V = 331$ m/s

$V = \frac{d}{t} = \frac{465}{2.75}$



- ❑ The speed is 331 m/s while the frequency is 442.2 Hz
- ❑ The speed is 169.1 m/s while the frequency is 225.4 Hz
- ❑ The speed is 169.1 m/s while the frequency is 126.8 Hz
- ❑ The speed is 1278.75 m/s while the frequency is 126.8 Hz

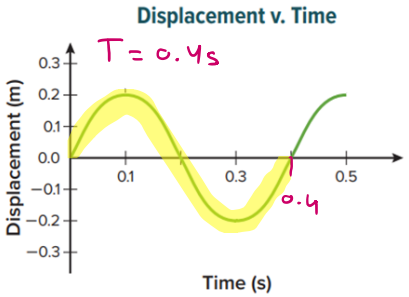
$f = \frac{V}{\lambda} = \frac{331}{0.75} = 441$ Hz

G10 A	Physics – inspire	physics	2023-2024

Question	1

$f = \frac{1}{T} = \frac{1}{0.4} = 2.5\ Hz$

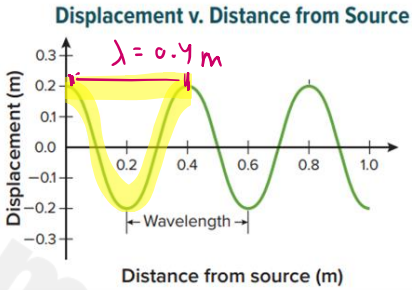
17. What is the frequency of the following wave?



- ❑ 6 Hz
- ❑ 0.4 Hz
- ❑ 2.5 Hz
- ❑ 0.2 Hz

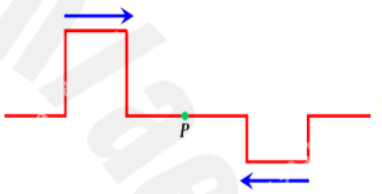
18. what is the frequency of the wave if you know that its speed is 300 m/s

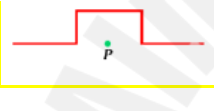
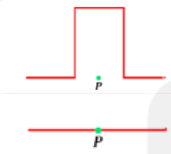
$f = \frac{V}{\lambda} = \frac{300}{0.4} = 750\ Hz$



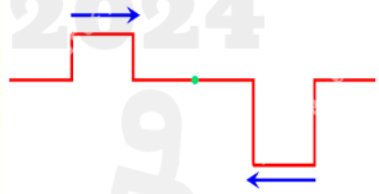
- ❑ 240 Hz
- ❑ 120 Hz
- ❑ 750 Hz
- ❑ 1 Hz

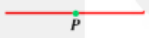
19. Two wave pulses on the same string are headed towards each other as shown. When both occupy the same space, which diagram best describes the resulting wave form?



- ❑ 
- ❑ 
- ❑ 
- ❑ 1 Hz

20. Two wave pulses on the same string are headed towards each other as shown. When both occupy the same space, which diagram best describes the resulting wave form?



- ❑ 
- ❑ 
- ❑ 
- ❑ 

21. What is the speed of sound at 30 Celsius?

$V = 343 + 0.6(T - 20)$

$V = 343 + 0.6\ (30 - 20)$

$V = 349\ m/s$

- ❑ 349 m/s
- ❑ 333 m/s
- ❑ 331 m/s
- ❑ 343 m/s

22. In which type of materials is the sound fastest ?

- ❑ Solids
- ❑ Liquids
- ❑ gasses
- ❑ plasma

G10 A	Physics – inspire	physics	2023-2024

Question	1

23. A speaker is placed next to a flame, a loud sound wave is placed through the speaker causing the flame to vibrate. Which of the following rows describes, correctly, the type of the wave and the direction of the flame movement?

	Type of waves	Direction of flame movement
A	Longitudinal	⟷
B	Transverse	⟷
C	Longitudinal	↕
D	Transverse	↕

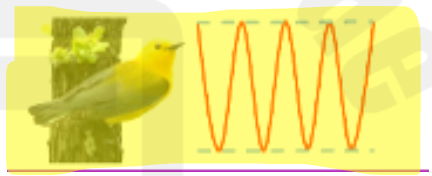
amplitude

24 Which of the following birds has the loudest sound ?

❑ 

❑ 

❑ 

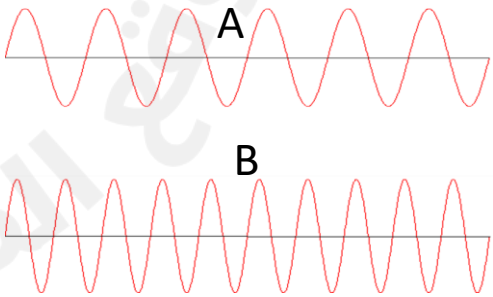
❑ 

25. To increase the pitch of the sound , we must increase which of the following properties?

❑ The amplitude ❑ The frequency

❑ phase ❑ energy

26. Which of the following statements is true about wave A and B ?



❑ The amplitude of A is higher than the amplitude of B

❑ The frequency of A is higher than the frequency of B

❑ The amplitude of B is higher than the amplitude of A

❑ The frequency of B is higher than the frequency of A

27. When a wave crosses a boundary between two media thin rope and thick rope, as

❑ its frequency and speed change, but its wavelength does not.

❑ its wavelength and frequency change, but its speed does not.

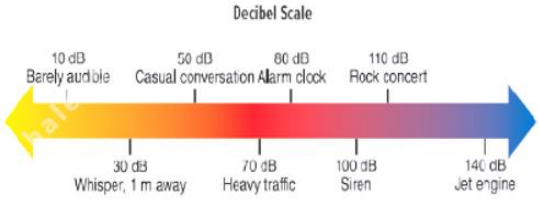
❑ its wavelength, speed and frequency change

❑ its wavelength and speed change, but its frequency does not.

G10 A	Physics – inspire	physics	2023-2024

Question	1

23. Which one of the following quantities is measured in decibels (dB) ?



- ❑ Energy of sound
- ❑ Loudness of sound
- ❑ Pitch of sound
- ❑ Sound level

24. Which one of the following units is used to quantify sound level?

- ❑ Joules
- ❑ decibel
- ❑ Hertz
- ❑ meters

25. How long must a pendulum be on Jupiter , where g=24.8 N/kg to have a period of 0.5 s ?

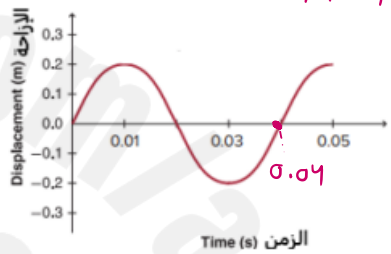
$L = ??$ T

$T = 2\pi\sqrt{\frac{L}{g}} \rightarrow 0.5 = 2\pi\sqrt{\frac{L}{24.8}}$

shift + solve .

- ❑ 0.79 m
- ❑ 0.16 m
- ❑ 0.32 m
- ❑ 0.20 m

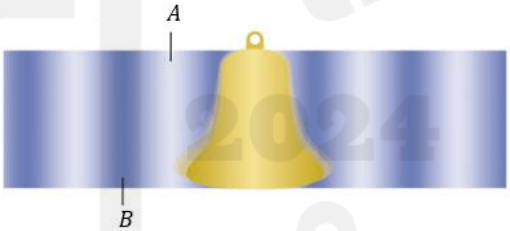
26. According to the wave figure. What is the frequency of the wave?



$f = \frac{1}{T} = \frac{1}{0.04} = 25$

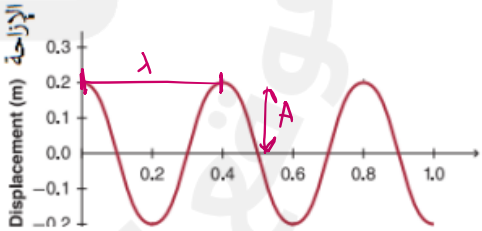
- ❑ 0.2 Hz
- ❑ 13 Hz
- ❑ 50 Hz
- ❑ 25 Hz

27. The diagram shows waves moving out from the bell after it has been struck in air. Which of the following is correct according to regions A and B ?



- ❑ A low pressure , B high pressure
- ❑ A high pressure , B low pressure
- ❑ A and B high pressure
- ❑ A and B low pressure

28. According to figure. Which of the following is correct?



- ❑ $\lambda = 0.4\ m$, $A = 0.2\ m$
- ❑ $\lambda = 0.2\ m$, $A = 0.4\ m$
- ❑ $\lambda = 1\ m$, $A = 0.2\ m$
- ❑ $\lambda = 0.4\ m$, $A = 1\ m$

29. According to hook's law the magnitude of the force exerted by a spring depends on:

- ❑ The spring constant
- ❑ The stretch distance
- ❑ The stretch compression
- ❑ All the above

30. A spring with a spring constant k= 215 N/m compressed by 0.340m. What is the spring's elastic potential energy?

$PE = \frac{1}{2}kx^2$

$= \frac{1}{2} \times 215 \times (0.34)^2$

- ❑ 36.6 J
- ❑ 73.1 J
- ❑ 24.8 J
- ❑ 12.4 J

G10 A	Physics – inspire	physics	2023-2024

Question	1

31. What is the wave that disturbs the particles in the medium perpendicular to the direction of the wave's travel ?

- ❑ Neither transverse wave nor longitudinal wave
- ❑ a component of longitudinal wave and transverse wave
- ❑ The longitudinal wave
- ❑ The transverse wave

32. What is the name given to the wave behavior in which a wave changes direction as it moves from one medium to another medium ?

- ❑ interference
- ❑ reflection
- ❑ Superposition
- ❑ refraction

33. A sound wave has a wavelength of 4.0 m and travels at a speed of 340 m/s. What is the period of the wave?

- ❑ 85 s
- ❑ 0.006 s
- ❑ 0.024 s
- ❑ 0.012 s

34. How many times greater is the sound pressure level of a typical airplane (130 dB) than a normal whisper (30 Db)

- ❑ 10 times greater
- ❑ 1000 times greater
- ❑ 100 times greater
- ❑ 100000 times greater

35. How many times greater is the sound pressure level of a typical rock concert (110 dB) than a normal whisper (50 Db)

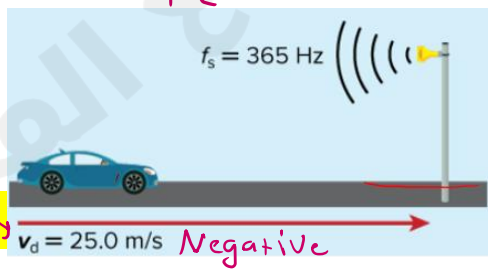
- ❑ 10 times greater
- ❑ 1000 times greater
- ❑ 100 times greater
- ❑ 10000 times greater

36. In which case do you hear a frequency higher than the actual frequency of the sound ?

- ❑ When the source of sound is moving away from you
- ❑ When you move away from the source of sound
- ❑ When the source of sound is moving towards you
- ❑ When you and the source of sound are not moving

37. You are in a car, travelling toward a siren. If the siren's frequency is 365 Hz, what frequency do you hear? Use 343 m/s as the speed of sound

- ❑ 382Hz
- ❑ 363 Hz
- ❑ 400 Hz
- ❑ 291 Hz



38. A train is travelling with constant speed $(0.25v)$ toward an observer standing on a platform, where v is the speed of sound. What is the observed frequency ?

- ❑ $\frac{8}{10}f$
- ❑ $\frac{7}{4}f$
- ❑ $\frac{4}{3}f$
- ❑ $\frac{1}{2}f$

G10 A	Physics – inspire	physics	2023-2024

Question	1

39. A stationary siren wails a sound wave of 390Hz traveling in the air towards an observer who runs towards the siren at speed of (5.0m/s). If you know that the speed of sound in air is 345m/s, what is the **wavelength** of the sound wave received by the observer?

- ❑ 0.372 m
- ❑ 0.621 m
- ❑ 0.980 m
- ❑ 0.885 m

$\lambda = \frac{v}{f_o} = \frac{345}{395.6} =$

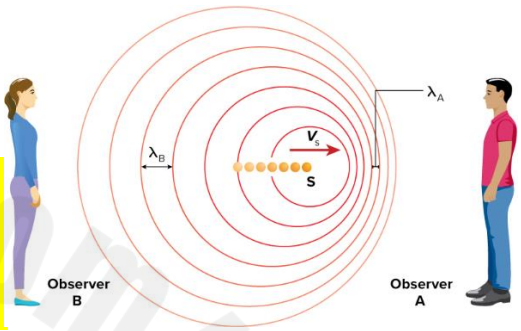
$f_o = f_s \times \left(\frac{v - v_o}{v - v_s}\right)$

$f_o = 390 \times \left(\frac{345 - -5}{345 - 0}\right)$

$f_o = 395.6\ Hz$

40. The figure shows an ambulance sounding its siren, it moved towards Adam, away from sara. Which of the following is correct?

- ❑ Adam hears the siren sound at a lower frequency than Sara
- ❑ Adam hears the siren sound, while Sara does not
- ❑ Adam hears the siren sound with a frequency equal to what Sara hears
- ❑ Adam hears the siren sound at a higher frequency than Sara



41. A 440 Hz tuning fork is used with a resonating column to determine the speed of sound in helium gas. If the spacing between the resonances is 110 cm, what is the speed of sound in helium gas ?

- ❑ 2.20 m/s
- ❑ 1109 m/s
- ❑ 343 m/s
- ❑ 968 m/s

$L_2 - L_1 = \frac{1}{2}\lambda$

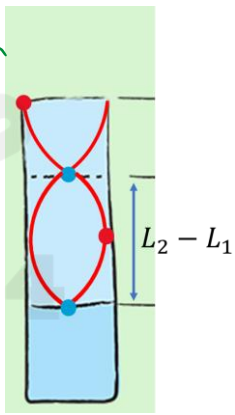
$1.1 = \frac{1}{2}\lambda$

$\lambda = 2.2\ m$

$v = \lambda f$

$= 2.2 \times 440$

$= 968\ m/s$



42. Two clarinet players are tuning their instruments. One player sounds a tone with a pitch of 527 Hz and the other player sounds a tone with a pitch of 522 Hz. How many beats per second will the players hear?

- ❑ None
- ❑ 4
- ❑ 5
- ❑ 525

$f_{beat} = |f_A - f_B|$

$= |527 - 522| = 5\ beats/s$

43. Which of the following indicates the quality of sound that gives each different musical instrument a unique sound?

- ❑ dissonance
- ❑ timber
- ❑ harmonics
- ❑ Hearing resonance

43. If a guitar string has a fundamental frequency of 500 Hz , which of the following frequencies can set the string into resonance ?

- ❑ 1250 Hz
- ❑ 750 Hz
- ❑ 1500 Hz
- ❑ 1750 Hz

$f_1 = 500$ $f_2 = 2 \times 500 = 1000$ $f_3 = 3 \times 500 = 1500$

$f_4 = 4 \times 500 = 2000$

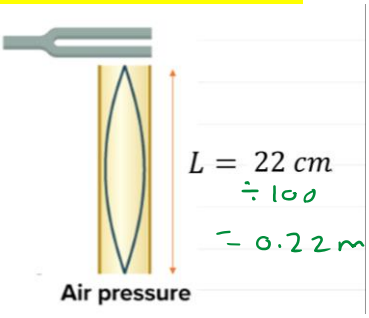
G10 A	Physics – inspire	physics	2023-2024

Question	1

45. Which of the following statements is not correct for air pipes?

- ❑ Standing waves in pipes can be represented by sine waves
- ❑ A closed pipe resonates when its length is an odd number of quarter wavelengths
- ❑ An open pipe resonates when its length is an even number of quarter wavelengths
- ❑ In closed pipes, the sound wave reflects off the closed end. High pressure waves reflect as low pressure

46. The figure shows the first resonance length of an open air pipe. If the frequency of the sound is 820Hz, what is the speed of the sound?



- ❑ 0.44 m/s
- ❑ 400 m/s
- ❑ 361 m/s
- ❑ 20 m/s

$L_2 - L_1 = \frac{1}{2}\lambda$

$0.22 = \frac{1}{2}\lambda$

$\lambda = 0.44\ m$

$V = \lambda f = 0.44 \times 820$

$= 360.8\ m/s$

47. What happens to the pitch of the note played by a pipe instrument if the air column gets longer ?

- ❑ increases
- ❑ decreases
- ❑ Stays the same
- ❑ The pitch doesn't depend on the length of the air column

48. When the frequency of a standing wave is doubled to obtain another standing wave. What happens to the number of nodes and antinodes?

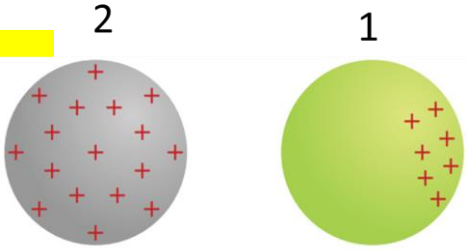
- ❑ The number of nodes decreases, and the number of antinodes increases
- ❑ The number of nodes decreases, and the number of antinodes decreases
- ❑ The number of nodes increases, and the number of antinodes decreases
- ❑ The number of nodes increases, and the number of antinodes increases

49. Which of the following is true?

- ❑ An insulator prevents charge from flowing
- ❑ Most plastic materials are good conductors
- ❑ Charges spread out evenly on an insulator always
- ❑ Conductors hold charge where they are places

50. According to the figure shown free positive charge distribution over two isolated spheres. Which of the following may be correct for the two spheres?

- ❑ 1 : copper , 2: plastic
- ❑ 1: plastic , 2: copper
- ❑ 1: copper , 2: copper
- ❑ 1: plastic , 2: plastic



G10 A	Physics – inspire	physics	2023-2024

Question	1

51. When a polythene rod gains a negative charge when it is rubbed with a cloth. Which of the following statements best explains how thins happens?

- ❑ Protons transfer from the cloth to the polythene rod
- ❑ electrons transfer from the cloth to the polythene rod
- ❑ Protons transfer to the cloth from the polyethene tod
- ❑ Electrons transfer to the cloth from the polythene rod

52. When you want to charge an electroscope with a rod by induction and you want the charge to remain when you remove the charging object. Which one of the following arrangements you will choose?

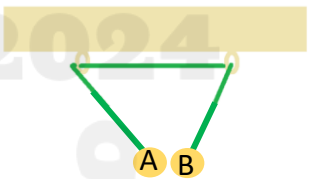
- ❑ Bring the charged rod close to the knob, ground the knob, remove grounding then remove the rod.
- ❑ Bring the charged rod close to the knob, ground the knob, remove the rod then remove grounding.
- ❑ Ground the knob, bring the charged rod close to the knob, remove the charging rod then remove grounding
- ❑ Bring the charged rod close to the knob, remove the charging rod then ground the knob

53. Charging a neutral body by touching it with a charged body is called charging by.....

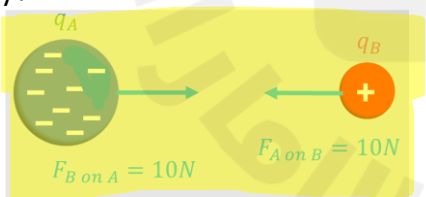
- ❑ discharging
- ❑ grounding
- ❑ induction
- ❑ conduction

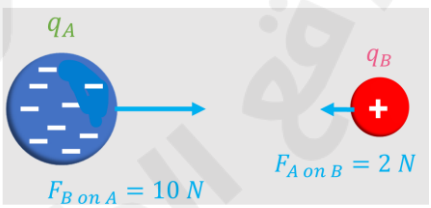
54. In the figure, two isolated bodies (A and B) are suspended freely. Which of the following can be correct about the charge type on the two bodies?

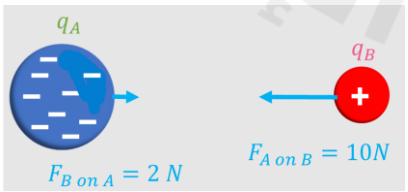
- ❑ A: positive . B: positive
- ❑ A: negative . B: negative
- ❑ A: negative . B:positive
- ❑ A: neutral . B: Neutral

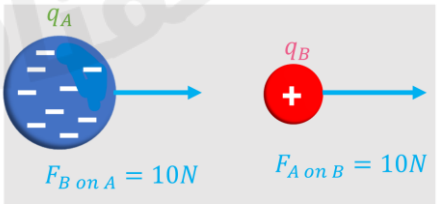


55. Which situation addresses coulomb's law and the forces between two unequally charge bodies correctly?

- ❑ 

- ❑ 

- ❑ 

- ❑ 

G10 A	Physics – inspire	physics	2023-2024

Question	1

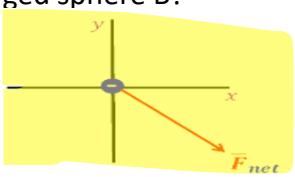
56. What happens to the electrostatic force if the distance between the charges halves??

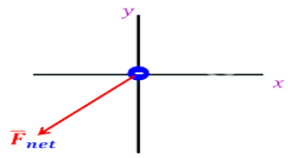
- ❑ The force doubles
- ❑ The force halves
- ❑ The force becomes one fourth its vale
- ❑ The force quadruples

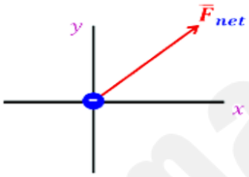
$F = k \frac{|q_A q_B|}{(\frac{1}{2}r)^2}$

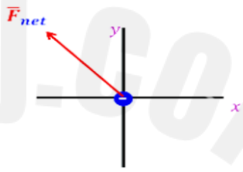
$F_{new} = 4F_{old}$

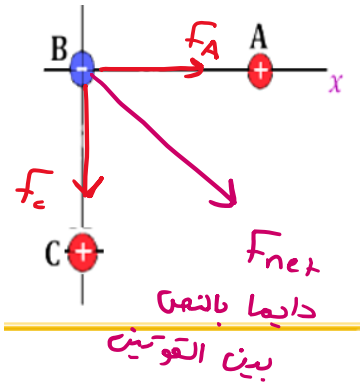
57. Three charged spheres are at positions shown in figure. Which one of the following diagrams represent the direction of the net force acting on charged sphere B?

- ❑ 

- ❑ 

- ❑ 

- ❑ 



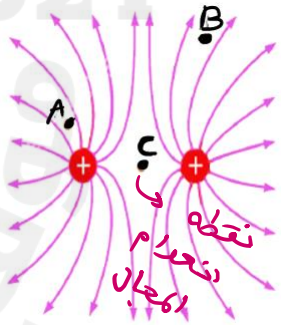
58. According to the figure , the force between the two charged spheres is (0.28 N) . What is the charge on the positive sphere ?

- ❑ $1.8 \times 10^{-7}\ C$
- ❑ $8.8 \times 10^{-7}\ C$
- ❑ $3.5 \times 10^{-13}\ C$
- ❑ $4.4 \times 10^{-6}\ C$

حله موجود في البور بوينت

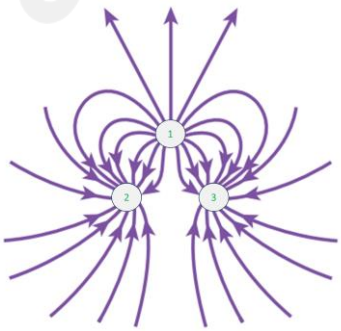
59. Diagrams represent the electric field lines of two point charges. (A, B, C) are three points in the electric field of the two charges. Which of the following represents the correct ranking of the electric field's magnitude at the three points?

- ❑ $E_B < E_A < E_C$
- ❑ $E_A > E_B > E_C$
- ❑ $(E_B = E_A) < E_C$
- ❑ $E_B > E_A > E_C$



60. What are the types of the three charges shown below

- ❑ 1: positive , 2: negative , 3: positive
- ❑ 1: positive , 2: negative , 3: negative
- ❑ 1: positive , 2: positive , 3: positive
- ❑ 1:negative, 2: negative , 3: positive



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Question	1

61. A $+1.6\mu C$ test charge is located at point a near a point charge (q), as shown in the figure. The electric force exerted by q on the test charge is 0.68N what is the magnitude of the electric field at point a?

- ❑ $1.08 \times 10^{-6}\ N/C$
- ❑ $4.3 \times 10^{2}\ N/C$
- ❑ $4.3 \times 10^{5}\ N/C$
- ❑ $2.4 \times 10^{-6}\ N/C$

$$E = \frac{F_{on\,q'}}{q'} = \frac{0.68}{1.6\times10^{-6}} = 425000\ N/C$$

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موقع المناهج الإماراتية

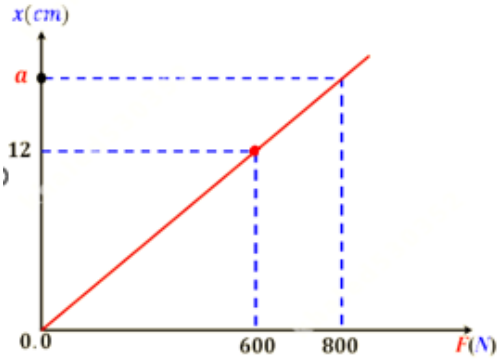
Question	1

1. The figure represents the relationship between the stretch distance x of a spring and the force acting on it. What is the magnitude of the stretch distance (a) on the graph?

600 → 12
800 → a

$\frac{600a}{600} = \frac{12 \times 800}{600}$

a = 16 cm



2. A spring has a spring constant of 256 N/m. how far must it be stretched to give it an elastic potential energy of 60 J

k x = ?? PE

alpha + calc

$PE = \frac{1}{2}kx^2 \rightarrow 60 = \frac{1}{2} \times 256 \times x^2$ → alpha +)

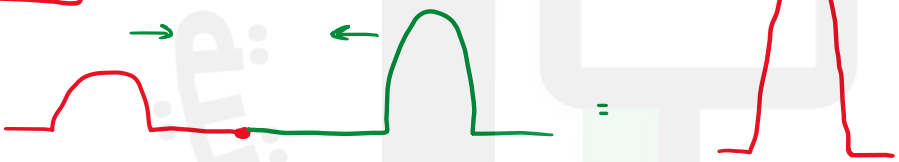
to solve: press shift then calc then =

X = 0.68 m

Question	2

Superposition of Waves:

Sketch two wave pulses whose interference produces a pulse with an amplitude greater than either of the individual waves.



constructive interference
same orientation
∩ + ∩ = ∩
∪ + ∪ = ∪

Sketch two wave pulses whose interference produces a pulse with an amplitude lesser than either of the individual waves.

distructive
different orientation
∩ + ∪ = ∩
∩ + ∪ = ∪

Sketch two wave pulses whose interference is completely distructive

same amplitude different orientation = total distruction!

Question	3

A trumpet plays a note with a frequency of 262 Hz. How fast would it have to be moving to raise the frequency to 277 Hz ? Use 343 m/s as the speed of sound and assume the listener is stationery

f_s $V_s = ?$ f_J V

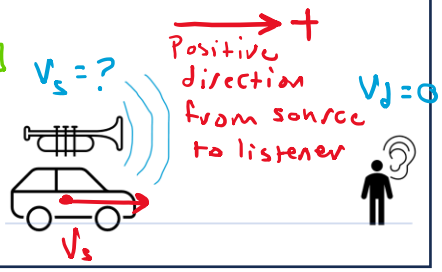
$f_J = f_s \times \left(\frac{V - V_J}{V - V_s} \right)$

$277 = 262 \times \left(\frac{343 - 0}{343 - V_s} \right)$

alpha + calc — alpha + =

to solve: shift + calc + =

$V_s = 18.5$ m/s



Question	4

Write closed or open to identify weather each description applies to closed-pipe resonators or open piper resonators.

closed has a node at one end and an antinode at another end

open has nodes at both ends

open resonance lengths are $\frac{1}{2}\lambda$, λ, $\frac{3}{2}\lambda$, 2λ, etc.

closed resonance lengths are $\frac{1}{4}\lambda$, $\frac{3}{4}\lambda$, $\frac{5}{4}\lambda$, $\frac{7}{4}\lambda$, etc

closed high pressure reflects as high pressure

open high pressure reflects as low pressure

closed only has odd numbered harmonics

open resonance lengths have an even number of quarter wavelengths

closed resonance lengths have an odd number of quarter wavelengths

Question	5

The bottle acts as an organ pipe open at one end and closed at the other. The length of the pipe is equal to the length of the bottle (0.18 m), and the speed of sound is 343 m/s. what is the frequency of the harmonic formed in the bottle ?

L V $f = ?$

$L = \frac{3}{4}\lambda$

$0.18 = \frac{3}{4}\lambda$ ← alpha + =

alpha + calc

then shift + calc + =

$\lambda = 0.24$ m

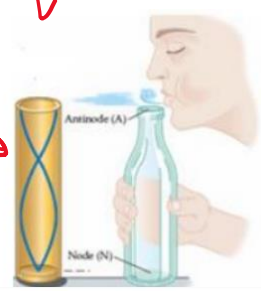
$f = \frac{V}{\lambda}$

$= \frac{343}{0.24}$

$= 1429.16$ Hz

or $(1.43$ KHz$)$

3rd harmonic in a closed Pipe.



$L = \frac{3}{4}\lambda$

V / λ / f

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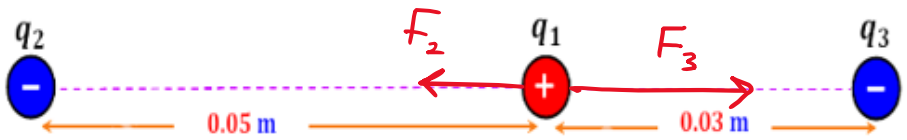
Question	6

The figure shows three charges ($q_1 = 3.0\ \mu C$) , ($q_2 = -2.0\ \mu C$) and ($q_3 = -4.0\ \mu C$) what is the net force exerted on the positive charge (q_1) ?
Coulomb's constant $k = 9 \times 10^9$



$$F_2 = k\frac{q_1 q_2}{r_{12}^2} = 9\times10^9 \times \frac{3\times10^{-6}\times 2\times10^{-6}}{(0.05)^2} = 21.6\ N \quad left$$

$$F_3 = k\frac{q_3 q_2}{r_{32}^2} = 9\times10^9 \times \frac{4\times10^{-6}\times 2\times10^{-6}}{(0.03)^2} = 80 \quad right$$

$$F_{net} = F_3 - F_2 = 80 - 21.6 = 58.4 \quad right$$