Final Exam
Academic Year 1446 Hijri- First Term

Exam Information معلومات الامتحان			
Course name	**General Physics**		**اسم المقرر**
Course Code	**PHYS 109**		**رمز المقرر**
Exam Date	**17/12/2024**	**16/06/1446**	**تاريخ الامتحان**
Exam Time	**1:00 to 4:00 pm**		**وقت الامتحان**
Exam Duration	**3.0 hours**	**3.0 ساعات**	**مدة الامتحان**
Classroom No.			**رقم قاعة الاختبار**
Instructor Name			**اسم استاذ المقرر**

Student Information معلومات الطالب		
Student's Name		**اسم الطالب**
ID number		**الرقم الجامعي**
Section No.		**رقم الشعبة**

تعليمات عامة:

يجب إبقاء الهواتف والساعات الذكية مغلقة أسفل المقعد.
تتضمن ورقة الاختبار 30 سؤالاً، عليك الإجابة على 27 سؤالاً فقط لاغير وذلك بتظليل الاجابة الصحيحة A أو B أو C أو D أو E.
وبتظليل الحرف X كإجابة لكل من الأسئلة الثلاثة المتبقية والتي لا ترغب الإجابة عليها.
إذا خالفت التعليمات و أجبت على أكثر من 27 سؤال، فلن يتم التصحيح إلا للـ27 سؤال الأولى فقط، وستلغى اجابات الاسئلة الزائدة الأخيرة بغض النظر عن صحتها من عدمه.

هذا الجزء خاص بأستاذ المادة

This section is ONLY for instructor

#	Course Learning Outcomes (CLOs)	Related Question (s)	Points	Final Score
1	Understand basic concepts and methods of classical mechanics.			/40
2	Define the fundamental concepts and terminology in optics, electricity and modern physics.			
3	Explain methods of solving physics problems using fundamental physics laws.			
4	Recognize the link between general physics and medical applications.			

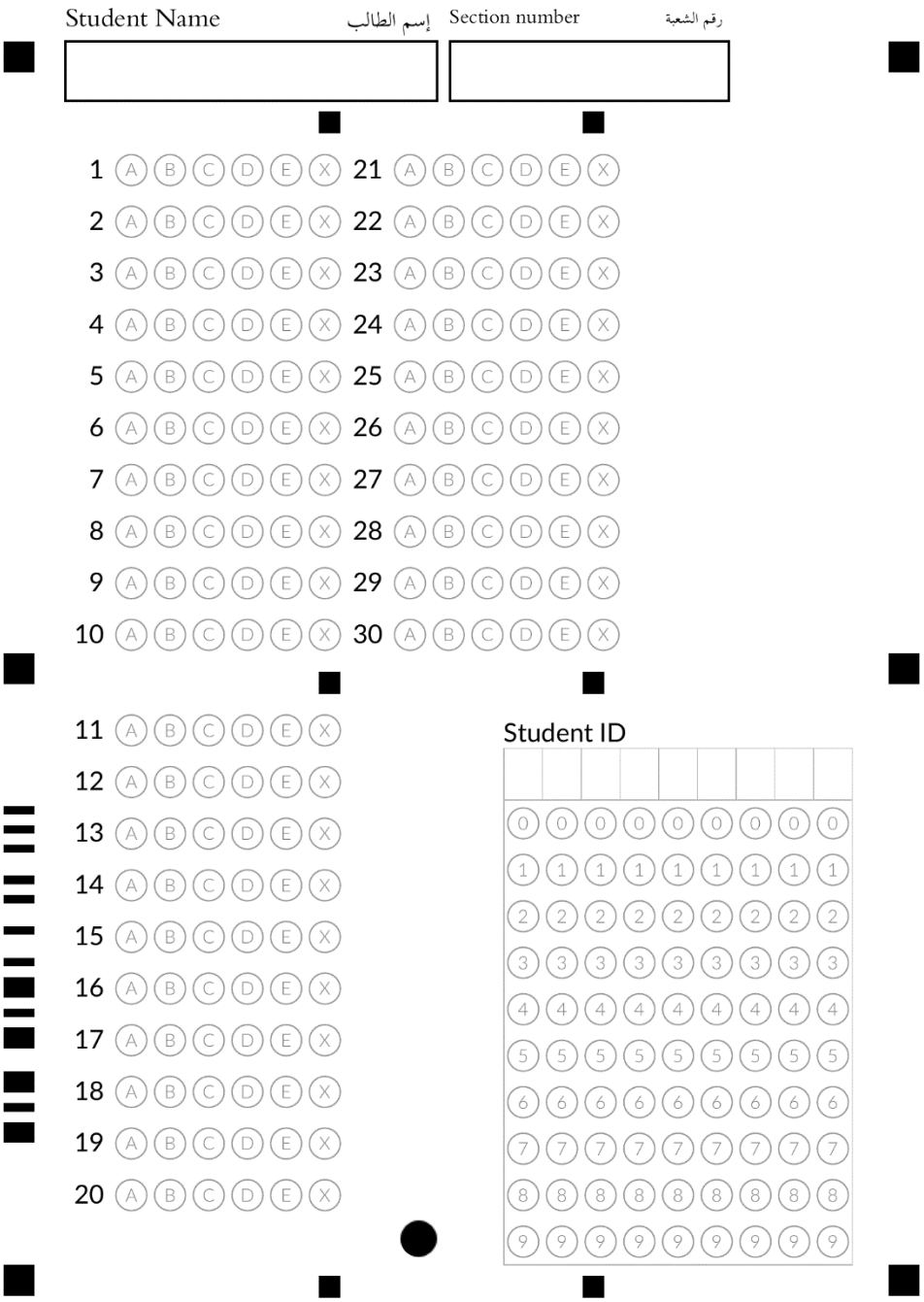
If needed, use:

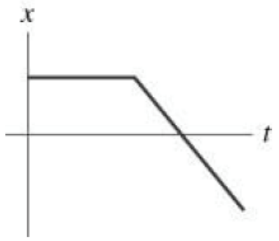
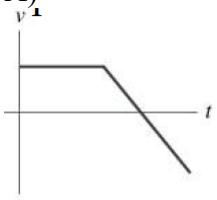
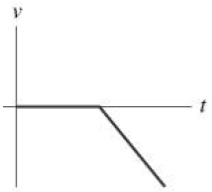
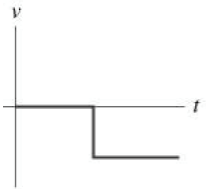
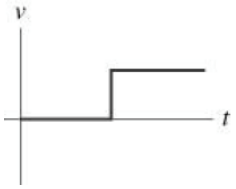
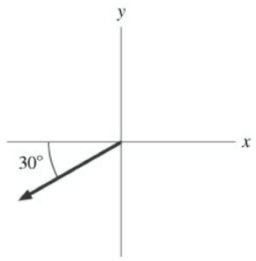
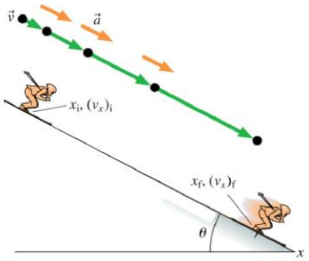
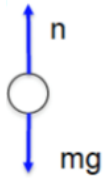
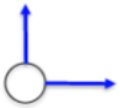
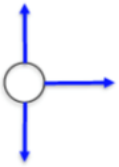
$$g = 9.8\ m.s^{-2}$$

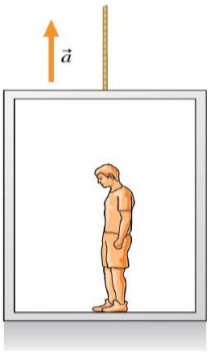
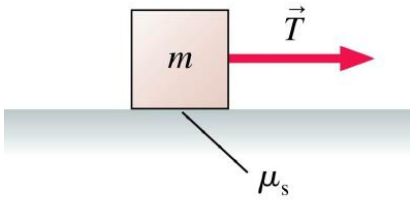
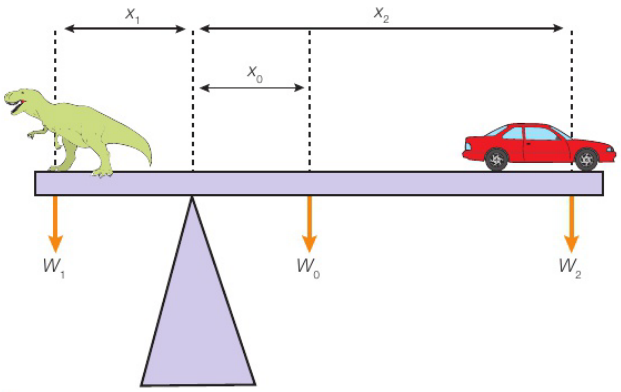
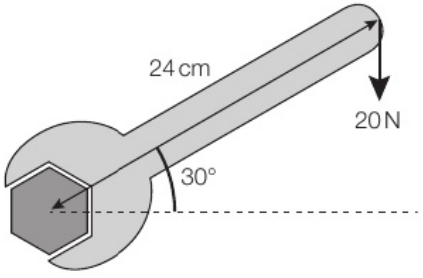
$$\rho_{water} = 10^3\ kg/m^3 \quad , e = 1.6\times 10^{-19}\ C$$

$$k = 1/4\pi\varepsilon_o = 9 \times 10^9\ N \cdot m^2/C^2$$

-لا تعتبر الإجابات إلا التي في الجدول التالي:
-عليك الإجابة على 27 سؤالاً من 30 فقط لا غير وذلك بتظليل الاجابة الصحيحة A أو B أو C أو D أو E وتظليل X لكل من الأسئلة الثلاثة المتبقية والتي لا ترغب الإجابة عليها.



No	Question				
1	Which of the below velocity-time graphs matches the position-time graph to the right?				
	A) 	B) 	C) 	D) 	E) None of them
2	A train is moving with velocity v=40 m/s. While coming to a stop with an acceleration a= - 0.2 m/s^2, the covered distance in meters is:				
	A) 4000	B) 1960	C) 70	D) 140	E) 314
3	The following vector's length is 4.0 units. Its *x*- and *y*-components are:				
	A) 4.3, 2.5	B) 2.5, 4.3	C) - 4.3, 2.5	D) - 3.5, - 2.0	E) - 4.3, - 2.5
4	A skier starts from rest at the top of a frictionless slope inclined at 30°. She reaches the bottom in 18 seconds. Her velocity at the bottom of the slope (in m/s) is:				
	A) 24. 5	B) 14.7	C) 39.2	D) 88.2	E) 0
5	The free-body diagram that correctly represents the forces acting on a box at rest on a horizontal surface is:				
	A) 	B) 	C) 	D) 	E) No forces are acting on the box.

6	A constant force causes an object to accelerate at 7 m/s^2. The acceleration of an object with twice the mass that experiences the same force (in m/s^2) is:				
	A) 1.5	B) 2.5	C) 3.5	D) 5.0	E) 10
7	You are riding in an elevator that is accelerating upward. Suppose you stand on a scale. The reading on the scale is:				
	A) Less than your actual weight	B) The same	C) Greater than your actual weight	D) None of the above	E) Need more information
8	A box on a rough surface is pulled by a horizontal rope with tension T. The box **is not moving**. In this situation:				
	A) $f_s = T$	B) $f_s < T$	C) $f_s > T$	D) $f_s = \mu_s mg$	E) $f_s = 0$
9	In the figure shown, the weight of the toy dinosaur is $W_1 = 5.8$ N and the weight of the toy car is $W_2 = 0.95$ N. You are also given that $x_1 = 20$ cm, $x_0 = 30$ cm. The length of the beam is 1 m. The weight of the beam W_0 (in N) is:				
	A) 0.9	B) 1.3	C) 1.8	D) 2.1	E) 1.5
10	The torque exerted on the nut by the spanner due to the force of 20 N (in Nm) is:				
	A) 4.85	B) 2.16	C) 4.35	D) - 2.40	E) - 4.16

11 A baseball has a mass of 180 g. A fast player throws it at 40 m/s.
The momentum of the ball (in kg.m/s) is:

A) 6.3 | B) 56.8 | C) 7.2 | D) 54.1 | E) 5.8

12 Which of the following is a correct expression for the momentum?

A) Mass ÷ speed
B) Mass × speed
C) Mass ÷ velocity
D) Mass × velocity
E) Mass + speed

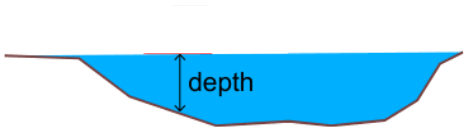
13 A box of mass 150 kg is lifted by a rope vertically up 5.0 m in 4.0 s.
The power of the rope (in kW) is:

A) 1.47 | B) 1.84 | C) 2.65 | D) 2.23 | E) 2.85

14 Which of the following is a correct?

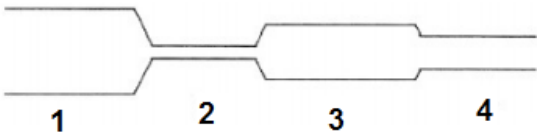
A) Kinetic and potential energy are always positive
B) Kinetic and potential energy are always negative
C) Kinetic energy is always positive while potential energy can be positive. negative or zero
D) Kinetic energy is always positive while potential energy can be positive or negative
E) Kinetic energy is always negative while potential energy can be positive or negative

15 The gauge pressure, in Pa, at the depth of 20.3 m from the surface of lake is:



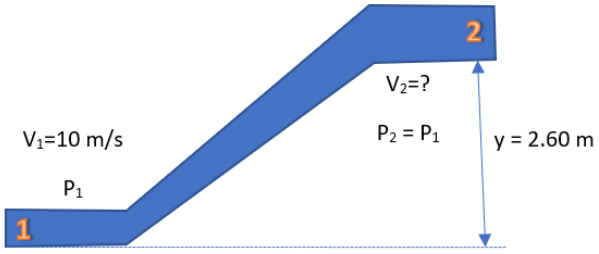
A) 1.013×10^5 | B) 1.50×10^5 | C) 0.69×10^5 | D) 1.99×10^5 | E) 1.503×10^4

16 A fluid is moving through a pipe having different cross sections as shown.
The flow rate is:

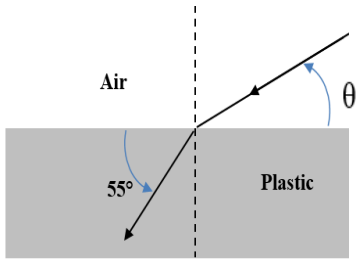
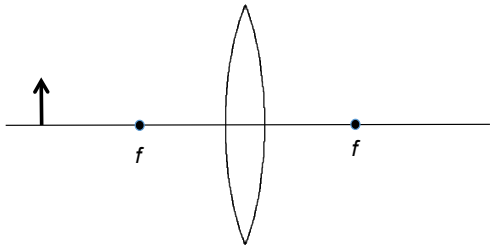
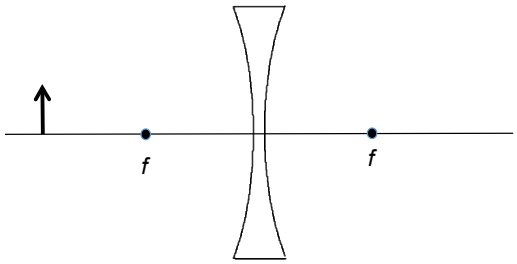


A) minimum at 1 | B) minimum at 2 | C) maximum at 3 | D) maximum at 4 | E) same everywhere

17 Water flows at 10 m/s through a pipe.
The pipe goes up to the second floor of the building, 2.60 m higher, and the pressure remains unchanged.
The speed of the water flow in the pipe on the second floor (in m/s) is:



A) 6.0 | B) 6.5 | C) 7.2 | D) 7.0 | E) 10.0

18	If the index of the plastic is 1.36, then the angle θ is:				
	A) 48.9°	B) 40.3°	C) 33.62°	D) 38.7°	E) 38.9°
19	If an object is placed 10.0 cm from a converging lens with a focal length of 5.0 cm, as shown, then the image distance (in cm) is:				
	A) 15.0	B) -15	C) 30.0	D) 10.0	E) -30.0
20	If an object is placed 20 cm from a diverging lens with a focal length of 10 cm forms an image. The magnification of the image is: *Hint: You will need to first find the image distance then calculate the magnification*				
	A) 0.1	B) 0.2	C) 0.3	D) 0.4	E) 0.5
21	Two-point charges, Q_1 and Q_2, are separated by a distance r. If the magnitude of each charge is halved and their separation distance r is doubled, the electrical force that each charge exerts on the other:				
	A) decreases by a factor of 16. B) decreases by a factor of 8. C) increases by a factor of 4. D) increases by a factor of 8. E) increases by a factor of 16.				
22	The electric field at a point 2.8 cm from a small charged object points outwards from the object and has a strength of 207 kN/C. The object's charge q (in nC) is about:				
	A) -16	B) +16	C) -17	D) +18	E) -19
23	The SI unit of electric potential is:				
	A) J/C	B) N/s	C) C/s	D) J/A	E) J/s
24	A parallel plate capacitor is filled with an insulating material with a dielectric having a permittivity constant $\varepsilon = 1.5\text{x}10^{-11}$ F/m. The distance between the plates of the capacitor is 0.2 mm. If the capacitance after the insertion of the dielectric is 0.34 μF, the plate area (in m^2) is:				
	A) 1.5	B) 2.0	C) 3.0	D) 4.5	E) 5.5

25	If the potential difference between the terminals of an electric motor is 220 V and an electric current of 10 A is flowing through it. The resistance of electric motor (in Ω) will be:				
	A) 71	B) 11	C) 22	D) 44	E) 1100
26	If the radius of a resistance wire is halved, then its resistance will be				
	A) doubled.	B) quadrupled.	C) tripled.	D) halved.	E) still constant.
27	The resistivity of a copper wire is $1.7\text{x}10^{-8}$ Ω.m. If the wire is 22 m long and the radius of its cross-sectional area is 0.5 mm, then its resistance (in Ω) is:				
	A) 0.48	B) $1.2\text{x}10^{-4}$	C) $2.8\text{x}10^{-7}$	D) $4.2\text{x}10^{-8}$	E) 0.24
28	A 400 g sample of radioactive nuclei X is placed in a sealed box. The half-life of this isotope is 2 days. After 6 days, the remaining mass of this sample in the box is:				
	A) Unchanged.	B) 50 g	C) 25 g	D) 0	E) not enough information to know.
29	In the following radioactive decay $^{A}_{Z}X \rightarrow {}^{A-4}_{Z-2}Y + ?+$ energy The missing particle (or ray) in the decay equation is:				
	A) γ	B) e^{+}	C) e^{-}	D) α	E) No missing particles or ray.
30	The number of neutrons in the isotope $^{11}_{5}\mathrm{B}$ is:				
	A) 11	B) 16	C) 5	D) 8	E) 6