College of Sciences
Department of Physics & Astronomy

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كلية العلوم
قسم الفيزياء والفلك

Final Exam - Academic Year 1443 H – 2nd Semester			
Exam Information معلومات الامتحان			
Course name:	General Physics (PHYS 103)*	فيزياء عامة (١٠٣فيز)*	اسم المقرر:
Exam date:	Tuesday 31/05/2022G	١٤٤٣/١١/٠١هـ الثلاثاء	تاريخ الامتحان:
Exam time:	01:00 PM	١:٠٠ مساءاً	وقت الامتحان:

Student Information معلومات الطالب		
Student's name:		اسم الطالب:
Student ID no.:		الرقم الجامعي:
Teacher's name:		اسم أستاذ المقرر:

تعليمات الاختبار:

- يجب إتباع تعليمات الجامعة بخصوص الإجراءات الاحترازية والتدابير الوقائية حول عدوى كورونا (COVID-19).
- إظهار بطاقة الطالب الجامعية.
- الجوالات والساعات الذكية يجب أن تكون خارج قاعة الاختبار.
- كتابة الإجابة لكل سؤال بالأحرف الكبيرة (CAPITAL LETTERS) في الجدول أدناه باستخدام قلم الحبر.
- تسلم جميع صفحات الاختبار لأستاذ المادة / المراقب.

Write you final answer for each question (in CAPITAL LETTERS) in the following table:

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

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Take g = 9.8 ms^{-2} wherever needed

Q	Multiple choice questions
1	If the dimensions of force (**F**) and energy (**E**) are **ML/T²**, and **ML²/T²** respectively, which of the following equations is dimensionally correct? (***m, x, a, v***, and ***t*** represent mass, distance, acceleration, speed, and time respectively) A) $x = \frac{1}{2}at^3$ B) $E = \frac{1}{2}mv$ C) $v = v_0 + ax$ D) $v = \sqrt{Fx/m}$
2	A particle moves along x-axis according to the equation ($x = 5t^3 + 2$), where **x** is in meters and t is in seconds. In the time interval between **t=3 s** and **t= 7 s**, what is its average speed? A) 105 m/s B) 137 m/s C) 395 m/s D) 737 m/s
3	A stone is dropped from **rest** from the top of a tall building. After **3 s** of free fall, its displacement from top of the building is: A) – 44.1 m B) +54.2 m C) -23.3 m D) +38.2 m
4	Vector **A** has x and y components of **–8.7 cm** and **15 cm**, respectively; vector **B** has x and y components of **13.2 cm** and **–6.6 cm**, respectively. If **A – B + 3C = 0**, the components of vector **C** are: A) -3.6 **i**, 5.1 **j** B) -6.7 **i**, 4.1 **j** C) 3.2 **i**, -4.1 **j** D) 7.3 **i**, -7.2 **j**
5	For which of the following vectors is the magnitude of the vector equal to one of the components of the vector? A) 2 **i** +5 **j** B) -2 **j** C) 2 **i**-3 **j** D) 4 **i**
6	A rock is projected from the edge of the top of a building with an initial velocity of **12.2 m/s** at an angle of **53°** above the horizontal. The rock strikes the ground at a horizontal distance of **25 m** from the base of the building. Assume that the ground is level and that the side of the building is vertical. How tall is the building? A) 25.3 m B) 29.6 m C) 27.4 m D) 23.5 m
7	A car moving along a circular path at constant speed. The car is accelerating: A) Only on the right part of the circular path. B) Only on the left part of the circular path. C) Everywhere on the circular path. D) Nowhere, because it is traveling at constant speed.

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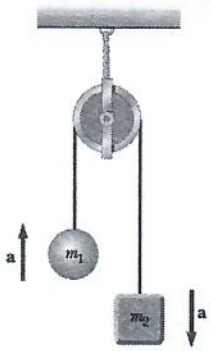
8	You press your physics textbook flat against a vertical wall with your hand. What is the direction of the friction force exerted by the wall on the book?			
	A) Into the wall.	B) Upward	C) Out from the wall	D) Downward
9	In the Atwood machine shown in the figure, m_1=**2 kg** and m_2= **4 kg**. If we ignore friction and the mass of the pulley and string, the tension in the string is: 			
	A) 45.13 N	B) 20.54 N	C) 39.22 N	D) 26.13 N
10	A box started sliding on a flat horizantal suface with speed of **8m/s**. After **20 meters** its speed decreasded to **2 m/s**. The kinetic friction coefficient for this surface is:			
	A) 0.15	B) 0.06	C) 0.23	D) 0.7
11	A car is expected to move around a banked circular curve road of radius **200 m** at **90 km/h**. If there is no dependence on friction, then the value of banking angle is:			
	A) 14.4°	B) 19.6°	C) 17.7°	D) 23.6°
12	A **30 kg** child rides on a circus Ferris wheel (عجلة دوارة عمودية) that takes him around a vertical circular path with a radius of **20 m** every **22 s**. What is the magnitude of the resultant force on the child at the highest point on this trajectory?			
	A) 49 N	B) 25 N	C) 39 N	D) 15 N
13	Ball **A** has **half** the mass and **8 times** the kinetic energy of ball **B**. The speed ratio of ball **B** to ball **A** is:			
	A) 1	B) 0.5	C) 0.75	D) 0.25
14	An object with mass **2 kg** is moving on a frictionless surface with an initial velocity v_i = ***6.32 m/s***. After a time, t, its velocity become v_f=***11.18 m/s***. The kinetic energy of this object after time t is:			
	A) Remain the same	B) Doubles	C) Increase by 85	D) Decrease by 85

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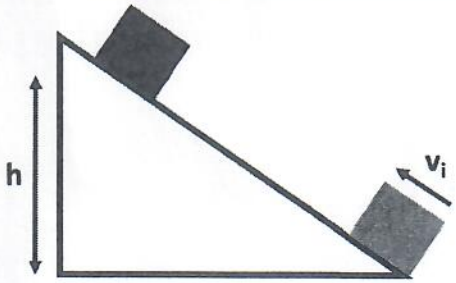
15	A box with **m = 2 kg** moves to the right on a frictionless surface with velocity v = **6 m/s** collides with a spring that has spring constant of **k = 2000 N/m**. If the spring is compressed for a distance **15 cm** the velocity of the box becomes: A) 2.5 m/s B) 3.67 m/s C) 5.12 m/s D) 6.34 m/s
16	A **5 kg** block is bulled over a rough horizontal surface by a constant force of **20 N** at an angle of **20°** above the horizontal. If the speed of the block increases from **4 m/s to 8 m/s** in a displacement of **12 m**, the magnitude of the work done in joules by the friction force during this displacement is: A) 82.1 J B) 105.5 J C) 120.8 J D) 225.5 J
17	A man on a bicycle has a total mass of **90 kg.** The power in watts must give to drive at a constant speed of **30 km/h** up an incline of **10°** above the horizontal is: A) 153 W B) 357 W C) 1276 W D) 4590 W
18	A ball is thrown with an initial velocity (v_i=**10 m/s**) from the top of the building with unknown angle. If the building height is **63 m**, what is the ball final velocity just before it hits the ground? A) 36.5 m/s B) 53.2 m/s C) 29.4 m/s D) 18.8 m/s
19	A box is moving up on a frictionless incline with an initial velocity of (**12 m/s**). What is the maximum height (**h**) above the ground the box will reach?  A) 7.3 m B) 11.3 m C) 15.2 m D) 4.5 m
20	A stone is pushed against a spring a distance d. When released, its speed is v_1. If the same stone is pushed against the same spring a distance $2d$, then its speed v_2 after releasing is: A) $v_2 = 2v_1$ B) $v_2 = v_1$ C) $v_2 = 4v_1$ D) $v_2 = 8v_1$
21	A block of mass **0.25 kg** is placed on top of a light vertical spring of constant **k = 5000 N/m** and is pushed downward so that the spring is compressed **0.1 m**. After the block is released, it travels upward and then leaves the spring. To what maximum height above the point of release does it rise? A) 2.4 m B) 10.2 m C) 25 m D) 20.4 m

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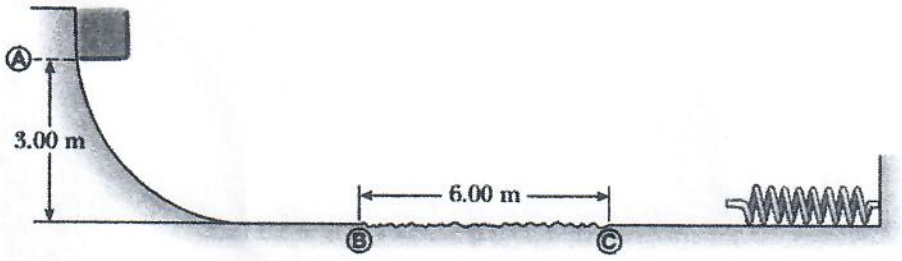
22	A **10 kg** block is released from point **A** in the attached Figure. The track is frictionless except for the portion between **B** and **C** which has a length of **6 m**. The block travels down the track, hits a spring of force constant **k = 2250 N/m**, and compresses the spring **0.3 m** from its equilibrium position before coming to rest momentarily. Determine the coefficient of kinetic friction between the block and the rough surface between **B** and **C**.  A) 0.58 B) 0.15 C) 0.21 D) 0.32
23	The time rate of change of the linear momentum for any particle is A) Impulse B) Net force C)Work D)Acceleration
24	A **60 kg** archer stands at rest of frictionless ice and firs a **0.5 kg** arrow horizontally at **50 m/s.** The archer velocity after fired the arrow is: A) 0.84 m/s B) -54 m/s C) 16 m/s D) -0.42 m/s
25	A tennis player receives a shot with ball (**0.06 kg**) travelling horizontally at **50 m/s** and returns the shot with the ball travelling horizontally at **40 m/s** in the opposite direction. What is the impulse delivered to the ball: A) 5.40 N.s B) 8.7 N.s C) 12.1 N.s D)3.4 N.S
26	A **2 kg** object moving **5 m/s** collides with and sticks to an **8 kg** object initially at rest. Determine the kinetic energy **lost** by the system as a result of this collision. A) 20 J B) 15 J C) 30 J D) 25 J
27	A **2 kg** object moving **3 m/s** strikes a **1 kg** object initially at rest. Immediately after the collision, the **2 kg** object has a velocity of **1.5 m/s** directed **30°** from its initial direction of motion. What is the x-component of the velocity of the **1 kg** object just after the collision? A) 1.5 m/s B) 3.4 m/s C) 2.4 m/s D) 4.1 m/s

The End