

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

PHYSICAL SETTING
PHYSICS

Wednesday, June 22, 2005 — 1:15 to 4:15 p.m., only

ANSWER SHEET

Student Circular Motion Key Sex: Male Female Grade

Teacher School

Record your answers to Part A and Part B-1 on this answer sheet.

Part A

- 1 1
- 2 1
- 3 2
- 4 4
- 5 1
- 6 4
- 7 4
- 8 4
- 9 2
- 10 3
- 11 3

Part A Score

Part B-1

- 12 2
- 13 3
- 14 3
- 15 3
- 16 4
- 17 1

Part B-1 Score

Write your answers to Part B-2 and Part C in your answer booklet.

The declaration below should be signed when you have completed the examination.

I do hereby affirm, at the close of this examination, that I had no unlawful knowledge of the questions or answers prior to the examination and that I have neither given nor received assistance in answering any of the questions during the examination.

Signature

**PHYSICAL SETTING
 PHYSICS**

ANSWER BOOKLET

Student Sex: Male Female
 Teacher
 School Grade

Answer all questions in Part B-2 and Part C. Record your answers in this booklet.

| Part | Maximum Score | Student's Score |
|---|---------------|----------------------|
| A | 11 | |
| B-1 | 6 | |
| B-2 | 13 | |
| C | 9 | |
| Total Written Test Score (Maximum Raw Score: 39) | | <input type="text"/> |
| Final Score (From Conversion Chart) | | <input type="text"/> |
| Raters' Initials: Rater 1 Rater 2 | | |

Part B-2

For Raters Only

18-19

$$\textcircled{1} \bar{v} = \frac{d}{t} = \frac{1005.31\text{m}}{36\text{s}} = \boxed{\bar{v} = 27.93 \frac{\text{m}}{\text{s}}}$$

$$\textcircled{2} d = C = 2\pi r$$

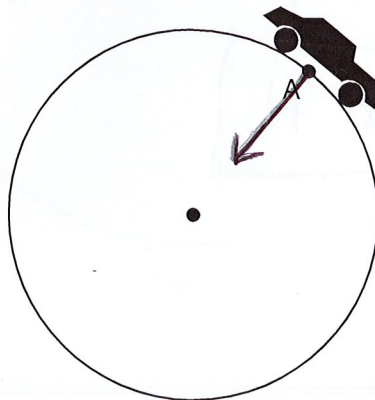
$$d = 2\pi(160\text{m}) = 1005.31\text{m}$$

$$\text{OR } \bar{v} = \frac{2\pi r}{t} = \frac{2\pi(160\text{m})}{36\text{s}} = 27.93 \frac{\text{m}}{\text{s}}$$

18

19

20



20

21-22

$$\frac{G}{v} = \frac{u}{a_c}$$

$$v = 27.93 \frac{\text{m}}{\text{s}}$$

$$r = 160 \text{ m}$$

$$t = 365$$

$$d = 1005.3 \text{ m}$$

$$a_c = \frac{v^2}{r}$$

$$a_c = \frac{(27.93 \frac{\text{m}}{\text{s}})^2}{160 \text{ m}}$$

$$a_c = 4.87 \frac{\text{m}}{\text{s}^2}$$

21

22

23-24

G

$$m_{\text{earth}} = 5.98 \times 10^{24} \text{ kg} \cdot \frac{u}{F_g}$$

$$m_{\text{moon}} = 7.35 \times 10^{22} \text{ kg}$$

$$r_{\text{earth-moon}} = 3.84 \times 10^8 \text{ m}$$

$$G = 6.67 \times 10^{-11} \frac{\text{N} \cdot \text{m}^2}{\text{kg}^2}$$

$$F_g = \frac{G m_1 m_2}{r^2}$$

$$F_g = \frac{(6.67 \times 10^{-11} \frac{\text{N} \cdot \text{m}^2}{\text{kg}^2}) (5.98 \times 10^{24} \text{ kg}) (7.35 \times 10^{22} \text{ kg})}{(3.84 \times 10^8 \text{ m})^2}$$

$$F_g = 1.99 \times 10^{20} \text{ N}$$

23

24

25-26

G

$$m = 0.028 \text{ kg}$$

$$r = 0.8 \text{ m}$$

$$v = 2.5 \text{ m/s}$$

$$a_c = \frac{v^2}{r}$$

$$a_c = \frac{(2.5 \frac{\text{m}}{\text{s}})^2}{0.8 \text{ m}}$$

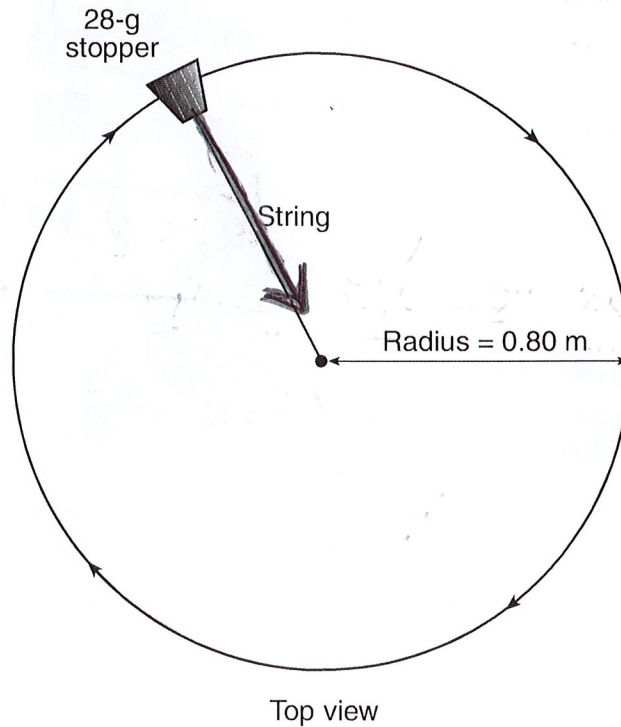
$$a_c = 7.81 \text{ m/s}^2$$

For Raters
Only

25

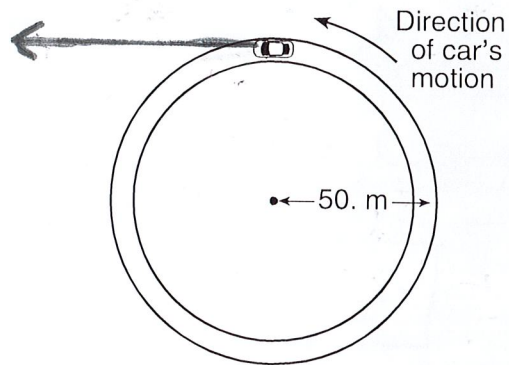
26

27



27

28



Track, as Viewed from Above

29-30

$$\begin{aligned} G \\ m &= 1.5 \times 10^3 \text{ kg} \\ v &= 12 \frac{\text{m}}{\text{s}} \\ r &= 50 \text{ m} \end{aligned}$$

$$\frac{u}{a_c}$$

$$\begin{aligned} a_c &= \frac{v^2}{r} \\ a_c &= \frac{(12 \frac{\text{m}}{\text{s}})^2}{50 \text{ m}} \end{aligned}$$

$$a_c = 2.88 \frac{\text{m}}{\text{s}^2}$$

For Raters Only

25

29

30

37-38

$$\frac{G}{g} = \frac{F_g}{m}$$

$$F_g = 3.53 \times 10^{18} \text{ N}$$

$$m = 1.55 \times 10^{21} \text{ kg}$$

$$g = \frac{F_g}{m}$$

$$g = \frac{3.53 \times 10^{18} \text{ N}}{1.55 \times 10^{21} \text{ kg}}$$

$$g = 0.0023 \frac{\text{m}}{\text{s}^2}$$

37

38

39

Pluto's mass is greater than the mass of Charon [distances are the same]

39