

 Indywidualny identyfikator uczestnika konkursu

WOJEWÓDZKI KONKURS PRZEDMIOTOWY
Z FIZYKI

organizowany przez Łódzkiego Kuratora Oświaty
dla uczniów szkół podstawowych w roku szkolnym 2023/2024

TEST – ETAP SZKOLNY

* Na wypełnienie testu masz **60 min**.
* Arkusz liczy **10 stron** i zawiera **7 zadań,** w tym brudnopis.
* Przed rozpoczęciem pracy sprawdź, czy Twój arkusz jest kompletny. Jeżeli zauważysz usterki, zgłoś je Komisji Konkursowej.
* Zadania czytaj uważnie i ze zrozumieniem.
* Odpowiedzi wpisuj długopisem bądź piórem, kolorem czarnym lub niebieskim.
* Dbaj o czytelność pisma i precyzję odpowiedzi.
* Do każdego numeru zadania podana jest maksymalna liczba punktów możliwa do uzyskania za prawidłową odpowiedź.
* Pracuj samodzielnie. Postaraj się udzielić odpowiedzi na wszystkie pytania.
* Nie używaj korektora. Jeśli pomylisz się w zadaniach otwartych, przekreśl błędną odpowiedź
i wpisz poprawną.
* Korzystaj tylko z przyborów i materiałów określonych w regulaminie konkursu.
* W zadaniach przyjmij wartość przyspieszenia ziemskiego 10 $\frac{m}{s^{2}}$.
* Pamiętaj o rachunku (sprawdzaniu) jednostek wielkości fizycznych.

 ***Powodzenia***

Maksymalna liczba punktów - 60

Liczba uzyskanych punktów - …..

Imię i nazwisko ucznia: …………………………………………..……………

 wypełnia Komisja Konkursowa po zakończeniu sprawdzenia prac

Podpisy członków komisji sprawdzających prace:

1. ………………………………………………….. ……………….……………

 (imię i nazwisko) (podpis)

1. ………………………………………………….. ……………….……………

 (imię i nazwisko) (podpis)

# Zadanie nr 1

Franek idąc na spacer zabrał ze sobą niewielki wózek o masie 2 kg. W parku wszedł na szczyt górki i pchnął wózek w dół. Podczas zjazdu z górki wózek przyspieszał,
a gdy zakończył zjazd w dół zaczął wyraźnie zwalniać poruszając się po poziomym podłożu. Korzystając z wykresu zależności wartości prędkości wózka od czasu wykonaj poniższe polecenia. Opór powietrza pomijamy.

I

II

1. Nazwij rodzaje ruchów, jakimi poruszał się wózek w poszczególnych fragmentach ruchu.
2. Oblicz długość stoku górki.
3. Określ, jak długo wózek poruszał się poza obszarem górki.
4. Oblicz wartości przyspieszeń, jakie miał wózek na górce i poza jej obszarem.
5. Oblicz wartość pędu wózka przy zjeździe z górki u jej podnóża.
6. Oblicz szybkość średnią, z jaką poruszał się wózek na całej trasie.
7. Oblicz wartość siły wypadkowej działającej na wózek, gdy zjeżdżał on z górki.
8. Oblicz energię kinetyczną, jaką miał wózek u podnóża górki.
9. Oblicz wartość siły tarcia, jaka działała na wózek, podczas ruchu
po poziomym podłożu.

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**……………….../ 12 pkt.**

(liczba uzyskanych punktów / maksymalna liczba punktów)

# Zadanie nr 2

Pan Jan musi ogrodzić działkę o wymiarach 20 m x 30 m. Ma już zakupioną siatkę, ale brak mu drutu do jej usztywnienia. Sąsiad podarował mu zwój drutu stalowego
o średnicy 1,6 mm i masie 0,936 kg. Gęstość stali wynosi 7800 $\frac{kg}{m^{3}}$ . Oblicz, na ile metrów ogrodzenia wystarczy tego drutu oraz ile jeszcze metrów drutu musi dokupić Pan Jan.

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**……………….../ 11 pkt.**

(liczba uzyskanych punktów / maksymalna liczba punktów

# Zadanie nr 3

Energia kinetyczna kamienia o masie 0,5 kg w chwili wyrzucenia pionowo do góry z powierzchni ziemi wynosiła 500 J. Oblicz wysokość (liczoną od powierzchni ziemi), na jakiej kamień będzie miał prędkość o wartości 10 $\frac{m}{s}$, jeżeli do tej chwili przy pokonywaniu oporów powietrza utracił 40 % swojej energii początkowej.

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**……………….../ 6 pkt.**

(liczba uzyskanych punktów / maksymalna liczba punktów

# Zadanie nr 4

Samochód o masie 1500 kg ruszając z miejsca osiągnął prędkość o wartości 54 $\frac{km}{h}$ w czasie 10 s. Oblicz wartość siły ciągu silnika samochodu, jeżeli współczynnik tarcia opon o asfalt ma wartość 0,9. Opór powietrza pomijamy.

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**……………….../ 9 pkt.**

(liczba uzyskanych punktów / maksymalna liczba punktów

**Zadanie nr 5**

Ciało o ciężarze 14 N zawieszono na siłomierzu i zanurzono całkowicie najpierw
w wodzie, a następnie w nieznanej cieczy. Siłomierz po zanurzeniu ciała w wodzie wskazał 12 N, a w nieznanej cieczy wskazał 12,6 N. Gęstość wody wynosi 1000 $\frac{kg}{m^{3}}$. Oblicz gęstość nieznanej cieczy. Gęstość nieznanej cieczy wyraź w $\frac{g}{cm^{3}}$.

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**……………….../ 10 pkt.**

(liczba uzyskanych punktów / maksymalna liczba punktów

**Zadanie nr 6**

Pociąg porusza się ze stałą prędkością o wartości 57,6 $\frac{km}{h}$. Koła pociągu mają promień 40 cm. Oblicz okres obrotu koła oraz liczbę pełnych obrotów koła w czasie jednej sekundy.

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**……………….../ 7 pkt.**

(liczba uzyskanych punktów / maksymalna liczba punktów

**Zadanie nr 7**

Z działa wystrzelono pocisk z prędkością o wartości 480 $\frac{m}{s}$. Oblicz wartość prędkości, jaką uzyska działo w wyniku odrzutu, jeśli jego masa jest 240 razy większa od masy pocisku. Opory ruchu pomijamy. Wynik zapisz w $\frac{km}{h}$.

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**……………….../ 5 pkt.**

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