THIS IS THE JOURNAL FOR
PAPER NUMBER 26

THIS IS AN EXAMPLE OF PERSONALIZED TESTS.

If needed, please use the following constants.

Constant	Symbol	Value
Acceleration due to earth's gravity	g	9.80 m/s^2
Avogadro's number	N_A	6.0221367×10^{23} mol^{-1}
Boltzmann's constant	k	1.380658×10^{-23} J/K
Coulomb's constant	k	8.99×10^{9} N·m^2/C^2
Electron charge magnitiude	e	$1.60217733 \times 10^{-19}$ C
Permeability of free space	μ_0	$1.25663706 \times 10^{-6}$ T·m/A
Permittivity of free space	ϵ_0	$8.854187817 \times 10^{-12}$ C^2/(N·m^2)
Pi	π	3.14159265
Planck's constant	h	$6.6260755 \times 10^{-34}$ J·s
Mass of electron	m_e	$9.1093897 \times 10^{-31}$ kg
Mass of neutron	m_n	$1.6749286 \times 10^{-27}$ kg
Mass of proton	m_p	$1.6726231 \times 10^{-27}$ kg
Speed of light in vacuum	c	299792458. m/s
Universal gravitational constant	G	6.67259×10^{-11} N·m^2/kg^2
Universal gas constant	R	8.314510 J/(mol·K)

Please be advised that in this paper there are questions from 26.1 through 26.9. And any one of them may contain more than one sub-question, thus the total number of sub-questions here is around 14, of which 13 should be answered.

PAPER TITLE GENERATED.

In this paper, big questions will be generated in the following order:
1 (6) , 2 (5) , 3 (3) , 4 (2) , 5 (1) , 6 (4) , 7 (7) , 8 (8) , 9 (9) .

QUESTION 26.1 (6)

Please answer ONLY 5 of the following 6 questions (Questions 26.1.1 through 26.1.6).

Here are still some constants for use in the following questions:

Constant	Symbol	Value
Boltzmann's constant	k	1.381×10^{-23} J/K
Avogadro's number	N_A	6.022×10^{23} mol^{-1}
Mass of electron	m_e	$9.1093897 \times 10^{-31}$ kg

In this big question of CHOOSE structure, 6 questions will be generated: 1 (10 , 25) , 2 (11 , 26) , 3 (13 , 28) , 4 (9 , 24) , 5 (8 , 23) , 6 (7 , 22) .

Question 26.1.1 (6 , 10 , 25)

See the following picture.
Which one of the following is missing in it?

A. An air-boat
B. Lawn
C. A table
D. A truck
E. An airplane
F. Not any of aboves.

Auto-answer:

D. A truck
E. An airplane

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
0	0	6 simple	6	0	yes	no

Calculated values:

All inputs:

Question 26.1.2 (6 , 11 , 26)

In a hotel, the possiblity of non-smoking customer is $a = 0.270$, and the possiblity of equal or above 30 years old customer is $b = 0.5200$. Please calculate the possiblity of smoking and under 30 years old customer.

Solution:

Since the possiblity of non-smoking customer is $a = 0.270$, and the possiblity of equal or above 30 years old customer is $b = 0.5200$, the possiblity of smoking customer is $c = 1.0 - a = 1.0 - 0.270 = 0.730$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - 0.5200 = 0.4800$. So the possibility of smoking and under 30 years old customer is $c \times d = 0.350$.

End of Solution.

Answer:

The possibility of smoking and under 30 years old customer is $(1 - a)(1 - b) = 0.350$.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	3	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	3	0.730
Calculated 2	real	4	0.4800
Calculated 3	real	3	0.350

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	logical	.TRUE. .FALSE.	smoking non-smoking	 $<--$
INPUT 2	real	-3	1.0×10^{-2} 1.000 1.0×10^{-2}	 0.270
INPUT 3	logical	.TRUE. .FALSE.	equal or above 30 years old under 30 years old	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-4	2.00×10^{-2} 1.0000 2.00×10^{-2}	 0.5200

Question 26.1.3 (6 , 13 , 28)

What is the operation between $a = 3$ and $b = 2$: $a + b =$? Please also calculate it.

Answer:

3;
2;
The operation is ADDITION and the result is 5.0000.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
3	2	0	0	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	string	1 (1 strings):	ADDITION
Calculated 2	real	5	5.0000

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 10, 2$	3
INPUT 2	integer		$2, 10, 2$	2
INPUT 3	string		$+$ $-$ $\times$ $\div$	$<--$

Question 26.1.4 (6 , 9 , 24)

Let us use Newton's Law of Universal Gravitation to calculate the force of the Sun acting on the eight planets. Let us suppose the mass of the Sun is $7.00 \times 10^{24} kg$. With the mass and the distance to the Sun of each planet in the following table, please fill the blanks for the forces.

The Planet	Mass (kg)	Distanace from Sun (m)	The Force (N)
Mercury	$2.00000000 \times 10^{24}$	$5.000000000 \times 10^{24}$	
Venus	8.00×10^{24}	6.00×10^{24}	
Earth	9.00×10^{24}	3.00×10^{24}	
Mars	9.00×10^{24}	4.00×10^{24}	
Jupiter	2.00×10^{24}	3.00×10^{24}	
Saturn	9.00×10^{24}	6.00×10^{24}	
Uranus	8.00×10^{24}	7.00×10^{24}	
Neptune	5.00×10^{24}	4.00×10^{24}	

Solution:

By using Newton's Law of Universal Gravitation:

$$F = G\frac{(Sun's\ \ mass) \times (Planet's\ \ mass)}{(distance)^2},$$

where $G = 6.67 \times 10^{-11} Nm^2(kg)^{-2}$, the forces can be easily calculated as

The Planet	Mass (kg)	Distanace from Sun (m)	The Force (N)
Mercury	$2.00000000 \times 10^{24}$	$5.000000000 \times 10^{24}$	3.74×10^{-11}
Venus	8.00×10^{24}	6.00×10^{24}	1.04×10^{-10}
Earth	9.00×10^{24}	3.00×10^{24}	4.67×10^{-10}
Mars	9.00×10^{24}	4.00×10^{24}	2.63×10^{-10}
Jupiter	2.00×10^{24}	3.00×10^{24}	1.04×10^{-10}
Saturn	9.00×10^{24}	6.00×10^{24}	1.17×10^{-10}
Uranus	8.00×10^{24}	7.00×10^{24}	7.62×10^{-11}
Neptune	5.00×10^{24}	4.00×10^{24}	1.46×10^{-10}

End of Solution.

Answer:

By using Newton's Law of Universal Gravitation:

$$F = G\frac{(Sun's\ \ mass) \times (Planet's\ \ mass)}{(distance)^2},$$

where $G = 6.67 \times 10^{-11} Nm^2(kg)^{-2}$, the forces can be easily calculated as

The Planet	Mass (kg)	Distanace from Sun (m)	The Force (N)
Mercury	$2.00000000 \times 10^{24}$	$5.000000000 \times 10^{24}$	3.74×10^{-11}
Venus	8.00×10^{24}	6.00×10^{24}	1.04×10^{-10}
Earth	9.00×10^{24}	3.00×10^{24}	4.67×10^{-10}
Mars	9.00×10^{24}	4.00×10^{24}	2.63×10^{-10}
Jupiter	2.00×10^{24}	3.00×10^{24}	$1.04 \times 10^{-10}3$
Saturn	9.00×10^{24}	6.00×10^{24}	1.17×10^{-10}
Uranus	8.00×10^{24}	7.00×10^{24}	7.62×10^{-11}
Neptune	5.00×10^{24}	4.00×10^{24}	1.46×10^{-10}

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
19	8	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	3	3.74×10^{-11}
Calculated 2	real	3	1.04×10^{-10}
Calculated 3	real	3	4.67×10^{-10}
Calculated 4	real	3	2.63×10^{-10}
Calculated 5	real	3	1.04×10^{-10}
Calculated 6	real	3	1.17×10^{-10}
Calculated 7	real	3	7.62×10^{-11}
Calculated 8	real	3	1.46×10^{-10}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	7.00×10^{24}
INPUT 2	real	16	$2.00000000 \times 10^{24}$ $1.010000000 \times 10^{25}$ $1.00000000 \times 10^{24}$	$2.00000000 \times 10^{24}$
INPUT 3	real	15	$2.000000000 \times 10^{24}$ $1.0100000000 \times 10^{25}$ $1.000000000 \times 10^{24}$	$5.000000000 \times 10^{24}$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	8.00×10^{24}
INPUT 5	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	6.00×10^{24}
INPUT 6	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	9.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 7	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	3.00×10^{24}
INPUT 8	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	9.00×10^{24}
INPUT 9	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	4.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 10	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	2.00×10^{24}
INPUT 11	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	3.00×10^{24}
INPUT 12	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	9.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 13	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	6.00×10^{24}
INPUT 14	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	8.00×10^{24}
INPUT 15	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	7.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 16	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	5.00×10^{24}
INPUT 17	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	4.00×10^{24}
INPUT 18	real	-13	6.67×10^{-11} 6.67×10^{-11} 1.00×10^{-11}	6.67×10^{-11}
Sequential	Type	Accuracy	Three inputs	Generated
INPUT 19	real	-13	6.67×10^{-11} 6.67×10^{-11} 1.00×10^{-11}	6.67×10^{-11}

Question 26.1.5 (6 , 8 , 23)

An object is subjected to an external net force $\mathbf{f} = (80.0, 3.0, -3000.0)N$. Its mass is known as $m = 52.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(6.6592ms^{-2}, 5.7692\times10^{-2}ms^{-2}, -2.5735\times10^{6}km/h^{2})$.
B. The accelaration is $(6.6592ms^{-2}, -0.12162ms^{-2}, -2.5735 \times 10^{6}km/h^{2})$.
C. The accelaration is $(6.6592ms^{-2}, 5.7692 \times 10^{-2}ms^{-2}, -747692.km/h^{2})$.
D. The accelaration is $(1.5385ms^{-2}, 5.7692 \times 10^{-2}ms^{-2}, -747692.km/h^{2})$.
E. none of these.

Auto-answer:

D. The accelaration is $(1.5385ms^{-2}, 5.7692 \times 10^{-2}ms^{-2}, -747692.km/h^{2})$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (80.0, 3.0, -3000.0)N$ and $m = 52.0kg$, bring them into the above equation, then we get

$$\begin{aligned}\mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(80.0, 3.0, -3000.0)N}{52.0kg} \\ &= (1.5385, 5.7692 \times 10^{-2}, -57.692)ms^{-2} \\ &= (19938., 747.69, -747692.)km/h^2.\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	5	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.5385
Calculated 2	real	5	5.7692×10^{-2}
Calculated 3	real	5	-57.692
Calculated 4	real	5	19938.
Calculated 5	real	5	747.69
Calculated 6	real	5	$-747692.$

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	-1	20.0 101.0 10.0	 80.0
INPUT 2	real	-1	2.0 10.1 1.0	 3.0
INPUT 3	real	-1	-2000.0 -10001.0 -1000.0	 -3000.0

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-1	50.0 60.1 2.0	 52.0

Question 26.1.6 (6 , 7 , 22)

An object is subjected to an external net force $\mathbf{f} = (90.0, 2.0, -7000.0)N$. Its mass is known as $m = 56.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration (vector) is $(-103670., 462.86, 4.9517 \times 10^6)km/h^2$.
B. The accelaration (vector) is $(55447., 462.86, 6.8897 \times 10^6)km/h^2$.
C. The accelaration (vector) is $(55447., 462.86, -1.6200 \times 10^6)km/h^2$.
D. The accelaration (vector) is $(20829., 462.86, -1.6200 \times 10^6)km/h^2$.
E. The accelaration (vector) is $(20829., 462.86, 6.8897 \times 10^6)km/h^2$.
F. The accelaration (vector) is $(-103670., 462.86, 6.8897 \times 10^6)km/h^2$.
G. The accelaration (vector) is $(20829., 462.86, 4.1819 \times 10^6)km/h^2$.
H. The accelaration (vector) is $(71153., 462.86, 4.1819 \times 10^6)km/h^2$.
I. The accelaration (vector) is $(55447., 462.86, 4.9517 \times 10^6)km/h^2$.
J. The accelaration (vector) is $(-103670., 462.86, 4.1819 \times 10^6)km/h^2$.
K. The accelaration (vector) is $(71153., 462.86, 4.9517 \times 10^6)km/h^2$.
L. The accelaration (vector) is $(-103670., 462.86, -1.6200 \times 10^6)km/h^2$.

Auto-answer:

D. The accelaration (vector) is $(20829., 462.86, -1.6200 \times 10^6)km/h^2$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (90.0, 2.0, -7000.0)N$ and $m = 56.0kg$, bring them into the above equation, then we get

$$\begin{aligned}\mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(90.0, 2.0, -7000.0)N}{56.0kg} \\ &= (1.6071, 3.5714 \times 10^{-2}, -125.00)ms^{-2} \\ &= (20829., 462.86, -1.6200 \times 10^{6})km/h^{2}.\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	12	2	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.6071
Calculated 2	real	5	3.5714×10^{-2}
Calculated 3	real	5	-125.00
Calculated 4	real	5	20829.
Calculated 5	real	5	462.86
Calculated 6	real	5	-1.6200×10^{6}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	-1	20.0 101.0 10.0	 90.0
INPUT 2	real	-1	2.0 10.1 1.0	 2.0
INPUT 3	real	-1	-2000.0 -10001.0 -1000.0	 -7000.0

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-1	50.0 60.1 2.0	 56.0

You have done all the above? A very good beginning, please go ahead. More constants the Mass of electron m_e= 9.109390 $\times 10^{-31}$ kg , Universal gas constant R= 8.315 J/(mol·K) , e= 1.60217733 $\times 10^{-19}$ C , and m_p= 1.6726231 $\times 10^{-27}$ kg may be very helpful.

QUESTION 26.2 (5 , 5 , 5)

If any one of the following statements is correct, please fill the box ahead of it with T . If wrong, fill with F.

Your answer	

1. 96 is an even number.

Your answer	

2. Toronto is in Ontario province.

Your answer	

3. $|\mathbf{F}| = Gm_1m_2r^{-2}$ is a mathmatical form of the Newton's Second Law.

Answer:

The correct answer	T

1. 96 is an even number.

The correct answer	T

2. Toronto is in Ontario province.

The correct answer	F

3. $|\mathbf{F}| = Gm_1m_2r^{-2}$ is a mathmatical form of the Newton's Second Law.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
6	3	0	0	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	string	1 (1 strings):	T
Calculated 2	string	1 (1 strings):	T
Calculated 3	string	1 (1 strings):	F

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 100, 1$	96
INPUT 2	string		even odd	$<--$
INPUT 3	string		Toronto Kingston Montreal Hull	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	string		Ontario Quebec	$<--$
INPUT 5	string		$\mathbf{F} = m\mathbf{a}$ $\lvert\mathbf{F}\rvert = Gm_1m_2r^{-2}$	$<--$
INPUT 6	string		the Newton's Second Law Newton's Law of Universal Gravitation	$<--$

QUESTION 26.3 (3 , 3 , 3)

Please choose the correct one from the following statements:

A. Canada has 34 provinces and 39 territories.
B. Canada has 37 provinces and 37 territories.
C. Canada has 36 provinces and 35 territories.
D. Canada has 33 provinces and 38 territories.
E. Canada has 35 provinces and 34 territories.
F. None of above.

Auto-answer:

F. None of above.

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
0	20	6 simple	6	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		10
Calculated 2	integer		3
Calculated 3	integer		23
Calculated 4	integer		24
Calculated 5	integer		25
Calculated 6	integer		26
Calculated 7	integer		27
Calculated 8	integer		28
Calculated 9	integer		29
Calculated 10	integer		30

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		31
Calculated 12	integer		32
Calculated 13	integer		33
Calculated 14	integer		34
Calculated 15	integer		35
Calculated 16	integer		36
Calculated 17	integer		37
Calculated 18	integer		38
Calculated 19	integer		39
Calculated 20	integer		40

All inputs:

QUESTION 26.4 (2 , 2 , 2)

An object is subjected to an external net force $\mathbf{f} = (30.000, 3.0000, -9000.0)N$. Its mass is known as $m = 52.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(-1.9975ms^{-2}, 747.69km/h^2, 554.32ms^{-2})$.
B. The accelaration is $(-1.9975ms^{-2}, 3540.9km/h^2, -173.08ms^{-2})$.
C. The accelaration is $(-1.9975ms^{-2}, 3540.9km/h^2, 554.32ms^{-2})$.
D. The accelaration is $(0.57692ms^{-2}, 3540.9km/h^2, -173.08ms^{-2})$.
E. The accelaration is $(-1.9975ms^{-2}, 747.69km/h^2, -173.08ms^{-2})$.
F. The accelaration is $(0.57692ms^{-2}, 3540.9km/h^2, 554.32ms^{-2})$.
G. None of these.

Auto-answer:

G. None of these.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (30.000, 3.0000, -9000.0)N$ and $m = 52.0000kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(30.000, 3.0000, -9000.0)N}{52.0000kg} \\
&= (0.57692, 5.7692 \times 10^{-2}, -173.08)ms^{-2} \\
&= (7476.9, 747.69, -2.2431 \times 10^{6})km/h^2.
\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	7	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	0.57692
Calculated 2	real	5	5.7692×10^{-2}
Calculated 3	real	5	-173.08
Calculated 4	real	5	7476.9
Calculated 5	real	5	747.69
Calculated 6	real	5	-2.2431×10^{6}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	−3	20.000 101.000 10.000	 30.000
INPUT 2	real	−4	2.0000 10.1000 1.0000	 3.0000
INPUT 3	real	−1	−2000.0 −10001.0 −1000.0	 −9000.0

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−4	50.0000 60.1000 2.0000	 52.0000

QUESTION 26.5 (1 , 1 , 1)

Abstract: This is a simple Newton's Second Law calculation multi-choice problem. **end of abstract.**

An object is subjected to an external net force $\mathbf{f} = (20.0, 7.0, -9000.0)N$. Its mass is known as $m = 54.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(0.370, 0.26, -166.67)ms^{-2}$.
B. The accelaration is $(4.13, 0.26, 397.85)ms^{-2}$.
C. The accelaration is $(4.13, 0.13, -166.67)ms^{-2}$.
D. The accelaration is $(0.370, 0.26, 397.85)ms^{-2}$.
E. The accelaration is $(0.370, 0.13, 397.85)ms^{-2}$.
F. The accelaration is $(0.370, 0.13, -166.67)ms^{-2}$.
G. The accelaration is $(4.13, 0.13, 397.85)ms^{-2}$.
H. The accelaration is $(4.13, 0.26, -166.67)ms^{-2}$.

Auto-answer:

F. The accelaration is $(0.370, 0.13, -166.67)ms^{-2}$.

End of auto-answer.

Answer:

The correct answer from the choices is
F. The accelaration is $(0.370, 0.13, -166.67)ms^{-2}$.

End of Answer.
Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (20.0, 7.0, -9000.0)N$ and $m = 54.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(20.0, 7.0, -9000.0)N}{54.0000kg} \\ &= (0.370, 0.13, -166.67)ms^{-2} \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	8	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	vector	3	0.370
		2	0.13
		5	−166.67

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	vector	−1	20.0	
			101.0	
			10.0	20.0
		−1	2.0	
			10.1	
			1.0	7.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−9000.0
INPUT 2	real	−4	50.0000	
			60.1000	
			2.0000	54.0000

QUESTION 26.6 (4 , 4 , 4)

Considering case-insensitivity, please match the following same strings.

Column Left	Column Right	Your choinces
A. A	a	
B. C	eR	
C. er	ER	
D. Er	c	
E. asdf(:)	ASDF(:)	

Auto-answer:

Column Left	Column Right	Answers
A. A	a	**A.**
B. C	eR	**C.** , **D.**
C. er	ER	**C.** , **D.**
D. Er	c	**B.**
E. asdf(:)	ASDF(:)	**E.**

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	0	16	5	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		2

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		2, 8, 2	4
INPUT 2	integer		2, 3, 2	2

You have done all the above? Excellent! Not much left, please continue.

QUESTION 26.7 (7 , 14 , 50)

An object is subjected to an external net force $\mathbf{f} = (90.0, 9.0, -5000.0)N$. Its mass is known as $m = 54.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.67, 0.17, -92.593)ms^{-2}$.
B. The accelaration is $(4.19, 0.17, -92.593)ms^{-2}$.
C. The accelaration is $(4.19, -0.58, 242.38)ms^{-2}$.
D. The accelaration is $(1.67, 0.17, 242.38)ms^{-2}$.

Auto-answer:

A. The accelaration is $(1.67, 0.17, -92.593)ms^{-2}$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (90.0, 9.0, -5000.0)N$ and $m = 54.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(90.0, 9.0, -5000.0)N}{54.0kg} \\ &= (1.67, 0.17, -92.593)ms^{-2} \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	4	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	vector	3	1.67
		2	0.17
		5	−92.593

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	vector	−1	20.0	
			101.0	
			10.0	90.0
		−1	2.0	
			10.1	
			1.0	9.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−5000.0
INPUT 2	real	−1	50.0	
			60.1	
			2.0	54.0

QUESTION 26.8 (8 , 15 , 60)

$$\begin{pmatrix} 4 & 7 & 5 & 4 \\ 4 & 4 & 4 & 4 \\ 5 & 6 & 5 & 5 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} =?$$

$$\begin{pmatrix} \Theta & \zeta \\ \Phi & \eta \\ \Theta & \Upsilon \\ \Delta & \Xi \end{pmatrix} \begin{pmatrix} \beta \\ \gamma \end{pmatrix} =?$$

Answer:

$$\begin{pmatrix} 4 & 7 & 5 & 4 \\ 4 & 4 & 4 & 4 \\ 5 & 6 & 5 & 5 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} = \begin{pmatrix} 40 \\ 32 \\ 42 \end{pmatrix}$$

$$\begin{pmatrix} \Theta & \zeta \\ \Phi & \eta \\ \Theta & \Upsilon \\ \Delta & \Xi \end{pmatrix} \begin{pmatrix} \beta \\ \gamma \end{pmatrix} = \begin{pmatrix} \Theta \times \beta + \zeta \times \gamma \\ \Phi \times \beta + \eta \times \gamma \\ \Theta \times \beta + \Upsilon \times \gamma \\ \Delta \times \beta + \Xi \times \gamma \end{pmatrix}$$

End of Answer.

Solution:

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	2	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	i-matrix		(size: 3 by 1)

40
32
42

Sequential	Type	Accuracy	Calculated
Calculated 2	s-matrix		(size: 4 by 1)

$$\begin{pmatrix} \Theta \times \beta + \zeta \times \gamma \\ \Phi \times \beta + \eta \times \gamma \\ \Theta \times \beta + \Upsilon \times \gamma \\ \Delta \times \beta + \Xi \times \gamma \end{pmatrix}$$

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	i-matrix		$4, 7, 1$	(size: 3 by 4)

4 7 5 4
4 4 4 4
5 6 5 5

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 2	i-matrix		$2, 2, 1$	(size: 4 by 1)

2
2
2
2

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 3	s-matrix		α β γ δ ϵ ε ζ η ρ σ Γ Δ Θ Λ Ξ Υ Φ Ψ Ω	(size: 4 by 2)

$$\begin{pmatrix} \Theta & \zeta \\ \Phi & \eta \\ \Theta & \Upsilon \\ \Delta & \Xi \end{pmatrix}$$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	s-matrix		β γ	(size: 2 by 1)

$$\begin{pmatrix} \beta \\ \gamma \end{pmatrix}$$

QUESTION 26.9 (9 , 16 , 70)

Abstract: Quadratic Equation constructed from the following first two random (input) integers as roots, which of course should not show in the exam papers. **end of abstract.**

Please solve the following equation:

$$-11 \times x^2 - 154 \times x - 539 = 0$$

Answer:

-7, -7

End of Answer.

Solution:

Roots to the equation

$$-11 \times x^2 - 154 \times x - 539 = 0$$

are -7 and -7 .

Let us verity -7 first: $-11 \times x^2 - 154 \times x - 539 = -539 + (1078) + (-539) = 539 + (-539) = 0$

Then verity -7: $-11 \times x^2 - 154 \times x - 539 = -539 + (1078) + (-539) = 539 + (-539) = 0$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
3	13	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		−11
Calculated 2	string	1 (1 strings):	
Calculated 3	integer		−154
Calculated 4	string	1 (1 strings):	
Calculated 5	integer		−539
Calculated 6	integer		−539
Calculated 7	integer		1078
Calculated 8	integer		539
Calculated 9	integer		0
Calculated 10	integer		−539

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		1078
Calculated 12	integer		539
Calculated 13	integer		0

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$-11, 30, 4$	-7
INPUT 2	integer		$-31, 60, 3$	-7
INPUT 3	integer		$-15, 15, 2$	-11

Here are still some constants for use:

Constant	Symbol	Value
Mass of proton	m_p	$1.6726231 \times 10^{-27}$ kg
Boltzmann's constant	k	1.381×10^{-23} J/K

Thank you very much for answering these questions!

Please be advised that in this paper there are questions from 26.1 through 26.9. And any one of them may contain more than one sub-question, thus the total number of sub-questions here is around 14, of which 13 should be answered.

PAPER TAIL GENERATED.

***** END OF PAPER, THANKS *****

By: 239 (26 , 34)

THIS IS THE JOURNAL FOR PAPER NUMBER 27

THIS IS AN EXAMPLE OF PERSONALIZED TESTS.

If needed, please use the following constants.

Constant	Symbol	Value
Acceleration due to earth's gravity	g	9.80 m/s^2
Avogadro's number	N_A	6.0221367×10^{23} mol^{-1}
Boltzmann's constant	k	1.380658×10^{-23} J/K
Coulomb's constant	k	8.99×10^{9} N·m^2/C^2
Electron charge magnitiude	e	$1.60217733 \times 10^{-19}$ C
Permeability of free space	μ_0	$1.25663706 \times 10^{-6}$ T·m/A
Permittivity of free space	ϵ_0	$8.854187817 \times 10^{-12}$ C^2/(N·m^2)
Pi	π	3.14159265
Planck's constant	h	$6.6260755 \times 10^{-34}$ J·s
Mass of electron	m_e	$9.1093897 \times 10^{-31}$ kg
Mass of neutron	m_n	$1.6749286 \times 10^{-27}$ kg
Mass of proton	m_p	$1.6726231 \times 10^{-27}$ kg
Speed of light in vacuum	c	299792458. m/s
Universal gravitational constant	G	6.67259×10^{-11} N·m^2/kg^2
Universal gas constant	R	8.314510 J/(mol·K)

Please be advised that in this paper there are questions from 27.1 through 27.9. And any one of them may contain more than one sub-question, thus the total number of sub-questions here is around 14, of which 13 should be answered.

PAPER TITLE GENERATED.

In this paper, big questions will be generated in the following order:
1 (6) , 2 (1) , 3 (3) , 4 (2) , 5 (4) , 6 (5) , 7 (8) , 8 (7) , 9 (9) .

QUESTION 27.1 (6)

Please answer ONLY 5 of the following 6 questions (Questions 27.1.1 through 27.1.6).

Here are still some constants for use in the following questions:

Constant	Symbol	Value
Boltzmann's constant	k	1.381×10^{-23} J/K
Avogadro's number	N_A	6.022×10^{23} mol^{-1}
Mass of electron	m_e	$9.1093897 \times 10^{-31}$ kg

In this big question of CHOOSE structure, 6 questions will be generated: 1 (6 , 21) , 2 (10 , 25) , 3 (7 , 22) , 4 (8 , 23) , 5 (13 , 28) , 6 (11 , 26) .

Question 27.1.1 (6 , 6 , 21)

An object is subjected to an external net force $\mathbf{f} = (40.0, 7.0, -7000.0)N$. Its mass is known as $m = 52.0kg$. Please calculate its accelaration.

Answer:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (40.0, 7.0, -7000.0)N$ and $m = 52.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(40.0, 7.0, -7000.0)N}{52.0kg} \\ &= (0.76923, 0.13462, -134.62)ms^{-2} \\ &= (9969.2, 1744.6, -1.7446 \times 10^6)km/h^2. \end{aligned}$$

End of Answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (40.0, 7.0, -7000.0)N$ and $m = 52.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(40.0, 7.0, -7000.0)N}{52.0kg} \\
&= (0.76923, 0.13462, -134.62)ms^{-2} \\
&= (9969.2, 1744.6, -1.7446 \times 10^6)km/h^2.
\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	0.76923
Calculated 2	real	5	0.13462
Calculated 3	real	5	−134.62
Calculated 4	real	5	9969.2
Calculated 5	real	5	1744.6
Calculated 6	real	5	-1.7446×10^6

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	−1	20.0 101.0 10.0	 40.0
INPUT 2	real	−1	2.0 10.1 1.0	 7.0
INPUT 3	real	−1	−2000.0 −10001.0 −1000.0	 −7000.0

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−1	50.0 60.1 2.0	 52.0

Question 27.1.2 (6 , 10 , 25)

See the following picture.
Which one of the following is missing in it?

A. An air-boat
B. Lawn
C. A frisbee
D. A table
E. A truck
F. Not any of aboves.

Auto-answer:

E. A truck

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
0	0	6 simple	6	0	yes	no

Calculated values:

All inputs:

Question 27.1.3 (6 , 7 , 22)

An object is subjected to an external net force $\mathbf{f} = (30.0, 6.0, -6000.0)N$. Its mass is known as $m = 56.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration (vector) is $(33534., 1388.6, 4.0588 \times 10^6)km/h^2$.
B. The accelaration (vector) is $(33534., 1388.6, -1.3886 \times 10^6)km/h^2$.
C. The accelaration (vector) is $(31572., 1388.6, 5.1924 \times 10^6)km/h^2$.
D. The accelaration (vector) is $(31572., 1388.6, 4.0588 \times 10^6)km/h^2$.
E. The accelaration (vector) is $(33534., 1388.6, -4.2089 \times 10^6)km/h^2$.
F. The accelaration (vector) is $(32936., 1388.6, -1.3886 \times 10^6)km/h^2$.
G. The accelaration (vector) is $(32936., 1388.6, 5.1924 \times 10^6)km/h^2$.
H. The accelaration (vector) is $(6942.9, 1388.6, 4.0588 \times 10^6)km/h^2$.
I. The accelaration (vector) is $(6942.9, 1388.6, -4.2089 \times 10^6)km/h^2$.
J. The accelaration (vector) is $(33534., 1388.6, 5.1924 \times 10^6)km/h^2$.
K. The accelaration (vector) is $(6942.9, 1388.6, -1.3886 \times 10^6)km/h^2$.
L. The accelaration (vector) is $(32936., 1388.6, 4.0588 \times 10^6)km/h^2$.

Auto-answer:

K. The accelaration (vector) is $(6942.9, 1388.6, -1.3886 \times 10^6)km/h^2$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (30.0, 6.0, -6000.0)N$ and $m = 56.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(30.0, 6.0, -6000.0)N}{56.0kg} \\
&= (0.53571, 0.10714, -107.14)ms^{-2} \\
&= (6942.9, 1388.6, -1.3886 \times 10^6)km/h^2.
\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	12	2	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	0.53571
Calculated 2	real	5	0.10714
Calculated 3	real	5	-107.14
Calculated 4	real	5	6942.9
Calculated 5	real	5	1388.6
Calculated 6	real	5	-1.3886×10^6

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	-1	20.0 101.0 10.0	 30.0
INPUT 2	real	-1	2.0 10.1 1.0	 6.0
INPUT 3	real	-1	-2000.0 -10001.0 -1000.0	 -6000.0
Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-1	50.0 60.1 2.0	 56.0

Question 27.1.4 (6 , 8 , 23)

An object is subjected to an external net force $\mathbf{f} = (20.0, 6.0, -3000.0)N$. Its mass is known as $m = 52.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(-1.3940ms^{-2}, 0.11538ms^{-2}, 1.7163 \times 10^6 km/h^2)$.
B. The accelaration is $(-1.3940ms^{-2}, 0.50998ms^{-2}, 1.7163 \times 10^6 km/h^2)$.
C. The accelaration is $(0.38462ms^{-2}, 0.11538ms^{-2}, -747692.km/h^2)$.
D. The accelaration is $(0.38462ms^{-2}, 0.50998ms^{-2}, 1.7163 \times 10^6 km/h^2)$.
E. none of these.

Auto-answer:

C. The accelaration is $(0.38462ms^{-2}, 0.11538ms^{-2}, -747692.km/h^2)$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (20.0, 6.0, -3000.0)N$ and $m = 52.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(20.0, 6.0, -3000.0)N}{52.0kg} \\
&= (0.38462, 0.11538, -57.692)ms^{-2} \\
&= (4984.6, 1495.4, -747692.)km/h^2.
\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	5	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	0.38462
Calculated 2	real	5	0.11538
Calculated 3	real	5	−57.692
Calculated 4	real	5	4984.6
Calculated 5	real	5	1495.4
Calculated 6	real	5	−747692.

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	−1	20.0 101.0 10.0	 20.0
INPUT 2	real	−1	2.0 10.1 1.0	 6.0
INPUT 3	real	−1	−2000.0 −10001.0 −1000.0	 −3000.0
Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−1	50.0 60.1 2.0	 52.0

Question 27.1.5 (6 , 13 , 28)

What is the operation between $a = 7$ and $b = 6$: $a \times b =$? Please also calculate it.

Answer:

7;

6;

The operation is MULTIPLICATION and the result is 42.000.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
3	2	0	0	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	string	1 (1 strings):	MULTIPLICATION
Calculated 2	real	5	42.000

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 10, 2$	7
INPUT 2	integer		$2, 10, 2$	6
INPUT 3	string		$+$ $-$ $\times$ $\div$	$<--$

Question 27.1.6 (6 , 11 , 26)

In a hotel, the possiblity of non-smoking customer is $a = 7.0 \times 10^{-2}$, and the possiblity of equal or above 30 years old customer is $b = 0.6800$. Please calculate the possiblity of smoking and under 30 years old customer.

Solution:

Since the possiblity of non-smoking customer is $a = 7.0 \times 10^{-2}$, and the possiblity of equal or above 30 years old customer is $b = 0.6800$, the possiblity of smoking customer is $c = 1.0 - a = 1.0 - 7.0 \times 10^{-2} = 0.930$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - 0.6800 = 0.3200$. So the possibility of smoking and under 30 years old customer is $c \times d = 0.298$.

End of Solution.

Answer:

The possibility of smoking and under 30 years old customer is $(1 - a)(1 - b) = 0.298$.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	3	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	3	0.930
Calculated 2	real	4	0.3200
Calculated 3	real	3	0.298

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	logical	.TRUE. .FALSE.	smoking non-smoking	 $<--$
INPUT 2	real	-3	1.0×10^{-2} 1.000 1.0×10^{-2}	 7.0×10^{-2}
INPUT 3	logical	.TRUE. .FALSE.	equal or above 30 years old under 30 years old	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-4	2.00×10^{-2} 1.0000 2.00×10^{-2}	 0.6800

You have done all the above? A very good beginning, please go ahead.

More constants the Mass of electron m_e= 9.109390 $\times 10^{-31}$ kg , Universal gas constant R= 8.315 J/(mol·K) , e= 1.60217733 $\times 10^{-19}$ C , and m_p= 1.6726231 $\times 10^{-27}$ kg may be very helpful.

QUESTION 27.2 (1 , 1 , 1)

Abstract: This is a simple Newton's Second Law calculation multi-choice problem. **end of abstract.**

An object is subjected to an external net force $\mathbf{f} = (40.0, 9.0, -7000.0)N$. Its mass is known as $m = 58.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(0.690, 0.16, -120.69)ms^{-2}$.
B. The accelaration is $(-2.04, 0.46, 576.39)ms^{-2}$.
C. The accelaration is $(-2.04, 0.46, -120.69)ms^{-2}$.
D. The accelaration is $(0.690, 0.46, -120.69)ms^{-2}$.
E. The accelaration is $(-2.04, 0.16, -120.69)ms^{-2}$.
F. The accelaration is $(0.690, 0.46, 576.39)ms^{-2}$.
G. The accelaration is $(0.690, 0.16, 576.39)ms^{-2}$.
H. The accelaration is $(-2.04, 0.16, 576.39)ms^{-2}$.

Auto-answer:

A. The accelaration is $(0.690, 0.16, -120.69)ms^{-2}$.

End of auto-answer.

Answer:

The correct answer from the choices is

A. The accelaration is $(0.690, 0.16, -120.69)ms^{-2}$.

End of Answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (40.0, 9.0, -7000.0)N$ and $m = 58.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(40.0, 9.0, -7000.0)N}{58.0000kg} \\ &= (0.690, 0.16, -120.69)ms^{-2} \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	8	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	vector	3	0.690
		2	0.16
		5	−120.69

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	vector	−1	20.0	
			101.0	
			10.0	40.0
		−1	2.0	
			10.1	
			1.0	9.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−7000.0
INPUT 2	real	−4	50.0000	
			60.1000	
			2.0000	58.0000

QUESTION 27.3 (3 , 3 , 3)

Please choose the correct one from the following statements:

A. Canada has 35 provinces and 34 territories.
B. Canada has 37 provinces and 37 territories.
C. Canada has 34 provinces and 39 territories.
D. Canada has 33 provinces and 38 territories.
E. Canada has 10 provinces and 3 territories.
F. None of above.

Auto-answer:

E. Canada has 10 provinces and 3 territories.

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
0	20	6 simple	6	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		10
Calculated 2	integer		3
Calculated 3	integer		23
Calculated 4	integer		24
Calculated 5	integer		25
Calculated 6	integer		26
Calculated 7	integer		27
Calculated 8	integer		28
Calculated 9	integer		29
Calculated 10	integer		30
Sequential	Type	Accuracy	Calculated
Calculated 11	integer		31
Calculated 12	integer		32
Calculated 13	integer		33
Calculated 14	integer		34
Calculated 15	integer		35
Calculated 16	integer		36
Calculated 17	integer		37
Calculated 18	integer		38
Calculated 19	integer		39
Calculated 20	integer		40

All inputs:

QUESTION 27.4 (2 , 2 , 2)

An object is subjected to an external net force $\mathbf{f} = (40.000, 3.0000, -3000.0)N$. Its mass is known as $m = 54.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(0.74074ms^{-2}, 720.00km/h^2, -55.556ms^{-2})$.
B. The accelaration is $(3.0767ms^{-2}, 720.00km/h^2, 237.05ms^{-2})$.
C. The accelaration is $(3.0767ms^{-2}, 3596.1km/h^2, -55.556ms^{-2})$.
D. The accelaration is $(0.74074ms^{-2}, 3596.1km/h^2, 237.05ms^{-2})$.
E. The accelaration is $(0.74074ms^{-2}, 3596.1km/h^2, -55.556ms^{-2})$.
F. The accelaration is $(3.0767ms^{-2}, 720.00km/h^2, -55.556ms^{-2})$.
G. None of these.

Auto-answer:

A. The accelaration is $(0.74074ms^{-2}, 720.00km/h^2, -55.556ms^{-2})$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (40.000, 3.0000, -3000.0)N$ and $m = 54.0000kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(40.000, 3.0000, -3000.0)N}{54.0000kg} \\
&= (0.74074, 5.5556 \times 10^{-2}, -55.556)ms^{-2} \\
&= (9600.0, 720.00, -720000.)km/h^2.
\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	7	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	0.74074
Calculated 2	real	5	5.5556×10^{-2}
Calculated 3	real	5	-55.556
Calculated 4	real	5	9600.0
Calculated 5	real	5	720.00
Calculated 6	real	5	$-720000.$

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	−3	20.000 101.000 10.000	 40.000
INPUT 2	real	−4	2.0000 10.1000 1.0000	 3.0000
INPUT 3	real	−1	−2000.0 −10001.0 −1000.0	 −3000.0

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−4	50.0000 60.1000 2.0000	 54.0000

QUESTION 27.5 (4 , 4 , 4)

Considering case-insensitivity, please match the following same strings.

Column Left	Column Right	Your choinces
A. C	eR	
B. A= 2/ 2	a= 1	
C. yjh	ER	
D. Er	YJH	
E. er	c	

Auto-answer:

Column Left	Column Right	Answers
A. C	eR	**D.** , **E.**
B. A= 2/ 2	a= 1	**B.**
C. yjh	ER	**D.** , **E.**
D. Er	YJH	**C.**
E. er	c	**A.**

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	0	16	5	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		1

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		2, 8, 2	2
INPUT 2	integer		2, 3, 2	2

QUESTION 27.6 (5 , 5 , 5)

If any one of the following statements is correct, please fill the box ahead of it with T . If wrong, fill with F.

Your answer	

1. 22 is an odd number.

Your answer	

2. Toronto is in Ontario province.

Your answer	

3. $\mathbf{F} = m\mathbf{a}$ is a mathmatical form of the Newton's Second Law.

Answer:

The correct answer	F

1. 22 is an odd number.

The correct answer	T

2. Toronto is in Ontario province.

The correct answer	T

3. $\mathbf{F} = m\mathbf{a}$ is a mathmatical form of the Newton's Second Law.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
6	3	0	0	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	string	1 (1 strings):	F
Calculated 2	string	1 (1 strings):	T
Calculated 3	string	1 (1 strings):	T

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 100, 1$	22
INPUT 2	string		even odd	 $<--$
INPUT 3	string		Toronto Kingston Montreal Hull	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	string		Ontario Quebec	$<--$
INPUT 5	string		$\mathbf{F} = m\mathbf{a}$ $\lvert\mathbf{F}\rvert = Gm_1m_2r^{-2}$	$<--$
INPUT 6	string		the Newton's Second Law Newton's Law of Universal Gravitation	$<--$

You have done all the above? Excellent! Not much left, please continue.

QUESTION 27.7 (8 , 15 , 60)

$$\begin{pmatrix} 5 & 4 & 5 & 4 \\ 5 & 6 & 5 & 6 \\ 5 & 6 & 6 & 5 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} =?$$

$$\begin{pmatrix} \Phi & \Phi \\ \Gamma & \alpha \\ \varepsilon & \Gamma \\ \alpha & \sigma \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} =?$$

Answer:

$$\begin{pmatrix} 5 & 4 & 5 & 4 \\ 5 & 6 & 5 & 6 \\ 5 & 6 & 6 & 5 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} = \begin{pmatrix} 36 \\ 44 \\ 44 \end{pmatrix}$$

$$\begin{pmatrix} \Phi & \Phi \\ \Gamma & \alpha \\ \varepsilon & \Gamma \\ \alpha & \sigma \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} = \begin{pmatrix} \Phi \times \beta + \Phi \times \beta \\ \Gamma \times \beta + \alpha \times \beta \\ \varepsilon \times \beta + \Gamma \times \beta \\ \alpha \times \beta + \sigma \times \beta \end{pmatrix}$$

End of Answer.

Solution:

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	2	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	i-matrix		(size: 3 by 1)

36
44
44

Sequential	Type	Accuracy	Calculated
Calculated 2	s-matrix		(size: 4 by 1)

$$\begin{pmatrix} \Phi \times \beta + \Phi \times \beta \\ \Gamma \times \beta + \alpha \times \beta \\ \varepsilon \times \beta + \Gamma \times \beta \\ \alpha \times \beta + \sigma \times \beta \end{pmatrix}$$

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	i-matrix		$4, 7, 1$	(size: 3 by 4)

5 4 5 4
5 6 5 6
5 6 6 5

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 2	i-matrix		$2, 2, 1$	(size: 4 by 1)

2
2
2
2

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 3	s-matrix		α β γ δ ϵ ε ζ η ρ σ Γ Δ Θ Λ Ξ Υ Φ Ψ Ω	(size: 4 by 2)

$$\begin{pmatrix} \Phi & \Phi \\ \Gamma & \alpha \\ \varepsilon & \Gamma \\ \alpha & \sigma \end{pmatrix}$$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	s-matrix		β γ	(size: 2 by 1)

$$\begin{pmatrix} \beta \\ \beta \end{pmatrix}$$

QUESTION 27.8 (7 , 14 , 50)

An object is subjected to an external net force $\mathbf{f} = (70.0, 6.0, -6000.0)N$. Its mass is known as $m = 56.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.25, 0.39, -404.27)ms^{-2}$.
B. The accelaration is $(1.25, 0.11, -107.14)ms^{-2}$.
C. The accelaration is $(-3.60, 0.11, -107.14)ms^{-2}$.
D. The accelaration is $(-3.60, 0.11, -404.27)ms^{-2}$.

Auto-answer:

B. The accelaration is $(1.25, 0.11, -107.14)ms^{-2}$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (70.0, 6.0, -6000.0)N$ and $m = 56.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(70.0, 6.0, -6000.0)N}{56.0kg} \\ &= (1.25, 0.11, -107.14)ms^{-2} \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	4	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	vector	3	1.25
		2	0.11
		5	−107.14

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	vector	−1	20.0	
			101.0	
			10.0	70.0
		−1	2.0	
			10.1	
			1.0	6.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−6000.0
INPUT 2	real	−1	50.0	
			60.1	
			2.0	56.0

QUESTION 27.9 (9 , 16 , 70)

Abstract: Quadratic Equation constructed from the following first two random (input) integers as roots, which of course should not show in the exam papers. **end of abstract.**

Please solve the following equation:

$$7 \times x^2 - 252 \times x + 1925 = 0$$

Answer:

25, 11

End of Answer.

Solution:

Roots to the equation

$$7 \times x^2 - 252 \times x + 1925 = 0$$

are 25 and 11 .

Let us verity 25 first: $7 \times x^2 - 252 \times x + 1925 = 4375 + (-6300) + (1925) = -1925 + (1925) = 0$

Then verity 11: $7 \times x^2 - 252 \times x + 1925 = 847 + (-2772) + (1925) = -1925 + (1925) = 0$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
3	13	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		7
Calculated 2	string	1 (1 strings):	
Calculated 3	integer		-252
Calculated 4	string	1 (1 strings):	+
Calculated 5	integer		1925
Calculated 6	integer		4375
Calculated 7	integer		-6300
Calculated 8	integer		-1925
Calculated 9	integer		0
Calculated 10	integer		847

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		-2772
Calculated 12	integer		-1925
Calculated 13	integer		0

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$-11, 30, 4$	25
INPUT 2	integer		$-31, 60, 3$	11
INPUT 3	integer		$-15, 15, 2$	7

Here are still some constants for use:

Constant	Symbol	Value
Mass of proton	m_p	$1.6726231 \times 10^{-27}$ kg
Boltzmann's constant	k	1.381×10^{-23} J/K

Thank you very much for answering these questions!

Please be advised that in this paper there are questions from 27.1 through 27.9. And any one of them may contain more than one sub-question, thus the total number of sub-questions here is around 14, of which 13 should be answered.

PAPER TAIL GENERATED.

***** END OF PAPER, THANKS *****

By: 239 (26 , 34)

THIS IS THE JOURNAL FOR PAPER NUMBER 28

THIS IS AN EXAMPLE OF PERSONALIZED TESTS.

If needed, please use the following constants.

Constant	Symbol	Value
Acceleration due to earth's gravity	g	9.80 m/s^2
Avogadro's number	N_A	6.0221367×10^{23} mol^{-1}
Boltzmann's constant	k	1.380658×10^{-23} J/K
Coulomb's constant	k	8.99×10^{9} N·m^2/C^2
Electron charge magnitiude	e	$1.60217733 \times 10^{-19}$ C
Permeability of free space	μ_0	$1.25663706 \times 10^{-6}$ T·m/A
Permittivity of free space	ϵ_0	$8.854187817 \times 10^{-12}$ C^2/(N·m^2)
Pi	π	3.14159265
Planck's constant	h	$6.6260755 \times 10^{-34}$ J·s
Mass of electron	m_e	$9.1093897 \times 10^{-31}$ kg
Mass of neutron	m_n	$1.6749286 \times 10^{-27}$ kg
Mass of proton	m_p	$1.6726231 \times 10^{-27}$ kg
Speed of light in vacuum	c	299792458. m/s
Universal gravitational constant	G	6.67259×10^{-11} N·m^2/kg^2
Universal gas constant	R	8.314510 J/(mol·K)

Please be advised that in this paper there are questions from 28.1 through 28.9. And any one of them may contain more than one sub-question, thus the total number of sub-questions here is around 14, of which 13 should be answered.

PAPER TITLE GENERATED.

In this paper, big questions will be generated in the following order:
1 (6) , 2 (5) , 3 (3) , 4 (2) , 5 (1) , 6 (4) , 7 (8) , 8 (7) , 9 (9) .

QUESTION 28.1 (6)

Please answer ONLY 5 of the following 6 questions (Questions 28.1.1 through 28.1.6).

Here are still some constants for use in the following questions:

Constant	Symbol	Value
Boltzmann's constant	k	1.381×10^{-23} J/K
Avogadro's number	N_A	6.022×10^{23} mol^{-1}
Mass of electron	m_e	$9.1093897 \times 10^{-31}$ kg

In this big question of CHOOSE structure, 6 questions will be generated: 1 (8 , 23) , 2 (7 , 22) , 3 (6 , 21) , 4 (13 , 28) , 5 (11 , 26) , 6 (12 , 27) .

Question 28.1.1 (6 , 8 , 23)

An object is subjected to an external net force $\mathbf{f} = (80.0, 6.0, -7000.0)N$. Its mass is known as $m = 58.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.3793ms^{-2}, 0.44087ms^{-2}, -6.5340 \times 10^6 km/h^2)$.
B. The accelaration is $(1.3793ms^{-2}, 0.44087ms^{-2}, -1.5641 \times 10^6 km/h^2)$.
C. The accelaration is $(6.0670ms^{-2}, 0.10345ms^{-2}, -1.5641 \times 10^6 km/h^2)$.
D. The accelaration is $(6.0670ms^{-2}, 0.44087ms^{-2}, -6.5340 \times 10^6 km/h^2)$.
E. none of these.

Auto-answer:

E. none of these.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (80.0, 6.0, -7000.0)N$ and $m = 58.0kg$, bring them into the above equation, then we get

$$\begin{aligned}\mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(80.0, 6.0, -7000.0)N}{58.0kg} \\ &= (1.3793, 0.10345, -120.69)ms^{-2} \\ &= (17876., 1340.7, -1.5641 \times 10^6)km/h^2.\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	5	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.3793
Calculated 2	real	5	0.10345
Calculated 3	real	5	−120.69
Calculated 4	real	5	17876.
Calculated 5	real	5	1340.7
Calculated 6	real	5	-1.5641×10^6

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	−1	20.0 101.0 10.0	80.0
INPUT 2	real	−1	2.0 10.1 1.0	6.0
INPUT 3	real	−1	−2000.0 −10001.0 −1000.0	−7000.0

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-1	50.0 60.1 2.0	 58.0

Question 28.1.2 (6 , 7 , 22)

An object is subjected to an external net force $\mathbf{f} = (30.0, 2.0, -9000.0)N$. Its mass is known as $m = 54.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration (vector) is $(30346., 480.00, 7.4382 \times 10^6)km/h^2$.
B. The accelaration (vector) is $(33869., 480.00, 7.4382 \times 10^6)km/h^2$.
C. The accelaration (vector) is $(30346., 480.00, 8.5317 \times 10^6)km/h^2$.
D. The accelaration (vector) is $(33869., 480.00, -2.1600 \times 10^6)km/h^2$.
E. The accelaration (vector) is $(35630., 480.00, -2.1600 \times 10^6)km/h^2$.
F. The accelaration (vector) is $(7200.0, 480.00, 7.4382 \times 10^6)km/h^2$.
G. The accelaration (vector) is $(7200.0, 480.00, 7.2656 \times 10^6)km/h^2$.
H. The accelaration (vector) is $(7200.0, 480.00, -2.1600 \times 10^6)km/h^2$.
I. The accelaration (vector) is $(30346., 480.00, 7.2656 \times 10^6)km/h^2$.
J. The accelaration (vector) is $(35630., 480.00, 8.5317 \times 10^6)km/h^2$.
K. The accelaration (vector) is $(33869., 480.00, 8.5317 \times 10^6)km/h^2$.
L. The accelaration (vector) is $(7200.0, 480.00, 8.5317 \times 10^6)km/h^2$.

Auto-answer:

H. The accelaration (vector) is $(7200.0, 480.00, -2.1600 \times 10^6)km/h^2$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (30.0, 2.0, -9000.0)N$ and $m = 54.0kg$, bring them into the above equation, then we get

$$\begin{aligned}\mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(30.0, 2.0, -9000.0)N}{54.0kg} \\ &= (0.55556, 3.7037 \times 10^{-2}, -166.67)ms^{-2} \\ &= (7200.0, 480.00, -2.1600 \times 10^{6})km/h^{2}.\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	12	2	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	0.55556
Calculated 2	real	5	3.7037×10^{-2}
Calculated 3	real	5	-166.67
Calculated 4	real	5	7200.0
Calculated 5	real	5	480.00
Calculated 6	real	5	-2.1600×10^{6}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	-1	20.0 101.0 10.0	 30.0
INPUT 2	real	-1	2.0 10.1 1.0	 2.0
INPUT 3	real	-1	-2000.0 -10001.0 -1000.0	 -9000.0

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−1	50.0 60.1 2.0	 54.0

Question 28.1.3 (6 , 6 , 21)

An object is subjected to an external net force $\mathbf{f} = (50.0, 4.0, -6000.0)N$. Its mass is known as $m = 58.0kg$. Please calculate its accelaration.

Answer:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (50.0, 4.0, -6000.0)N$ and $m = 58.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(50.0, 4.0, -6000.0)N}{58.0kg} \\
&= (0.86207, 6.8966 \times 10^{-2}, -103.45)ms^{-2} \\
&= (11172., 893.79, -1.3407 \times 10^{6})km/h^2.
\end{aligned}$$

End of Answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (50.0, 4.0, -6000.0)N$ and $m = 58.0kg$, bring them into the above equation, then we get

$$\begin{aligned}\mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(50.0, 4.0, -6000.0)N}{58.0kg} \\ &= (0.86207, 6.8966 \times 10^{-2}, -103.45)ms^{-2} \\ &= (11172., 893.79, -1.3407 \times 10^{6})km/h^{2}.\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	0.86207
Calculated 2	real	5	6.8966×10^{-2}
Calculated 3	real	5	-103.45
Calculated 4	real	5	11172.
Calculated 5	real	5	893.79
Calculated 6	real	5	-1.3407×10^{6}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	-1	20.0 101.0 10.0	 50.0
INPUT 2	real	-1	2.0 10.1 1.0	 4.0
INPUT 3	real	-1	-2000.0 -10001.0 -1000.0	 -6000.0

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-1	50.0 60.1 2.0	 58.0

Question 28.1.4 (6 , 13 , 28)

What is the operation between $a = 5$ and $b = 8$: $a - b =$? Please also calculate it.

Answer:

5;
8;
The operation is SUBTRACTION and the result is -3.0000.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
3	2	0	0	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	string	1 (1 strings):	SUBTRACTION
Calculated 2	real	5	-3.0000

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 10, 2$	5
INPUT 2	integer		$2, 10, 2$	8
INPUT 3	string		$+$ $-$ $\times$ $\div$	 $<--$

Question 28.1.5 (6 , 11 , 26)

In a hotel, the possiblity of smoking customer is $a = 0.600$, and the possiblity of equal or above 30 years old customer is $b = 0.9800$. Please calculate the possiblity of non-smoking and under 30 years old customer.

Solution:

Since the possiblity of smoking customer is $a = 0.600$, and the possiblity of equal or above 30 years old customer is $b = 0.9800$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - 0.600 = 0.400$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - 0.9800 = 2.000 \times 10^{-2}$. So the possibility of non-smoking and under 30 years old customer is $c \times d = 8.00 \times 10^{-3}$.

End of Solution.

Answer:

The possibility of non-smoking and under 30 years old customer is $(1 - a)(1 - b) = 8.00 \times 10^{-3}$.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	3	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	3	0.400
Calculated 2	real	4	2.000×10^{-2}
Calculated 3	real	3	8.00×10^{-3}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	logical	.TRUE. .FALSE.	smoking non-smoking	$<--$
INPUT 2	real	-3	1.0×10^{-2} 1.000 1.0×10^{-2}	 0.600
INPUT 3	logical	.TRUE. .FALSE.	equal or above 30 years old under 30 years old	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-4	2.00×10^{-2} 1.0000 2.00×10^{-2}	 0.9800

Question 28.1.6 (6 , 12 , 27)

In a hotel, the possiblity of non-smoking customer is $a = 0.770$, and the possiblity of equal-or-above 30 years old customer is $b = 0.1400$. Please fill the following form.

Customer	Possibility
smoking and equal-or-above 30 years old	
smoking and under 30 years old	
non-smoking and equal-or-above 30 years old	
non-smoking and under 30 years old	

Solution:

Since the possiblity of non-smoking customer is $a = 0.770$, and the possiblity of equal-or-above 30 years old customer is $b = 0.1400$, the possiblity of smoking customer is $c = 1.0 - a = 1.0 - 0.770 = 0.230$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - 0.1400 = 0.8600$. Then

Customer	Possibility
smoking and equal-or-above 30 years old	$0.230 \times 0.1400 = 3.22 \times 10^{-2}$
smoking and under 30 years old	$0.230 \times 0.8600 = 0.198$
non-smoking and equal-or-above 30 years old	$0.770 \times 0.1400 = 0.108$
non-smoking and under 30 years old	$0.770 \times 0.8600 = 0.662$

And the total summation of all possibilities is 1.000.

End of Solution.

Answer:

Customer	Possibility
smoking and equal-or-above 30 years old	3.22×10^{-2}
smoking and under 30 years old	0.198
non-smoking and equal-or-above 30 years old	0.108
non-smoking and under 30 years old	0.662

And the total summation of all possibilities is 1.000.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	11	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	3	0.230
Calculated 2	real	4	0.8600
Calculated 3	real	3	0.230
Calculated 4	real	3	0.770
Calculated 5	real	4	0.1400
Calculated 6	real	4	0.8600
Calculated 7	real	3	3.22×10^{-2}
Calculated 8	real	3	0.198
Calculated 9	real	3	0.108
Calculated 10	real	3	0.662

Sequential	Type	Accuracy	Calculated
Calculated 11	real	4	1.000

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	logical	.TRUE. .FALSE.	smoking non-smoking	 $<--$
INPUT 2	real	-3	1.0×10^{-2} 1.000 1.0×10^{-2}	 0.770
INPUT 3	logical	.TRUE. .FALSE.	equal-or-above 30 years old under 30 years old	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-4	2.00×10^{-2} 1.0000 2.00×10^{-2}	 0.1400

You have done all the above? A very good beginning, please go ahead.

More constants the Mass of electron m_e= 9.109390 $\times 10^{-31}$ kg , Universal gas constant R= 8.315 J/(mol·K) , e= 1.60217733 $\times 10^{-19}$ C , and m_p= 1.6726231 $\times 10^{-27}$ kg may be very helpful.

QUESTION 28.2 (5 , 5 , 5)

If any one of the following statements is correct, please fill the box ahead of it with T . If wrong, fill with F.

Your answer	

1. 53 is an even number.

Your answer	

2. Kingston is in Ontario province.

Your answer	

3. $|\mathbf{F}| = Gm_1m_2r^{-2}$ is a mathmatical form of the Newton's Second Law.

Answer:

The correct answer	F

1. 53 is an even number.

The correct answer	T

2. Kingston is in Ontario province.

The correct answer	F

3. $|\mathbf{F}| = Gm_1m_2r^{-2}$ is a mathmatical form of the Newton's Second Law.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
6	3	0	0	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	string	1 (1 strings):	F
Calculated 2	string	1 (1 strings):	T
Calculated 3	string	1 (1 strings):	F

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 100, 1$	53
INPUT 2	string		even odd	$<--$
INPUT 3	string		Toronto Kingston Montreal Hull	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	string		Ontario Quebec	$<--$
INPUT 5	string		$\mathbf{F} = m\mathbf{a}$ $\|\mathbf{F}\| = Gm_1m_2r^{-2}$	$<--$
INPUT 6	string		the Newton's Second Law Newton's Law of Universal Gravitation	$<--$

QUESTION 28.3 (3 , 3 , 3)

Please choose the correct one from the following statements:

A. Canada has 34 provinces and 39 territories.
B. Canada has 37 provinces and 37 territories.
C. Canada has 33 provinces and 38 territories.
D. Canada has 10 provinces and 3 territories.
E. Canada has 35 provinces and 34 territories.
F. None of above.

Auto-answer:

D. Canada has 10 provinces and 3 territories.

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
0	20	6 simple	6	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		10
Calculated 2	integer		3
Calculated 3	integer		23
Calculated 4	integer		24
Calculated 5	integer		25
Calculated 6	integer		26
Calculated 7	integer		27
Calculated 8	integer		28
Calculated 9	integer		29
Calculated 10	integer		30
Sequential	Type	Accuracy	Calculated
Calculated 11	integer		31
Calculated 12	integer		32
Calculated 13	integer		33
Calculated 14	integer		34
Calculated 15	integer		35
Calculated 16	integer		36
Calculated 17	integer		37
Calculated 18	integer		38
Calculated 19	integer		39
Calculated 20	integer		40

All inputs:

QUESTION 28.4 (2 , 2 , 2)

An object is subjected to an external net force $\mathbf{f} = (80.000, 7.0000, -9000.0)N$. Its mass is known as $m = 52.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.5385ms^{-2}, 1744.6km/h^2, 461.11ms^{-2})$.
B. The accelaration is $(-6.2715ms^{-2}, 1744.6km/h^2, -173.08ms^{-2})$.
C. The accelaration is $(-6.2715ms^{-2}, -8229.0km/h^2, -173.08ms^{-2})$.
D. The accelaration is $(-6.2715ms^{-2}, 1744.6km/h^2, 461.11ms^{-2})$.
E. The accelaration is $(-6.2715ms^{-2}, -8229.0km/h^2, 461.11ms^{-2})$.
F. The accelaration is $(1.5385ms^{-2}, -8229.0km/h^2, 461.11ms^{-2})$.
G. None of these.

Auto-answer:

G. None of these.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (80.000, 7.0000, -9000.0)N$ and $m = 52.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(80.000, 7.0000, -9000.0)N}{52.0000kg} \\ &= (1.5385, 0.13462, -173.08)ms^{-2} \\ &= (19938., 1744.6, -2.2431 \times 10^6)km/h^2. \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	7	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.5385
Calculated 2	real	5	0.13462
Calculated 3	real	5	-173.08
Calculated 4	real	5	19938.
Calculated 5	real	5	1744.6
Calculated 6	real	5	-2.2431×10^6

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	−3	20.000 101.000 10.000	 80.000
INPUT 2	real	−4	2.0000 10.1000 1.0000	 7.0000
INPUT 3	real	−1	−2000.0 −10001.0 −1000.0	 −9000.0

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−4	50.0000 60.1000 2.0000	 52.0000

QUESTION 28.5 (1 , 1 , 1)

Abstract: This is a simple Newton's Second Law calculation multi-choice problem. **end of abstract.**

An object is subjected to an external net force $\mathbf{f} = (80.0, 9.0, -7000.0)N$. Its mass is known as $m = 50.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(4.22, 0.18, 415.24)ms^{-2}$.
B. The accelaration is $(4.22, -0.54, 415.24)ms^{-2}$.
C. The accelaration is $(1.60, -0.54, -140.00)ms^{-2}$.
D. The accelaration is $(4.22, -0.54, -140.00)ms^{-2}$.
E. The accelaration is $(1.60, 0.18, 415.24)ms^{-2}$.
F. The accelaration is $(4.22, 0.18, -140.00)ms^{-2}$.
G. The accelaration is $(1.60, 0.18, -140.00)ms^{-2}$.
H. The accelaration is $(1.60, -0.54, 415.24)ms^{-2}$.

Auto-answer:

G. The accelaration is $(1.60, 0.18, -140.00)ms^{-2}$.

End of auto-answer.

Answer:

The correct answer from the choices is
G. The accelaration is $(1.60, 0.18, -140.00)ms^{-2}$.

End of Answer.
Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (80.0, 9.0, -7000.0)N$ and $m = 50.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(80.0, 9.0, -7000.0)N}{50.0000kg} \\ &= (1.60, 0.18, -140.00)ms^{-2} \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	8	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	vector	3	1.60
		2	0.18
		5	−140.00

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	vector	−1	20.0	
			101.0	
			10.0	80.0
		−1	2.0	
			10.1	
			1.0	9.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−7000.0
INPUT 2	real	−4	50.0000	
			60.1000	
			2.0000	50.0000

QUESTION 28.6 (4 , 4 , 4)

Considering case-insensitivity, please match the following same strings.

Column Left	Column Right	Your choinces
A. C	YJH	
B. Er	eR	
C. A	ER	
D. yjh	a	
E. er	c	

Auto-answer:

Column Left	Column Right	Answers
A. C	YJH	**D.**
B. Er	eR	**B.** , **E.**
C. A	ER	**B.** , **E.**
D. yjh	a	**C.**
E. er	c	**A.**

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	0	16	5	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		2

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$2, 8, 2$	4
INPUT 2	integer		$2, 3, 2$	2

You have done all the above? Excellent! Not much left, please continue.

QUESTION 28.7 (8 , 15 , 60)

$$\begin{pmatrix} 5 & 5 & 5 & 7 \\ 4 & 6 & 6 & 6 \\ 6 & 6 & 6 & 5 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} =?$$

$$\begin{pmatrix} \eta & \Phi \\ \sigma & \Delta \\ \Psi & \Psi \\ \Gamma & \sigma \end{pmatrix} \begin{pmatrix} \beta \\ \gamma \end{pmatrix} =?$$

Answer:

$$\begin{pmatrix} 5 & 5 & 5 & 7 \\ 4 & 6 & 6 & 6 \\ 6 & 6 & 6 & 5 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} = \begin{pmatrix} 44 \\ 44 \\ 46 \end{pmatrix}$$

$$\begin{pmatrix} \eta & \Phi \\ \sigma & \Delta \\ \Psi & \Psi \\ \Gamma & \sigma \end{pmatrix} \begin{pmatrix} \beta \\ \gamma \end{pmatrix} = \begin{pmatrix} \eta \times \beta + \Phi \times \gamma \\ \sigma \times \beta + \Delta \times \gamma \\ \Psi \times \beta + \Psi \times \gamma \\ \Gamma \times \beta + \sigma \times \gamma \end{pmatrix}$$

End of Answer.

Solution:

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	2	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	i-matrix		(size: 3 by 1)

44
44
46

Sequential	Type	Accuracy	Calculated
Calculated 2	s-matrix		(size: 4 by 1)

$$\begin{pmatrix} \eta \times \beta + \Phi \times \gamma \\ \sigma \times \beta + \Delta \times \gamma \\ \Psi \times \beta + \Psi \times \gamma \\ \Gamma \times \beta + \sigma \times \gamma \end{pmatrix}$$

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	i-matrix		$4, 7, 1$	(size: 3 by 4)

5 5 5 7
4 6 6 6
6 6 6 5

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 2	i-matrix		$2, 2, 1$	(size: 4 by 1)

2
2
2
2

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 3	s-matrix		α β γ δ ϵ ε ζ η ρ σ Γ Δ Θ Λ Ξ Υ Φ Ψ Ω	(size: 4 by 2)

$$\begin{pmatrix} \eta & \Phi \\ \sigma & \Delta \\ \Psi & \Psi \\ \Gamma & \sigma \end{pmatrix}$$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	s-matrix		β γ	(size: 2 by 1)

$$\begin{pmatrix} \beta \\ \gamma \end{pmatrix}$$

QUESTION 28.8 (7 , 14 , 50)

An object is subjected to an external net force $\mathbf{f} = (80.0, 6.0, -4000.0)N$. Its mass is known as $m = 56.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(2.88, 0.11, -71.429)ms^{-2}$.
B. The accelaration is $(1.43, 0.11, 251.90)ms^{-2}$.
C. The accelaration is $(1.43, 0.11, -71.429)ms^{-2}$.

D. The accelaration is $(2.88, -0.33, 251.90)ms^{-2}$.

Auto-answer:

C. The accelaration is $(1.43, 0.11, -71.429)ms^{-2}$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (80.0, 6.0, -4000.0)N$ and $m = 56.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(80.0, 6.0, -4000.0)N}{56.0kg} \\ &= (1.43, 0.11, -71.429)ms^{-2} \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	4	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	vector	3	1.43
		2	0.11
		5	−71.429

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	vector	−1	20.0	
			101.0	
			10.0	80.0
		−1	2.0	
			10.1	
			1.0	6.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−4000.0
INPUT 2	real	−1	50.0	
			60.1	
			2.0	56.0

QUESTION 28.9 (9 , 16 , 70)

Abstract: Quadratic Equation constructed from the following first two random (input) integers as roots, which of course should not show in the exam papers. **end of abstract.**

Please solve the following equation:

$$-11 \times x^2 + 539 \times x - 5984 = 0$$

Answer:

17, 32

End of Answer.

Solution:

Roots to the equation

$$-11 \times x^2 + 539 \times x - 5984 = 0$$

are 17 and 32 .

Let us verity 17 first: $-11 \times x^2 + 539 \times x - 5984 = -3179 + (9163) + (-5984) = 5984 + (-5984) = 0$

Then verity 32: $-11 \times x^2 + 539 \times x - 5984 = -11264 + (17248) + (-5984) = 5984 + (-5984) = 0$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
3	13	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		-11
Calculated 2	string	1 (1 strings):	+
Calculated 3	integer		539
Calculated 4	string	1 (1 strings):	
Calculated 5	integer		-5984
Calculated 6	integer		-3179
Calculated 7	integer		9163
Calculated 8	integer		5984
Calculated 9	integer		0
Calculated 10	integer		-11264

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		17248
Calculated 12	integer		5984
Calculated 13	integer		0

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$-11, 30, 4$	17
INPUT 2	integer		$-31, 60, 3$	32
INPUT 3	integer		$-15, 15, 2$	-11

Here are still some constants for use:

Constant	Symbol	Value
Mass of proton	m_p	$1.6726231 \times 10^{-27}$ kg
Boltzmann's constant	k	1.381×10^{-23} J/K

Thank you very much for answering these questions!

Please be advised that in this paper there are questions from 28.1 through 28.9. And any one of them may contain more than one sub-question, thus the total number of sub-questions here is around 14, of which 13 should be answered.

PAPER TAIL GENERATED.

***** END OF PAPER, THANKS *****

By: 239 (26 , 34)

THIS IS THE JOURNAL FOR PAPER NUMBER 29

THIS IS AN EXAMPLE OF PERSONALIZED TESTS.

If needed, please use the following constants.

Constant	Symbol	Value
Acceleration due to earth's gravity	g	9.80 m/s^2
Avogadro's number	N_A	6.0221367×10^{23} mol^{-1}
Boltzmann's constant	k	1.380658×10^{-23} J/K
Coulomb's constant	k	8.99×10^{9} N·m^2/C^2
Electron charge magnitiude	e	$1.60217733 \times 10^{-19}$ C
Permeability of free space	μ_0	$1.25663706 \times 10^{-6}$ T·m/A
Permittivity of free space	ϵ_0	$8.854187817 \times 10^{-12}$ C^2/(N·m^2)
Pi	π	3.14159265
Planck's constant	h	$6.6260755 \times 10^{-34}$ J·s
Mass of electron	m_e	$9.1093897 \times 10^{-31}$ kg
Mass of neutron	m_n	$1.6749286 \times 10^{-27}$ kg
Mass of proton	m_p	$1.6726231 \times 10^{-27}$ kg
Speed of light in vacuum	c	299792458. m/s
Universal gravitational constant	G	6.67259×10^{-11} N·m^2/kg^2
Universal gas constant	R	8.314510 J/(mol·K)

Please be advised that in this paper there are questions from 29.1 through 29.9. And any one of them may contain more than one sub-question, thus the total number of sub-questions here is around 14, of which 13 should be answered.

PAPER TITLE GENERATED.

In this paper, big questions will be generated in the following order:
1 (6) , 2 (1) , 3 (2) , 4 (4) , 5 (3) , 6 (5) , 7 (8) , 8 (7) , 9 (9) .

QUESTION 29.1 (6)

Please answer ONLY 5 of the following 6 questions (Questions 29.1.1 through 29.1.6).

Here are still some constants for use in the following questions:

Constant	Symbol	Value
Boltzmann's constant	k	1.381×10^{-23} J/K
Avogadro's number	N_A	6.022×10^{23} mol^{-1}
Mass of electron	m_e	$9.1093897 \times 10^{-31}$ kg

In this big question of CHOOSE structure, 6 questions will be generated: 1 (7 , 22) , 2 (13 , 28) , 3 (12 , 27) , 4 (6 , 21) , 5 (8 , 23) , 6 (11 , 26) .

Question 29.1.1 (6 , 7 , 22)

An object is subjected to an external net force $\mathbf{f} = (50.0, 7.0, -5000.0)N$. Its mass is known as $m = 52.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration (vector) is $(53724., 1744.6, 4.2009 \times 10^6)km/h^2$.
B. The accelaration (vector) is $(53724., 1744.6, -4.5702 \times 10^6)km/h^2$.
C. The accelaration (vector) is $(56648., 1744.6, -1.2462 \times 10^6)km/h^2$.
D. The accelaration (vector) is $(12462., 1744.6, 4.9047 \times 10^6)km/h^2$.
E. The accelaration (vector) is $(56648., 1744.6, 4.9047 \times 10^6)km/h^2$.
F. The accelaration (vector) is $(12462., 1744.6, -1.2462 \times 10^6)km/h^2$.
G. The accelaration (vector) is $(53724., 1744.6, 4.9047 \times 10^6)km/h^2$.
H. The accelaration (vector) is $(56648., 1744.6, 4.2009 \times 10^6)km/h^2$.
I. The accelaration (vector) is $(50025., 1744.6, -1.2462 \times 10^6)km/h^2$.
J. The accelaration (vector) is $(56648., 1744.6, -4.5702 \times 10^6)km/h^2$.
K. The accelaration (vector) is $(12462., 1744.6, -4.5702 \times 10^6)km/h^2$.
L. The accelaration (vector) is $(50025., 1744.6, 4.9047 \times 10^6)km/h^2$.

Auto-answer:

F. The accelaration (vector) is $(12462., 1744.6, -1.2462 \times 10^6)km/h^2$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (50.0, 7.0, -5000.0)N$ and $m = 52.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(50.0, 7.0, -5000.0)N}{52.0kg} \\
&= (0.96154, 0.13462, -96.154)ms^{-2} \\
&= (12462., 1744.6, -1.2462 \times 10^6)km/h^2.
\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	12	2	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	0.96154
Calculated 2	real	5	0.13462
Calculated 3	real	5	−96.154
Calculated 4	real	5	12462.
Calculated 5	real	5	1744.6
Calculated 6	real	5	-1.2462×10^6

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	−1	20.0 101.0 10.0	 50.0
INPUT 2	real	−1	2.0 10.1 1.0	 7.0
INPUT 3	real	−1	−2000.0 −10001.0 −1000.0	 −5000.0

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-1	50.0 60.1 2.0	 52.0

Question 29.1.2 (6 , 13 , 28)

What is the operation between $a = 5$ and $b = 6$: $a \times b =$? Please also calculate it.

Answer:

5;
6;
The operation is MULTIPLICATION and the result is 30.000.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
3	2	0	0	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	string	1 (1 strings):	MULTIPLICATION
Calculated 2	real	5	30.000

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 10, 2$	5
INPUT 2	integer		$2, 10, 2$	6
INPUT 3	string		$+$ $-$ $\times$ $\div$	 $<--$

Question 29.1.3 (6 , 12 , 27)

In a hotel, the possiblity of smoking customer is $a = 0.230$, and the possiblity of equal-or-above 30 years old customer is $b = 0.5600$. Please fill the following form.

Customer	Possibility
smoking and equal-or-above 30 years old	
smoking and under 30 years old	
non-smoking and equal-or-above 30 years old	
non-smoking and under 30 years old	

Solution:

Since the possiblity of smoking customer is $a = 0.230$, and the possiblity of equal-or-above 30 years old customer is $b = 0.5600$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - 0.230 = 0.770$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - 0.5600 = 0.4400$. Then

Customer	Possibility
smoking and equal-or-above 30 years old	$0.230 \times 0.5600 = 0.129$
smoking and under 30 years old	$0.230 \times 0.4400 = 0.101$
non-smoking and equal-or-above 30 years old	$0.770 \times 0.5600 = 0.431$
non-smoking and under 30 years old	$0.770 \times 0.4400 = 0.339$

And the total summation of all possibilities is 1.000.

End of Solution.

Answer:

Customer	Possibility
smoking and equal-or-above 30 years old	0.129
smoking and under 30 years old	0.101
non-smoking and equal-or-above 30 years old	0.431
non-smoking and under 30 years old	0.339

And the total summation of all possibilities is 1.000.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	11	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	3	0.770
Calculated 2	real	4	0.4400
Calculated 3	real	3	0.230
Calculated 4	real	3	0.770
Calculated 5	real	4	0.5600
Calculated 6	real	4	0.4400
Calculated 7	real	3	0.129
Calculated 8	real	3	0.101
Calculated 9	real	3	0.431
Calculated 10	real	3	0.339

Sequential	Type	Accuracy	Calculated
Calculated 11	real	4	1.000

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	logical	.TRUE. .FALSE.	smoking non-smoking	$<--$
INPUT 2	real	-3	1.0×10^{-2} 1.000 1.0×10^{-2}	 0.230
INPUT 3	logical	.TRUE. .FALSE.	equal-or-above 30 years old under 30 years old	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-4	2.00×10^{-2} 1.0000 2.00×10^{-2}	 0.5600

Question 29.1.4 (6 , 6 , 21)

An object is subjected to an external net force $\mathbf{f} = (60.0, 5.0, -4000.0)N$. Its mass is known as $m = 54.0kg$. Please calculate its accelaration.

Answer:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (60.0, 5.0, -4000.0)N$ and $m = 54.0kg$, bring them into the

above equation, then we get

$$\begin{aligned}\mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(60.0, 5.0, -4000.0)N}{54.0kg} \\ &= (1.1111, 9.2593 \times 10^{-2}, -74.074)ms^{-2} \\ &= (14400., 1200.0, -960000.)km/h^2.\end{aligned}$$

End of Answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (60.0, 5.0, -4000.0)N$ and $m = 54.0kg$, bring them into the above equation, then we get

$$\begin{aligned}\mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(60.0, 5.0, -4000.0)N}{54.0kg} \\ &= (1.1111, 9.2593 \times 10^{-2}, -74.074)ms^{-2} \\ &= (14400., 1200.0, -960000.)km/h^2.\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.1111
Calculated 2	real	5	9.2593×10^{-2}
Calculated 3	real	5	-74.074
Calculated 4	real	5	14400.
Calculated 5	real	5	1200.0
Calculated 6	real	5	$-960000.$

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	-1	20.0 101.0 10.0	60.0
INPUT 2	real	-1	2.0 10.1 1.0	5.0
INPUT 3	real	-1	-2000.0 -10001.0 -1000.0	-4000.0
Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-1	50.0 60.1 2.0	54.0

Question 29.1.5 (6 , 8 , 23)

An object is subjected to an external net force $\mathbf{f} = (60.0, 6.0, -3000.0)N$. Its mass is known as $m = 54.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.1111ms^{-2}, 0.42695ms^{-2}, -2.1061 \times 10^{6}km/h^{2})$.
B. The accelaration is $(1.1111ms^{-2}, 0.11111ms^{-2}, -2.1061 \times 10^{6}km/h^{2})$.
C. The accelaration is $(2.7139ms^{-2}, 0.42695ms^{-2}, -2.1061 \times 10^{6}km/h^{2})$.
D. The accelaration is $(1.1111ms^{-2}, 0.11111ms^{-2}, -720000.km/h^{2})$.
E. none of these.

Auto-answer:

D. The accelaration is $(1.1111ms^{-2}, 0.11111ms^{-2}, -720000.km/h^{2})$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (60.0, 6.0, -3000.0)N$ and $m = 54.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(60.0, 6.0, -3000.0)N}{54.0kg} \\ &= (1.1111, 0.11111, -55.556)ms^{-2} \\ &= (14400., 1440.0, -720000.)km/h^2. \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	5	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.1111
Calculated 2	real	5	0.11111
Calculated 3	real	5	−55.556
Calculated 4	real	5	14400.
Calculated 5	real	5	1440.0
Calculated 6	real	5	−720000.

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	-1	20.0 101.0 10.0	 60.0
INPUT 2	real	-1	2.0 10.1 1.0	 6.0
INPUT 3	real	-1	-2000.0 -10001.0 -1000.0	 -3000.0
Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-1	50.0 60.1 2.0	 54.0

Question 29.1.6 (6 , 11 , 26)

In a hotel, the possiblity of smoking customer is $a = 0.770$, and the possiblity of under 30 years old customer is $b = 0.7000$. Please calculate the possiblity of non-smoking and equal or above 30 years old customer.

Solution:

Since the possiblity of smoking customer is $a = 0.770$, and the possiblity of under 30 years old customer is $b = 0.7000$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - 0.770 = 0.230$ and the possiblity of equal or above 30 years old customer is $d = 1.0 - b = 1.0 - 0.7000 = 0.3000$. So the possibility of non-smoking and equal or above 30 years old customer is $c \times d = 6.90 \times 10^{-2}$.

End of Solution.

Answer:

The possibility of non-smoking and equal or above 30 years old customer is $(1 - a)(1 - b) = 6.90 \times 10^{-2}$.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	3	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	3	0.230
Calculated 2	real	4	0.3000
Calculated 3	real	3	6.90×10^{-2}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	logical	.TRUE. .FALSE.	smoking non-smoking	$<--$
INPUT 2	real	-3	1.0×10^{-2} 1.000 1.0×10^{-2}	 0.770
INPUT 3	logical	.TRUE. .FALSE.	equal or above 30 years old under 30 years old	 $<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-4	2.00×10^{-2} 1.0000 2.00×10^{-2}	 0.7000

You have done all the above? A very good beginning, please go ahead. More constants the Mass of electron m_e= 9.109390 $\times 10^{-31}$ kg , Universal gas constant R= 8.315 J/(mol·K) , e= 1.60217733 $\times 10^{-19}$ C , and m_p= 1.6726231 $\times 10^{-27}$ kg may be very helpful.

QUESTION 29.2 (1 , 1 , 1)

Abstract: This is a simple Newton's Second Law calculation multi-choice problem. **end of abstract.**

An object is subjected to an external net force $\mathbf{f} = (50.0, 4.0, -6000.0)N$. Its mass is known as $m = 52.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(0.962, 7.7 \times 10^{-2}, 427.13)ms^{-2}$.

B. The accelaration is $(4.16, 0.20, -115.38)ms^{-2}$.

C. The accelaration is $(4.16, 0.20, 427.13)ms^{-2}$.
D. The accelaration is $(4.16, 7.7 \times 10^{-2}, -115.38)ms^{-2}$.
E. The accelaration is $(0.962, 7.7 \times 10^{-2}, -115.38)ms^{-2}$.
F. The accelaration is $(4.16, 7.7 \times 10^{-2}, 427.13)ms^{-2}$.
G. The accelaration is $(0.962, 0.20, -115.38)ms^{-2}$.
H. The accelaration is $(0.962, 0.20, 427.13)ms^{-2}$.

Auto-answer:

E. The accelaration is $(0.962, 7.7 \times 10^{-2}, -115.38)ms^{-2}$.

End of auto-answer.

Answer:

The correct answer from the choices is
E. The accelaration is $(0.962, 7.7 \times 10^{-2}, -115.38)ms^{-2}$.

End of Answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (50.0, 4.0, -6000.0)N$ and $m = 52.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(50.0, 4.0, -6000.0)N}{52.0000kg} \\ &= (0.962, 7.7 \times 10^{-2}, -115.38)ms^{-2} \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	8	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	vector	3	0.962
		2	7.7×10^{-2}
		5	-115.38

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	vector	-1	20.0	
			101.0	
			10.0	50.0
		-1	2.0	
			10.1	
			1.0	4.0
		-1	-2000.0	
			-10001.0	
			-1000.0	-6000.0
INPUT 2	real	-4	50.0000	
			60.1000	
			2.0000	52.0000

QUESTION 29.3 (2 , 2 , 2)

An object is subjected to an external net force $\mathbf{f} = (50.000, 3.0000, -4000.0)N$. Its mass is known as $m = 54.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(0.92593ms^{-2}, 720.00km/h^2, -74.074ms^{-2})$.
B. The accelaration is $(4.5878ms^{-2}, -3482.9km/h^2, -74.074ms^{-2})$.
C. The accelaration is $(4.5878ms^{-2}, 720.00km/h^2, 346.91ms^{-2})$.
D. The accelaration is $(4.5878ms^{-2}, 720.00km/h^2, -74.074ms^{-2})$.
E. The accelaration is $(0.92593ms^{-2}, 720.00km/h^2, 346.91ms^{-2})$.
F. The accelaration is $(0.92593ms^{-2}, -3482.9km/h^2, 346.91ms^{-2})$.
G. None of these.

Auto-answer:

A. The accelaration is $(0.92593ms^{-2}, 720.00km/h^2, -74.074ms^{-2})$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (50.000, 3.0000, -4000.0)N$ and $m = 54.0000kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(50.000, 3.0000, -4000.0)N}{54.0000kg} \\
&= (0.92593, 5.5556 \times 10^{-2}, -74.074)ms^{-2} \\
&= (12000., 720.00, -960000.)km/h^2.
\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	7	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	0.92593
Calculated 2	real	5	5.5556×10^{-2}
Calculated 3	real	5	-74.074
Calculated 4	real	5	12000.
Calculated 5	real	5	720.00
Calculated 6	real	5	$-960000.$

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	−3	20.000 101.000 10.000	 50.000
INPUT 2	real	−4	2.0000 10.1000 1.0000	 3.0000
INPUT 3	real	−1	−2000.0 −10001.0 −1000.0	 −4000.0

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−4	50.0000 60.1000 2.0000	 54.0000

QUESTION 29.4 (4 , 4 , 4)

Considering case-insensitivity, please match the following same strings.

Column Left	Column Right	Your choinces
A. B	ER	
B. yjh	a	
C. A= 4/ 2	b	
D. A	a= 2	
E. er	YJH	

Auto-answer:

Column Left	Column Right	Answers
A. B	ER	**E.**
B. yjh	a	**D.**
C. A= 4/ 2	b	**A.**
D. A	a= 2	**C.**
E. er	YJH	**B.**

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	0	16	5	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		2

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		2, 8, 2	4
INPUT 2	integer		2, 3, 2	2

QUESTION 29.5 (3 , 3 , 3)

Please choose the correct one from the following statements:

A. Canada has 10 provinces and 3 territories.
B. Canada has 33 provinces and 38 territories.
C. Canada has 34 provinces and 39 territories.
D. Canada has 37 provinces and 37 territories.
E. Canada has 35 provinces and 34 territories.
F. None of above.

Auto-answer:

A. Canada has 10 provinces and 3 territories.

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
0	20	6 simple	6	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		10
Calculated 2	integer		3
Calculated 3	integer		23
Calculated 4	integer		24
Calculated 5	integer		25
Calculated 6	integer		26
Calculated 7	integer		27
Calculated 8	integer		28
Calculated 9	integer		29
Calculated 10	integer		30

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		31
Calculated 12	integer		32
Calculated 13	integer		33
Calculated 14	integer		34
Calculated 15	integer		35
Calculated 16	integer		36
Calculated 17	integer		37
Calculated 18	integer		38
Calculated 19	integer		39
Calculated 20	integer		40

All inputs:

QUESTION 29.6 (5 , 5 , 5)

If any one of the following statements is correct, please fill the box ahead of it with T . If wrong, fill with F.

Your answer	

1. 69 is an odd number.

Your answer	

2. Montreal is in Ontario province.

Your answer	

3. $\mathbf{F} = m\mathbf{a}$ is a mathmatical form of the Newton's Second Law.

Answer:

The correct answer	T

1. 69 is an odd number.

The correct answer	F

2. Montreal is in Ontario province.

The correct answer	T

3. $\mathbf{F} = m\mathbf{a}$ is a mathmatical form of the Newton's Second Law.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
6	3	0	0	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	string	1 (1 strings):	T
Calculated 2	string	1 (1 strings):	F
Calculated 3	string	1 (1 strings):	T

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 100, 1$	69
INPUT 2	string		even odd	 $<--$
INPUT 3	string		Toronto Kingston Montreal Hull	 $<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	string		Ontario Quebec	$<--$
INPUT 5	string		$\mathbf{F} = m\mathbf{a}$ $\lvert\mathbf{F}\rvert = Gm_1m_2r^{-2}$	$<--$
INPUT 6	string		the Newton's Second Law Newton's Law of Universal Gravitation	$<--$

You have done all the above? Excellent! Not much left, please continue.

QUESTION 29.7 (8 , 15 , 60)

$$\begin{pmatrix} 4 & 5 & 6 & 6 \\ 6 & 7 & 4 & 4 \\ 6 & 5 & 4 & 6 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} = ?$$

$$\begin{pmatrix} \delta & \beta \\ \Phi & \Gamma \\ \Delta & \Psi \\ \Psi & \Xi \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} =?$$

Answer:

$$\begin{pmatrix} 4 & 5 & 6 & 6 \\ 6 & 7 & 4 & 4 \\ 6 & 5 & 4 & 6 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} = \begin{pmatrix} 42 \\ 42 \\ 42 \end{pmatrix}$$

$$\begin{pmatrix} \delta & \beta \\ \Phi & \Gamma \\ \Delta & \Psi \\ \Psi & \Xi \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} = \begin{pmatrix} \delta \times \beta + \beta \times \beta \\ \Phi \times \beta + \Gamma \times \beta \\ \Delta \times \beta + \Psi \times \beta \\ \Psi \times \beta + \Xi \times \beta \end{pmatrix}$$

End of Answer.

Solution:

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	2	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	i-matrix		(size: 3 by 1)

42
42
42

Sequential	Type	Accuracy	Calculated
Calculated 2	s-matrix		(size: 4 by 1)

$$\begin{pmatrix} \delta \times \beta + \beta \times \beta \\ \Phi \times \beta + \Gamma \times \beta \\ \Delta \times \beta + \Psi \times \beta \\ \Psi \times \beta + \Xi \times \beta \end{pmatrix}$$

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	i-matrix		$4, 7, 1$	(size: 3 by 4)

$$\begin{matrix} 4 & 5 & 6 & 6 \\ 6 & 7 & 4 & 4 \\ 6 & 5 & 4 & 6 \end{matrix}$$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 2	i-matrix		$2, 2, 1$	(size: 4 by 1)

$$\begin{matrix} 2 \\ 2 \\ 2 \\ 2 \end{matrix}$$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 3	s-matrix		α	
			β	
			γ	
			δ	
			ϵ	
			ε	
			ζ	
			η	
			ρ	
			σ	
			Γ	
			Δ	
			Θ	
			Λ	
			Ξ	
			Υ	
			Φ	
			Ψ	
			Ω	(size: 4 by 2)

$$\begin{pmatrix} \delta & \beta \\ \Phi & \Gamma \\ \Delta & \Psi \\ \Psi & \Xi \end{pmatrix}$$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	s-matrix		β γ	(size: 2 by 1)

$$\begin{pmatrix} \beta \\ \beta \end{pmatrix}$$

QUESTION 29.8 (7 , 14 , 50)

An object is subjected to an external net force $\mathbf{f} = (50.0, 3.0, -3000.0)N$. Its mass is known as $m = 58.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(2.38, 5.2 \times 10^{-2}, -51.724)ms^{-2}$.
B. The accelaration is $(0.862, -0.17, -51.724)ms^{-2}$.
C. The accelaration is $(0.862, 5.2 \times 10^{-2}, 227.14)ms^{-2}$.
D. The accelaration is $(0.862, 5.2 \times 10^{-2}, -51.724)ms^{-2}$.

Auto-answer:

D. The accelaration is $(0.862, 5.2 \times 10^{-2}, -51.724)ms^{-2}$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (50.0, 3.0, -3000.0)N$ and $m = 58.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(50.0, 3.0, -3000.0)N}{58.0kg} \\ &= (0.862, 5.2 \times 10^{-2}, -51.724)ms^{-2} \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	4	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	vector	3	0.862
		2	5.2×10^{-2}
		5	-51.724

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	vector	-1	20.0	
			101.0	
			10.0	50.0
		-1	2.0	
			10.1	
			1.0	3.0
		-1	-2000.0	
			-10001.0	
			-1000.0	-3000.0
INPUT 2	real	-1	50.0	
			60.1	
			2.0	58.0

QUESTION 29.9 (9 , 16 , 70)

Abstract: Quadratic Equation constructed from the following first two random (input) integers as roots, which of course should not show in the exam papers. **end of abstract.**

Please solve the following equation:

$$11 \times x^2 - 671 \times x + 10208 = 0$$

Answer:

29, 32

End of Answer.

Solution:

Roots to the equation

$$11 \times x^2 - 671 \times x + 10208 = 0$$

are 29 and 32 .

Let us verity 29 first: $11 \times x^2 - 671 \times x + 10208 = 9251 + (-19459) + (10208) = -10208 + (10208) = 0$

Then verity 32: $11 \times x^2 - 671 \times x + 10208 = 11264 + (-21472) + (10208) = -10208 + (10208) = 0$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
3	13	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		11
Calculated 2	string	1 (1 strings):	
Calculated 3	integer		−671
Calculated 4	string	1 (1 strings):	+
Calculated 5	integer		10208
Calculated 6	integer		9251
Calculated 7	integer		−19459
Calculated 8	integer		−10208
Calculated 9	integer		0
Calculated 10	integer		11264

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		−21472
Calculated 12	integer		−10208
Calculated 13	integer		0

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$-11, 30, 4$	29
INPUT 2	integer		$-31, 60, 3$	32
INPUT 3	integer		$-15, 15, 2$	11

Here are still some constants for use:

Constant	Symbol	Value
Mass of proton	m_p	$1.6726231 \times 10^{-27}$ kg
Boltzmann's constant	k	1.381×10^{-23} J/K

Thank you very much for answering these questions!

Please be advised that in this paper there are questions from 29.1 through 29.9. And any one of them may contain more than one sub-question, thus the total number of sub-questions here is around 14, of which 13 should be answered.

PAPER TAIL GENERATED.

***** END OF PAPER, THANKS *****

By: 239 (26 , 34)

THIS IS THE JOURNAL FOR PAPER NUMBER 30

THIS IS AN EXAMPLE OF PERSONALIZED TESTS.

If needed, please use the following constants.

Constant	Symbol	Value
Acceleration due to earth's gravity	g	9.80 m/s^2
Avogadro's number	N_A	6.0221367×10^{23} mol^{-1}
Boltzmann's constant	k	1.380658×10^{-23} J/K
Coulomb's constant	k	8.99×10^{9} N·m^2/C^2
Electron charge magnitiude	e	$1.60217733 \times 10^{-19}$ C
Permeability of free space	μ_0	$1.25663706 \times 10^{-6}$ T·m/A
Permittivity of free space	ϵ_0	$8.854187817 \times 10^{-12}$ C^2/(N·m^2)
Pi	π	3.14159265
Planck's constant	h	$6.6260755 \times 10^{-34}$ J·s
Mass of electron	m_e	$9.1093897 \times 10^{-31}$ kg
Mass of neutron	m_n	$1.6749286 \times 10^{-27}$ kg
Mass of proton	m_p	$1.6726231 \times 10^{-27}$ kg
Speed of light in vacuum	c	299792458. m/s
Universal gravitational constant	G	6.67259×10^{-11} N·m^2/kg^2
Universal gas constant	R	8.314510 J/(mol·K)

Please be advised that in this paper there are questions from 30.1 through 30.9. And any one of them may contain more than one sub-question, thus the total number of sub-questions here is around 14, of which 13 should be answered.

PAPER TITLE GENERATED.

In this paper, big questions will be generated in the following order:
1 (6) , 2 (5) , 3 (3) , 4 (1) , 5 (4) , 6 (2) , 7 (7) , 8 (8) , 9 (9) .

QUESTION 30.1 (6)

Please answer ONLY 5 of the following 6 questions (Questions 30.1.1 through 30.1.6).

Here are still some constants for use in the following questions:

Constant	Symbol	Value
Boltzmann's constant	k	1.381×10^{-23} J/K
Avogadro's number	N_A	6.022×10^{23} mol^{-1}
Mass of electron	m_e	$9.1093897 \times 10^{-31}$ kg

In this big question of CHOOSE structure, 6 questions will be generated: 1 (10 , 25) , 2 (12 , 27) , 3 (6 , 21) , 4 (9 , 24) , 5 (8 , 23) , 6 (7 , 22) .

Question 30.1.1 (6 , 10 , 25)

See the following picture.
Which one of the following is missing in it?

A. An airplane
B. An air-boat
C. Lawn
D. A frisbee
E. A truck
F. Not any of aboves.

Auto-answer:

A. An airplane
E. A truck

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
0	0	6 simple	6	0	yes	no

Calculated values:

All inputs:

Question 30.1.2 (6 , 12 , 27)

In a hotel, the possiblity of smoking customer is $a = 0.730$, and the possiblity of equal-or-above 30 years old customer is $b = 0.7600$. Please fill the following form.

Customer	Possibility
smoking and equal-or-above 30 years old	
smoking and under 30 years old	
non-smoking and equal-or-above 30 years old	
non-smoking and under 30 years old	

Solution:

Since the possiblity of smoking customer is $a = 0.730$, and the possiblity of equal-or-above 30 years old customer is $b = 0.7600$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - 0.730 = 0.270$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - 0.7600 = 0.2400$. Then

Customer	Possibility
smoking and equal-or-above 30 years old	$0.730 \times 0.7600 = 0.555$
smoking and under 30 years old	$0.730 \times 0.2400 = 0.175$
non-smoking and equal-or-above 30 years old	$0.270 \times 0.7600 = 0.205$
non-smoking and under 30 years old	$0.270 \times 0.2400 = 6.48 \times 10^{-2}$

And the total summation of all possibilities is 1.000.

End of Solution.

Answer:

Customer	Possibility
smoking and equal-or-above 30 years old	0.555
smoking and under 30 years old	0.175
non-smoking and equal-or-above 30 years old	0.205
non-smoking and under 30 years old	6.48×10^{-2}

And the total summation of all possibilities is 1.000.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	11	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	3	0.270
Calculated 2	real	4	0.2400
Calculated 3	real	3	0.730
Calculated 4	real	3	0.270
Calculated 5	real	4	0.7600
Calculated 6	real	4	0.2400
Calculated 7	real	3	0.555
Calculated 8	real	3	0.175
Calculated 9	real	3	0.205
Calculated 10	real	3	6.48×10^{-2}
Sequential	Type	Accuracy	Calculated
Calculated 11	real	4	1.000

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	logical	.TRUE. .FALSE.	smoking non-smoking	$<--$
INPUT 2	real	-3	1.0×10^{-2} 1.000 1.0×10^{-2}	 0.730
INPUT 3	logical	.TRUE. .FALSE.	equal-or-above 30 years old under 30 years old	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-4	2.00×10^{-2} 1.0000 2.00×10^{-2}	 0.7600

Question 30.1.3 (6 , 6 , 21)

An object is subjected to an external net force $\mathbf{f} = (80.0, 2.0, -7000.0)N$. Its mass is known as $m = 58.0kg$. Please calculate its accelaration.

Answer:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (80.0, 2.0, -7000.0)N$ and $m = 58.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(80.0, 2.0, -7000.0)N}{58.0kg} \\ &= (1.3793, 3.4483 \times 10^{-2}, -120.69)ms^{-2} \\ &= (17876., 446.90, -1.5641 \times 10^{6})km/h^2. \end{aligned}$$

End of Answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (80.0, 2.0, -7000.0)N$ and $m = 58.0kg$, bring them into the above equation, then we get

$$\begin{aligned}\mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(80.0, 2.0, -7000.0)N}{58.0kg} \\ &= (1.3793, 3.4483 \times 10^{-2}, -120.69)ms^{-2} \\ &= (17876., 446.90, -1.5641 \times 10^{6})km/h^{2}.\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.3793
Calculated 2	real	5	3.4483×10^{-2}
Calculated 3	real	5	-120.69
Calculated 4	real	5	17876.
Calculated 5	real	5	446.90
Calculated 6	real	5	-1.5641×10^{6}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	-1	20.0 101.0 10.0	 80.0
INPUT 2	real	-1	2.0 10.1 1.0	 2.0
INPUT 3	real	-1	-2000.0 -10001.0 -1000.0	 -7000.0

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−1	50.0 60.1 2.0	 58.0

Question 30.1.4 (6 , 9 , 24)

Let us use Newton's Law of Universal Gravitation to calculate the force of the Sun acting on the eight planets. Let us suppose the mass of the Sun is $3.00 \times 10^{24} kg$. With the mass and the distance to the Sun of each planet in the following table, please fill the blanks for the forces.

The Planet	Mass (kg)	Distanace from Sun (m)	The Force (N)
Mercury	$3.00000000 \times 10^{24}$	$7.000000000 \times 10^{24}$	
Venus	3.00×10^{24}	5.00×10^{24}	
Earth	9.00×10^{24}	8.00×10^{24}	
Mars	9.00×10^{24}	3.00×10^{24}	
Jupiter	7.00×10^{24}	5.00×10^{24}	
Saturn	1.000×10^{25}	8.00×10^{24}	
Uranus	6.00×10^{24}	9.00×10^{24}	
Neptune	6.00×10^{24}	7.00×10^{24}	

Solution:

By using Newton's Law of Universal Gravitation:

$$F = G\frac{(Sun's\ \ mass) \times (Planet's\ \ mass)}{(distance)^2},$$

where $G = 6.67 \times 10^{-11} Nm^2(kg)^{-2}$, the forces can be easily calculated as

The Planet	Mass (kg)	Distanace from Sun (m)	The Force (N)
Mercury	$3.00000000 \times 10^{24}$	$7.000000000 \times 10^{24}$	1.23×10^{-11}
Venus	3.00×10^{24}	5.00×10^{24}	2.40×10^{-11}
Earth	9.00×10^{24}	8.00×10^{24}	2.81×10^{-11}
Mars	9.00×10^{24}	3.00×10^{24}	2.00×10^{-10}
Jupiter	7.00×10^{24}	5.00×10^{24}	5.60×10^{-11}
Saturn	1.000×10^{25}	8.00×10^{24}	3.13×10^{-11}
Uranus	6.00×10^{24}	9.00×10^{24}	1.48×10^{-11}
Neptune	6.00×10^{24}	7.00×10^{24}	2.45×10^{-11}

End of Solution.

Answer:

By using Newton's Law of Universal Gravitation:

$$F = G\frac{(Sun's\ \ mass) \times (Planet's\ \ mass)}{(distance)^2},$$

where $G = 6.67 \times 10^{-11} Nm^2(kg)^{-2}$, the forces can be easily calculated as

The Planet	Mass (kg)	Distanace from Sun (m)	The Force (N)
Mercury	$3.00000000 \times 10^{24}$	$7.000000000 \times 10^{24}$	1.23×10^{-11}
Venus	3.00×10^{24}	5.00×10^{24}	2.40×10^{-11}
Earth	9.00×10^{24}	8.00×10^{24}	2.81×10^{-11}
Mars	9.00×10^{24}	3.00×10^{24}	2.00×10^{-10}
Jupiter	7.00×10^{24}	5.00×10^{24}	$5.60 \times 10^{-11}3$
Saturn	1.000×10^{25}	8.00×10^{24}	3.13×10^{-11}
Uranus	6.00×10^{24}	9.00×10^{24}	1.48×10^{-11}
Neptune	6.00×10^{24}	7.00×10^{24}	2.45×10^{-11}

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
19	8	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	3	1.23×10^{-11}
Calculated 2	real	3	2.40×10^{-11}
Calculated 3	real	3	2.81×10^{-11}
Calculated 4	real	3	2.00×10^{-10}
Calculated 5	real	3	5.60×10^{-11}
Calculated 6	real	3	3.13×10^{-11}
Calculated 7	real	3	1.48×10^{-11}
Calculated 8	real	3	2.45×10^{-11}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	3.00×10^{24}
INPUT 2	real	16	$2.00000000 \times 10^{24}$ $1.010000000 \times 10^{25}$ $1.00000000 \times 10^{24}$	$3.00000000 \times 10^{24}$
INPUT 3	real	15	$2.000000000 \times 10^{24}$ $1.0100000000 \times 10^{25}$ $1.000000000 \times 10^{24}$	$7.000000000 \times 10^{24}$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	3.00×10^{24}
INPUT 5	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	5.00×10^{24}
INPUT 6	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	9.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 7	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	8.00×10^{24}
INPUT 8	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	9.00×10^{24}
INPUT 9	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	3.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 10	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	7.00×10^{24}
INPUT 11	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	5.00×10^{24}
INPUT 12	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	1.000×10^{25}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 13	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	8.00×10^{24}
INPUT 14	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	6.00×10^{24}
INPUT 15	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	9.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 16	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	6.00×10^{24}
INPUT 17	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	7.00×10^{24}
INPUT 18	real	-13	6.67×10^{-11} 6.67×10^{-11} 1.00×10^{-11}	6.67×10^{-11}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 19	real	-13	6.67×10^{-11} 6.67×10^{-11} 1.00×10^{-11}	6.67×10^{-11}

Question 30.1.5 (6 , 8 , 23)

An object is subjected to an external net force $\mathbf{f} = (60.0, 6.0, -3000.0)N$.

Its mass is known as $m = 56.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(2.9098ms^{-2}, 0.10714ms^{-2}, 1.9567 \times 10^6 km/h^2)$.
B. The accelaration is $(1.0714ms^{-2}, 0.46937ms^{-2}, -694286.km/h^2)$.
C. The accelaration is $(1.0714ms^{-2}, 0.10714ms^{-2}, -694286.km/h^2)$.
D. The accelaration is $(2.9098ms^{-2}, 0.46937ms^{-2}, 1.9567 \times 10^6 km/h^2)$.
E. none of these.

Auto-answer:

C. The accelaration is $(1.0714ms^{-2}, 0.10714ms^{-2}, -694286.km/h^2)$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (60.0, 6.0, -3000.0)N$ and $m = 56.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(60.0, 6.0, -3000.0)N}{56.0kg} \\
&= (1.0714, 0.10714, -53.571)ms^{-2} \\
&= (13886., 1388.6, -694286.)km/h^2.
\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	5	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.0714
Calculated 2	real	5	0.10714
Calculated 3	real	5	−53.571
Calculated 4	real	5	13886.
Calculated 5	real	5	1388.6
Calculated 6	real	5	−694286.

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	−1	20.0 101.0 10.0	 60.0
INPUT 2	real	−1	2.0 10.1 1.0	 6.0
INPUT 3	real	−1	−2000.0 −10001.0 −1000.0	 −3000.0
Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−1	50.0 60.1 2.0	 56.0

Question 30.1.6 (6 , 7 , 22)

An object is subjected to an external net force $\mathbf{f} = (30.0, 2.0, -6000.0)N$. Its mass is known as $m = 54.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration (vector) is $(7200.0, 480.00, -4.7594 \times 10^6)km/h^2$.
B. The accelaration (vector) is $(7200.0, 480.00, -1.4400 \times 10^6)km/h^2$.
C. The accelaration (vector) is $(27380., 480.00, 3.7975 \times 10^6)km/h^2$.
D. The accelaration (vector) is $(-20827., 480.00, 7.0625 \times 10^6)km/h^2$.
E. The accelaration (vector) is $(27380., 480.00, -4.7594 \times 10^6)km/h^2$.
F. The accelaration (vector) is $(-20827., 480.00, 3.7975 \times 10^6)km/h^2$.
G. The accelaration (vector) is $(27380., 480.00, -1.4400 \times 10^6)km/h^2$.
H. The accelaration (vector) is $(31230., 480.00, -1.4400 \times 10^6)km/h^2$.
I. The accelaration (vector) is $(7200.0, 480.00, 7.0625 \times 10^6)km/h^2$.

J. The accelaration (vector) is $(27380., 480.00, 7.0625 \times 10^6) km/h^2$.
K. The accelaration (vector) is $(31230., 480.00, 3.7975 \times 10^6) km/h^2$.
L. The accelaration (vector) is $(7200.0, 480.00, 3.7975 \times 10^6) km/h^2$.

Auto-answer:

B. The accelaration (vector) is $(7200.0, 480.00, -1.4400 \times 10^6) km/h^2$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (30.0, 2.0, -6000.0)N$ and $m = 54.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(30.0, 2.0, -6000.0)N}{54.0kg} \\ &= (0.55556, 3.7037 \times 10^{-2}, -111.11) ms^{-2} \\ &= (7200.0, 480.00, -1.4400 \times 10^6) km/h^2. \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	12	2	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	0.55556
Calculated 2	real	5	3.7037×10^{-2}
Calculated 3	real	5	-111.11
Calculated 4	real	5	7200.0
Calculated 5	real	5	480.00
Calculated 6	real	5	-1.4400×10^6

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	−1	20.0 101.0 10.0	 30.0
INPUT 2	real	−1	2.0 10.1 1.0	 2.0
INPUT 3	real	−1	−2000.0 −10001.0 −1000.0	 −6000.0
Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−1	50.0 60.1 2.0	 54.0

You have done all the above? A very good beginning, please go ahead. More constants the Mass of electron m_e= 9.109390 × 10^{-31} kg , Universal gas constant R= 8.315 J/(mol·K) , e= 1.60217733 × 10^{-19} C , and m_p= 1.6726231 × 10^{-27} kg may be very helpful.

QUESTION 30.2 (5 , 5 , 5)

If any one of the following statements is correct, please fill the box ahead of it with T . If wrong, fill with F.

Your answer	

1. 28 is an even number.

Your answer	

2. Montreal is in Ontario province.

Your answer	

3. $\mathbf{F} = m\mathbf{a}$ is a mathmatical form of the Newton's Second Law.

Answer:

The correct answer	T

1. 28 is an even number.

The correct answer	F

2. Montreal is in Ontario province.

The correct answer	T

3. $\mathbf{F} = m\mathbf{a}$ is a mathmatical form of the Newton's Second Law.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
6	3	0	0	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	string	1 (1 strings):	T
Calculated 2	string	1 (1 strings):	F
Calculated 3	string	1 (1 strings):	T

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 100, 1$	28
INPUT 2	string		even odd	$<--$
INPUT 3	string		Toronto Kingston Montreal Hull	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	string		Ontario Quebec	$<--$
INPUT 5	string		$\mathbf{F} = m\mathbf{a}$ $\lvert\mathbf{F}\rvert = Gm_1m_2r^{-2}$	$<--$
INPUT 6	string		the Newton's Second Law Newton's Law of Universal Gravitation	$<--$

QUESTION 30.3 (3 , 3 , 3)

Please choose the correct one from the following statements:

A. Canada has 33 provinces and 38 territories.

B. Canada has 35 provinces and 34 territories.
C. Canada has 37 provinces and 37 territories.
D. Canada has 36 provinces and 35 territories.
E. Canada has 34 provinces and 39 territories.
F. None of above.

Auto-answer:

F. None of above.

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
0	20	6 simple	6	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		10
Calculated 2	integer		3
Calculated 3	integer		23
Calculated 4	integer		24
Calculated 5	integer		25
Calculated 6	integer		26
Calculated 7	integer		27
Calculated 8	integer		28
Calculated 9	integer		29
Calculated 10	integer		30
Sequential	Type	Accuracy	Calculated
Calculated 11	integer		31
Calculated 12	integer		32
Calculated 13	integer		33
Calculated 14	integer		34
Calculated 15	integer		35
Calculated 16	integer		36
Calculated 17	integer		37
Calculated 18	integer		38
Calculated 19	integer		39
Calculated 20	integer		40

All inputs:

QUESTION 30.4 (1 , 1 , 1)

Abstract: This is a simple Newton's Second Law calculation multi-choice problem. **end of abstract.**

An object is subjected to an external net force $\mathbf{f} = (20.0, 4.0, -6000.0)N$. Its mass is known as $m = 52.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(0.385, 7.7 \times 10^{-2}, 526.04)ms^{-2}$.
B. The accelaration is $(0.385, 7.7 \times 10^{-2}, -115.38)ms^{-2}$.
C. The accelaration is $(0.385, 0.23, -115.38)ms^{-2}$.
D. The accelaration is $(4.34, 7.7 \times 10^{-2}, -115.38)ms^{-2}$.
E. The accelaration is $(4.34, 0.23, 526.04)ms^{-2}$.
F. The accelaration is $(0.385, 0.23, 526.04)ms^{-2}$.
G. The accelaration is $(4.34, 7.7 \times 10^{-2}, 526.04)ms^{-2}$.
H. The accelaration is $(4.34, 0.23, -115.38)ms^{-2}$.

Auto-answer:

B. The accelaration is $(0.385, 7.7 \times 10^{-2}, -115.38)ms^{-2}$.

End of auto-answer.

Answer:

The correct answer from the choices is
B. The accelaration is $(0.385, 7.7 \times 10^{-2}, -115.38)ms^{-2}$.

End of Answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (20.0, 4.0, -6000.0)N$ and $m = 52.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(20.0, 4.0, -6000.0)N}{52.0000kg} \\ &= (0.385, 7.7 \times 10^{-2}, -115.38)ms^{-2} \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	8	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	vector	3	0.385
		2	7.7×10^{-2}
		5	−115.38

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	vector	−1	20.0	
			101.0	
			10.0	20.0
		−1	2.0	
			10.1	
			1.0	4.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−6000.0
INPUT 2	real	−4	50.0000	
			60.1000	
			2.0000	52.0000

QUESTION 30.5 (4 , 4 , 4)

Considering case-insensitivity, please match the following same strings.

Column Left	Column Right	Your choinces
A. A	b	
B. A= 6/ 2	ER	
C. Er	eR	
D. B	a= 3	
E. er	a	

Auto-answer:

Column Left	Column Right	Answers
A. A	b	**D.**
B. A= 6/ 2	ER	**C.** , **E.**
C. Er	eR	**C.** , **E.**
D. B	a= 3	**B.**
E. er	a	**A.**

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	0	16	5	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		3

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		2, 8, 2	6
INPUT 2	integer		2, 3, 2	2

QUESTION 30.6 (2 , 2 , 2)

An object is subjected to an external net force $\mathbf{f} = (20.000, 3.0000, -2000.0)N$. Its mass is known as $m = 60.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(0.33333ms^{-2}, 648.00km/h^2, 116.36ms^{-2})$.
B. The accelaration is $(0.33333ms^{-2}, 648.00km/h^2, -33.333ms^{-2})$.
C. The accelaration is $(0.33333ms^{-2}, 1945.9km/h^2, -33.333ms^{-2})$.
D. The accelaration is $(-0.96447ms^{-2}, 1945.9km/h^2, -33.333ms^{-2})$.
E. The accelaration is $(-0.96447ms^{-2}, 648.00km/h^2, -33.333ms^{-2})$.
F. The accelaration is $(0.33333ms^{-2}, 1945.9km/h^2, 116.36ms^{-2})$.
G. None of these.

Auto-answer:

B. The accelaration is $(0.33333ms^{-2}, 648.00km/h^2, -33.333ms^{-2})$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (20.000, 3.0000, -2000.0)N$ and $m = 60.0000kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(20.000, 3.0000, -2000.0)N}{60.0000kg} \\
&= (0.33333, 5.0000 \times 10^{-2}, -33.333)ms^{-2} \\
&= (4320.0, 648.00, -432000.)km/h^2.
\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	7	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	0.33333
Calculated 2	real	5	5.0000×10^{-2}
Calculated 3	real	5	-33.333
Calculated 4	real	5	4320.0
Calculated 5	real	5	648.00
Calculated 6	real	5	$-432000.$

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	−3	20.000 101.000 10.000	 20.000
INPUT 2	real	−4	2.0000 10.1000 1.0000	 3.0000
INPUT 3	real	−1	−2000.0 −10001.0 −1000.0	 −2000.0

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−4	50.0000 60.1000 2.0000	 60.0000

You have done all the above? Excellent! Not much left, please continue.

QUESTION 30.7 (7 , 14 , 50)

An object is subjected to an external net force $\mathbf{f} = (60.0, 3.0, -6000.0)N$. Its mass is known as $m = 54.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.11, 5.6 \times 10^{-2}, -111.11)ms^{-2}$.
B. The accelaration is $(3.83, 5.6 \times 10^{-2}, -111.11)ms^{-2}$.
C. The accelaration is $(1.11, 5.6 \times 10^{-2}, 356.81)ms^{-2}$.
D. The accelaration is $(3.83, 0.19, 356.81)ms^{-2}$.

Auto-answer:

A. The accelaration is $(1.11, 5.6 \times 10^{-2}, -111.11)ms^{-2}$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (60.0, 3.0, -6000.0)N$ and $m = 54.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(60.0, 3.0, -6000.0)N}{54.0kg} \\ &= (1.11, 5.6 \times 10^{-2}, -111.11)ms^{-2} \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	4	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	vector	3	1.11
		2	5.6×10^{-2}
		5	-111.11

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	vector	-1	20.0	
			101.0	
			10.0	60.0
		-1	2.0	
			10.1	
			1.0	3.0
		-1	-2000.0	
			-10001.0	
			-1000.0	-6000.0
INPUT 2	real	-1	50.0	
			60.1	
			2.0	54.0

QUESTION 30.8 (8 , 15 , 60)

$$\begin{pmatrix} 4 & 6 & 7 & 5 \\ 5 & 4 & 5 & 6 \\ 5 & 4 & 5 & 6 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} =?$$

$$\begin{pmatrix} \Lambda & \Psi \\ \sigma & \Upsilon \\ \beta & \beta \\ \Phi & \Theta \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} =?$$

Answer:

$$\begin{pmatrix} 4 & 6 & 7 & 5 \\ 5 & 4 & 5 & 6 \\ 5 & 4 & 5 & 6 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} = \begin{pmatrix} 44 \\ 40 \\ 40 \end{pmatrix}$$

$$\begin{pmatrix} \Lambda & \Psi \\ \sigma & \Upsilon \\ \beta & \beta \\ \Phi & \Theta \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} = \begin{pmatrix} \Lambda \times \beta + \Psi \times \beta \\ \sigma \times \beta + \Upsilon \times \beta \\ \beta \times \beta + \beta \times \beta \\ \Phi \times \beta + \Theta \times \beta \end{pmatrix}$$

End of Answer.

Solution:

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	2	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	i-matrix		(size: 3 by 1)

44
40
40

Sequential	Type	Accuracy	Calculated
Calculated 2	s-matrix		(size: 4 by 1)

$$\begin{pmatrix} \Lambda \times \beta + \Psi \times \beta \\ \sigma \times \beta + \Upsilon \times \beta \\ \beta \times \beta + \beta \times \beta \\ \Phi \times \beta + \Theta \times \beta \end{pmatrix}$$

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	i-matrix		$4, 7, 1$	(size: 3 by 4)

$$\begin{matrix} 4 & 6 & 7 & 5 \\ 5 & 4 & 5 & 6 \\ 5 & 4 & 5 & 6 \end{matrix}$$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 2	i-matrix		$2, 2, 1$	(size: 4 by 1)

$$\begin{matrix} 2 \\ 2 \\ 2 \\ 2 \end{matrix}$$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 3	s-matrix		α	
			β	
			γ	
			δ	
			ϵ	
			ε	
			ζ	
			η	
			ρ	
			σ	
			Γ	
			Δ	
			Θ	
			Λ	
			Ξ	
			Υ	
			Φ	
			Ψ	
			Ω	(size: 4 by 2)

$$\begin{pmatrix} \Lambda & \Psi \\ \sigma & \Upsilon \\ \beta & \beta \\ \Phi & \Theta \end{pmatrix}$$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	s-matrix		β γ	 (size: 2 by 1)

$$\begin{pmatrix} \beta \\ \beta \end{pmatrix}$$

QUESTION 30.9 (9 , 16 , 70)

Abstract: Quadratic Equation constructed from the following first two random (input) integers as roots, which of course should not show in the exam papers. **end of abstract.**

Please solve the following equation:

$$-9 \times x^2 + 63 \times x + 1530 = 0$$

Answer:

17, -10

End of Answer.

Solution:

Roots to the equation

$$-9 \times x^2 + 63 \times x + 1530 = 0$$

are 17 and -10 .

Let us verity 17 first: $-9 \times x^2 + 63 \times x + 1530 = -2601 + (1071) + (1530) = -1530 + (1530) = 0$

Then verity -10: $-9 \times x^2 + 63 \times x + 1530 = -900 + (-630) + (1530) = -1530 + (1530) = 0$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
3	13	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		-9
Calculated 2	string	1 (1 strings):	+
Calculated 3	integer		63
Calculated 4	string	1 (1 strings):	+
Calculated 5	integer		1530
Calculated 6	integer		-2601
Calculated 7	integer		1071
Calculated 8	integer		-1530
Calculated 9	integer		0
Calculated 10	integer		-900

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		-630
Calculated 12	integer		-1530
Calculated 13	integer		0

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$-11, 30, 4$	17
INPUT 2	integer		$-31, 60, 3$	-10
INPUT 3	integer		$-15, 15, 2$	-9

Here are still some constants for use:

Constant	Symbol	Value
Mass of proton	m_p	$1.6726231 \times 10^{-27}$ kg
Boltzmann's constant	k	1.381×10^{-23} J/K

Thank you very much for answering these questions!

Please be advised that in this paper there are questions from 30.1 through 30.9. And any one of them may contain more than one sub-question, thus the total number of sub-questions here is around 14, of which 13 should be answered.

PAPER TAIL GENERATED.

***** END OF PAPER, THANKS *****

By: 239 (26 , 34)

THIS IS THE JOURNAL FOR PAPER NUMBER 31

THIS IS AN EXAMPLE OF PERSONALIZED TESTS.

If needed, please use the following constants.

Constant	Symbol	Value
Acceleration due to earth's gravity	g	9.80 m/s^2
Avogadro's number	N_A	6.0221367×10^{23} mol^{-1}
Boltzmann's constant	k	1.380658×10^{-23} J/K
Coulomb's constant	k	8.99×10^{9} N·m^2/C^2
Electron charge magnitiude	e	$1.60217733 \times 10^{-19}$ C
Permeability of free space	μ_0	$1.25663706 \times 10^{-6}$ T·m/A
Permittivity of free space	ϵ_0	$8.854187817 \times 10^{-12}$ C^2/(N·m^2)
Pi	π	3.14159265
Planck's constant	h	$6.6260755 \times 10^{-34}$ J·s
Mass of electron	m_e	$9.1093897 \times 10^{-31}$ kg
Mass of neutron	m_n	$1.6749286 \times 10^{-27}$ kg
Mass of proton	m_p	$1.6726231 \times 10^{-27}$ kg
Speed of light in vacuum	c	299792458. m/s
Universal gravitational constant	G	6.67259×10^{-11} N·m^2/kg^2
Universal gas constant	R	8.314510 J/(mol·K)

Please be advised that in this paper there are questions from 31.1 through 31.9. And any one of them may contain more than one sub-question, thus the total number of sub-questions here is around 14, of which 13 should be answered.

PAPER TITLE GENERATED.

In this paper, big questions will be generated in the following order:
1 (6) , 2 (3) , 3 (2) , 4 (4) , 5 (5) , 6 (1) , 7 (8) , 8 (7) , 9 (9) .

QUESTION 31.1 (6)

Please answer ONLY 5 of the following 6 questions (Questions 31.1.1 through 31.1.6).

Here are still some constants for use in the following questions:

Constant	Symbol	Value
Boltzmann's constant	k	1.381×10^{-23} J/K
Avogadro's number	N_A	6.022×10^{23} mol^{-1}
Mass of electron	m_e	$9.1093897 \times 10^{-31}$ kg

In this big question of CHOOSE structure, 6 questions will be generated: 1 (11 , 26) , 2 (7 , 22) , 3 (12 , 27) , 4 (8 , 23) , 5 (10 , 25) , 6 (6 , 21) .

Question 31.1.1 (6 , 11 , 26)

In a hotel, the possiblity of smoking customer is $a = 0.240$, and the possiblity of equal or above 30 years old customer is $b = 2.00 \times 10^{-2}$. Please calculate the possiblity of non-smoking and under 30 years old customer.

Solution:

Since the possiblity of smoking customer is $a = 0.240$, and the possiblity of equal or above 30 years old customer is $b = 2.00 \times 10^{-2}$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - 0.240 = 0.760$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - 2.00 \times 10^{-2} = 0.9800$. So the possibility of non-smoking and under 30 years old customer is $c \times d = 0.745$.

End of Solution.

Answer:

The possibility of non-smoking and under 30 years old customer is $(1 - a)(1 - b) = 0.745$.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	3	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	3	0.760
Calculated 2	real	4	0.9800
Calculated 3	real	3	0.745

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	logical	.TRUE. .FALSE.	smoking non-smoking	$<--$
INPUT 2	real	-3	1.0×10^{-2} 1.000 1.0×10^{-2}	 0.240
INPUT 3	logical	.TRUE. .FALSE.	equal or above 30 years old under 30 years old	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-4	2.00×10^{-2} 1.0000 2.00×10^{-2}	 2.00×10^{-2}

Question 31.1.2 (6 , 7 , 22)

An object is subjected to an external net force $\mathbf{f} = (20.0, 2.0, -4000.0)N$. Its mass is known as $m = 54.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration (vector) is $(-15958., 480.00, -960000.)km/h^2$.
B. The accelaration (vector) is $(18692., 480.00, -960000.)km/h^2$.
C. The accelaration (vector) is $(18692., 480.00, 2.0503 \times 10^6)km/h^2$.
D. The accelaration (vector) is $(-15958., 480.00, 3.2965 \times 10^6)km/h^2$.
E. The accelaration (vector) is $(18692., 480.00, -3.9936 \times 10^6)km/h^2$.
F. The accelaration (vector) is $(-15958., 480.00, -3.9936 \times 10^6)km/h^2$.
G. The accelaration (vector) is $(-15958., 480.00, 2.0503 \times 10^6)km/h^2$.
H. The accelaration (vector) is $(18692., 480.00, 3.2965 \times 10^6)km/h^2$.
I. The accelaration (vector) is $(-16677., 480.00, 2.0503 \times 10^6)km/h^2$.
J. The accelaration (vector) is $(4800.0, 480.00, -960000.)km/h^2$.
K. The accelaration (vector) is $(4800.0, 480.00, 3.2965 \times 10^6)km/h^2$.
L. The accelaration (vector) is $(-16677., 480.00, -960000.)km/h^2$.

Auto-answer:

J. The accelaration (vector) is $(4800.0, 480.00, -960000.)km/h^2$.

End of auto-answer.
Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (20.0, 2.0, -4000.0)N$ and $m = 54.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(20.0, 2.0, -4000.0)N}{54.0kg} \\ &= (0.37037, 3.7037 \times 10^{-2}, -74.074)ms^{-2} \\ &= (4800.0, 480.00, -960000.)km/h^2. \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	12	2	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	0.37037
Calculated 2	real	5	3.7037×10^{-2}
Calculated 3	real	5	-74.074
Calculated 4	real	5	4800.0
Calculated 5	real	5	480.00
Calculated 6	real	5	$-960000.$

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	-1	20.0 101.0 10.0	 20.0
INPUT 2	real	-1	2.0 10.1 1.0	 2.0
INPUT 3	real	-1	-2000.0 -10001.0 -1000.0	 -4000.0

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-1	50.0 60.1 2.0	 54.0

Question 31.1.3 (6 , 12 , 27)

In a hotel, the possiblity of non-smoking customer is $a = 0.910$, and the possiblity of equal-or-above 30 years old customer is $b = 0.5000$. Please fill the following form.

Customer	Possibility
smoking and equal-or-above 30 years old	
smoking and under 30 years old	
non-smoking and equal-or-above 30 years old	
non-smoking and under 30 years old	

Solution:

Since the possiblity of non-smoking customer is $a = 0.910$, and the possiblity of equal-or-above 30 years old customer is $b = 0.5000$, the possiblity of smoking customer is $c = 1.0 - a = 1.0 - 0.910 = 9.00 \times 10^{-2}$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - 0.5000 = 0.5000$. Then

Customer	Possibility
smoking and equal-or-above 30 years old	$9.00 \times 10^{-2} \times 0.5000 = 4.50 \times 10^{-2}$
smoking and under 30 years old	$9.00 \times 10^{-2} \times 0.5000 = 4.50 \times 10^{-2}$
non-smoking and equal-or-above 30 years old	$0.910 \times 0.5000 = 0.455$
non-smoking and under 30 years old	$0.910 \times 0.5000 = 0.455$

And the total summation of all possibilities is 1.000.

End of Solution.

Answer:

Customer	Possibility
smoking and equal-or-above 30 years old	4.50×10^{-2}
smoking and under 30 years old	4.50×10^{-2}
non-smoking and equal-or-above 30 years old	0.455
non-smoking and under 30 years old	0.455

And the total summation of all possibilities is 1.000.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	11	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	3	9.00×10^{-2}
Calculated 2	real	4	0.5000
Calculated 3	real	3	9.00×10^{-2}
Calculated 4	real	3	0.910
Calculated 5	real	4	0.5000
Calculated 6	real	4	0.5000
Calculated 7	real	3	4.50×10^{-2}
Calculated 8	real	3	4.50×10^{-2}
Calculated 9	real	3	0.455
Calculated 10	real	3	0.455
Sequential	Type	Accuracy	Calculated
Calculated 11	real	4	1.000

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	logical	.TRUE. .FALSE.	smoking non-smoking	 $<--$
INPUT 2	real	-3	1.0×10^{-2} 1.000 1.0×10^{-2}	 0.910
INPUT 3	logical	.TRUE. .FALSE.	equal-or-above 30 years old under 30 years old	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-4	2.00×10^{-2} 1.0000 2.00×10^{-2}	 0.5000

Question 31.1.4 (6 , 8 , 23)

An object is subjected to an external net force $\mathbf{f} = (30.0, 2.0, -2000.0)N$. Its mass is known as $m = 52.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(2.4439ms^{-2}, -0.18750ms^{-2}, -1.6744 \times 10^6 km/h^2)$.
B. The accelaration is $(2.4439ms^{-2}, 3.8462 \times 10^{-2}ms^{-2}, -1.6744 \times 10^6 km/h^2)$.
C. The accelaration is $(0.57692ms^{-2}, -0.18750ms^{-2}, -1.6744 \times 10^6 km/h^2)$.
D. The accelaration is $(0.57692ms^{-2}, -0.18750ms^{-2}, -498462.km/h^2)$.
E. none of these.

Auto-answer:

E. none of these.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (30.0, 2.0, -2000.0)N$ and $m = 52.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(30.0, 2.0, -2000.0)N}{52.0kg} \\ &= (0.57692, 3.8462 \times 10^{-2}, -38.462)ms^{-2} \\ &= (7476.9, 498.46, -498462.)km/h^2. \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	5	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	0.57692
Calculated 2	real	5	3.8462×10^{-2}
Calculated 3	real	5	-38.462
Calculated 4	real	5	7476.9
Calculated 5	real	5	498.46
Calculated 6	real	5	$-498462.$

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	-1	20.0 101.0 10.0	30.0
INPUT 2	real	-1	2.0 10.1 1.0	2.0
INPUT 3	real	-1	-2000.0 -10001.0 -1000.0	-2000.0
Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-1	50.0 60.1 2.0	52.0

Question 31.1.5 (6 , 10 , 25)

See the following picture.
Which one of the following is missing in it?

A. An airplane
B. An air-boat
C. Lawn
D. A table
E. A frisbee
F. Not any of aboves.

Auto-answer:

A. An airplane

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
0	0	6 simple	6	0	yes	no

Calculated values:

All inputs:

Question 31.1.6 (6 , 6 , 21)

An object is subjected to an external net force $\mathbf{f} = (60.0, 5.0, -6000.0)N$. Its mass is known as $m = 56.0kg$. Please calculate its accelaration.

Answer:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (60.0, 5.0, -6000.0)N$ and $m = 56.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(60.0, 5.0, -6000.0)N}{56.0kg} \\
&= (1.0714, 8.9286 \times 10^{-2}, -107.14)ms^{-2} \\
&= (13886., 1157.1, -1.3886 \times 10^{6})km/h^2.
\end{aligned}$$

End of Answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (60.0, 5.0, -6000.0)N$ and $m = 56.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(60.0, 5.0, -6000.0)N}{56.0kg} \\
&= (1.0714, 8.9286 \times 10^{-2}, -107.14)ms^{-2} \\
&= (13886., 1157.1, -1.3886 \times 10^{6})km/h^2.
\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.0714
Calculated 2	real	5	8.9286×10^{-2}
Calculated 3	real	5	-107.14
Calculated 4	real	5	13886.
Calculated 5	real	5	1157.1
Calculated 6	real	5	-1.3886×10^{6}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	-1	20.0 101.0 10.0	 60.0
INPUT 2	real	-1	2.0 10.1 1.0	 5.0
INPUT 3	real	-1	-2000.0 -10001.0 -1000.0	 -6000.0
Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-1	50.0 60.1 2.0	 56.0

You have done all the above? A very good beginning, please go ahead. More constants the Mass of electron m_e= 9.109390 $\times 10^{-31}$ kg , Universal gas constant R= 8.315 J/(mol·K) , e= 1.60217733 $\times 10^{-19}$ C , and m_p= 1.6726231 $\times 10^{-27}$ kg may be very helpful.

QUESTION 31.2 (3 , 3 , 3)

Please choose the correct one from the following statements:

A. Canada has 35 provinces and 34 territories.
B. Canada has 37 provinces and 37 territories.
C. Canada has 34 provinces and 39 territories.

D. Canada has 33 provinces and 38 territories.
E. Canada has 36 provinces and 35 territories.
F. None of above.

Auto-answer:

F. None of above.

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
0	20	6 simple	6	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		10
Calculated 2	integer		3
Calculated 3	integer		23
Calculated 4	integer		24
Calculated 5	integer		25
Calculated 6	integer		26
Calculated 7	integer		27
Calculated 8	integer		28
Calculated 9	integer		29
Calculated 10	integer		30

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		31
Calculated 12	integer		32
Calculated 13	integer		33
Calculated 14	integer		34
Calculated 15	integer		35
Calculated 16	integer		36
Calculated 17	integer		37
Calculated 18	integer		38
Calculated 19	integer		39
Calculated 20	integer		40

All inputs:

QUESTION 31.3 (2 , 2 , 2)

An object is subjected to an external net force $\mathbf{f} = (80.000, 9.0000, -5000.0)N$. Its mass is known as $m = 52.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(5.1859ms^{-2}, 2243.1km/h^2, -96.154ms^{-2})$.
B. The accelaration is $(5.1859ms^{-2}, 4767.8km/h^2, 441.36ms^{-2})$.
C. The accelaration is $(1.5385ms^{-2}, 2243.1km/h^2, -96.154ms^{-2})$.
D. The accelaration is $(5.1859ms^{-2}, 2243.1km/h^2, 441.36ms^{-2})$.
E. The accelaration is $(1.5385ms^{-2}, 4767.8km/h^2, -96.154ms^{-2})$.
F. The accelaration is $(1.5385ms^{-2}, 2243.1km/h^2, 441.36ms^{-2})$.
G. None of these.

Auto-answer:

C. The accelaration is $(1.5385ms^{-2}, 2243.1km/h^2, -96.154ms^{-2})$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (80.000, 9.0000, -5000.0)N$ and $m = 52.0000kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(80.000, 9.0000, -5000.0)N}{52.0000kg} \\
&= (1.5385, 0.17308, -96.154)ms^{-2} \\
&= (19938., 2243.1, -1.2462 \times 10^6)km/h^2.
\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	7	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.5385
Calculated 2	real	5	0.17308
Calculated 3	real	5	−96.154
Calculated 4	real	5	19938.
Calculated 5	real	5	2243.1
Calculated 6	real	5	-1.2462×10^6

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	−3	20.000 101.000 10.000	 80.000
INPUT 2	real	−4	2.0000 10.1000 1.0000	 9.0000
INPUT 3	real	−1	−2000.0 −10001.0 −1000.0	 −5000.0
Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−4	50.0000 60.1000 2.0000	 52.0000

QUESTION 31.4 (4 , 4 , 4)

Considering case-insensitivity, please match the following same strings.

Column Left	Column Right	Your choinces
A. B	YJH	
B. asdf(:)	a= 4	
C. A= 8/ 2	c	
D. C	b	
E. yjh	ASDF(:)	

Auto-answer:

Column Left	Column Right	Answers
A. B	YJH	**E.**
B. asdf(:)	a= 4	**C.**
C. A= 8/ 2	c	**D.**
D. C	b	**A.**
E. yjh	ASDF(:)	**B.**

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	0	16	5	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		4

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		2, 8, 2	8
INPUT 2	integer		2, 3, 2	2

QUESTION 31.5 (5 , 5 , 5)

If any one of the following statements is correct, please fill the box ahead of it with T . If wrong, fill with F.

Your answer	

1. 50 is an even number.

Your answer	

2. Montreal is in Ontario province.

Your answer	

3. $\mathbf{F} = m\mathbf{a}$ is a mathmatical form of the Newton's Second Law.

Answer:

The correct answer	T

1. 50 is an even number.

The correct answer	F

2. Montreal is in Ontario province.

The correct answer	T

3. $\mathbf{F} = m\mathbf{a}$ is a mathmatical form of the Newton's Second

Law.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
6	3	0	0	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	string	1 (1 strings):	T
Calculated 2	string	1 (1 strings):	F
Calculated 3	string	1 (1 strings):	T

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 100, 1$	50
INPUT 2	string		even odd	$<--$
INPUT 3	string		Toronto Kingston Montreal Hull	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	string		Ontario Quebec	$<--$
INPUT 5	string		$\mathbf{F} = m\mathbf{a}$ $\|\mathbf{F}\| = Gm_1m_2r^{-2}$	$<--$
INPUT 6	string		the Newton's Second Law Newton's Law of Universal Gravitation	$<--$

QUESTION 31.6 (1 , 1 , 1)

Abstract: This is a simple Newton's Second Law calculation multi-choice problem. **end of abstract.**

An object is subjected to an external net force $\mathbf{f} = (40.0, 3.0, -6000.0)N$. Its mass is known as $m = 52.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(-1.89, 0.26, -115.38)ms^{-2}$.
B. The accelaration is $(0.769, 5.8 \times 10^{-2}, -115.38)ms^{-2}$.
C. The accelaration is $(-1.89, 5.8 \times 10^{-2}, -115.38)ms^{-2}$.
D. The accelaration is $(-1.89, 0.26, -412.14)ms^{-2}$.
E. The accelaration is $(0.769, 0.26, -115.38)ms^{-2}$.
F. The accelaration is $(0.769, 0.26, -412.14)ms^{-2}$.
G. The accelaration is $(0.769, 5.8 \times 10^{-2}, -412.14)ms^{-2}$.
H. The accelaration is $(-1.89, 5.8 \times 10^{-2}, -412.14)ms^{-2}$.

Auto-answer:

B. The accelaration is $(0.769, 5.8 \times 10^{-2}, -115.38)ms^{-2}$.

End of auto-answer.

Answer:

The correct answer from the choices is
B. The accelaration is $(0.769, 5.8 \times 10^{-2}, -115.38)ms^{-2}$.

End of Answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (40.0, 3.0, -6000.0)N$ and $m = 52.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(40.0, 3.0, -6000.0)N}{52.0000kg} \\ &= (0.769, 5.8 \times 10^{-2}, -115.38)ms^{-2} \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	8	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	vector	3	0.769
		2	5.8×10^{-2}
		5	-115.38

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	vector	-1	20.0	
			101.0	
			10.0	40.0
		-1	2.0	
			10.1	
			1.0	3.0
		-1	-2000.0	
			-10001.0	
			-1000.0	-6000.0
INPUT 2	real	-4	50.0000	
			60.1000	
			2.0000	52.0000

You have done all the above? Excellent! Not much left, please continue.

QUESTION 31.7 (8 , 15 , 60)

$$\begin{pmatrix} 5 & 6 & 6 & 6 \\ 6 & 4 & 4 & 4 \\ 5 & 6 & 5 & 5 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} =?$$

$$\begin{pmatrix} \Theta & \delta \\ \Xi & \varepsilon \\ \delta & \beta \\ \Phi & \Xi \end{pmatrix} \begin{pmatrix} \gamma \\ \beta \end{pmatrix} =?$$

Answer:

$$\begin{pmatrix} 5 & 6 & 6 & 6 \\ 6 & 4 & 4 & 4 \\ 5 & 6 & 5 & 5 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} = \begin{pmatrix} 46 \\ 36 \\ 42 \end{pmatrix}$$

$$\begin{pmatrix} \Theta & \delta \\ \Xi & \varepsilon \\ \delta & \beta \\ \Phi & \Xi \end{pmatrix} \begin{pmatrix} \gamma \\ \beta \end{pmatrix} = \begin{pmatrix} \Theta \times \gamma + \delta \times \beta \\ \Xi \times \gamma + \varepsilon \times \beta \\ \delta \times \gamma + \beta \times \beta \\ \Phi \times \gamma + \Xi \times \beta \end{pmatrix}$$

End of Answer.

Solution:

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	2	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	i-matrix		(size: 3 by 1)

46
36
42

Sequential	Type	Accuracy	Calculated
Calculated 2	s-matrix		(size: 4 by 1)

$$\begin{pmatrix} \Theta \times \gamma + \delta \times \beta \\ \Xi \times \gamma + \varepsilon \times \beta \\ \delta \times \gamma + \beta \times \beta \\ \Phi \times \gamma + \Xi \times \beta \end{pmatrix}$$

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	i-matrix		$4, 7, 1$	(size: 3 by 4)

5 6 6 6
6 4 4 4
5 6 5 5

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 2	i-matrix		$2, 2, 1$	(size: 4 by 1)

2
2
2
2

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 3	s-matrix		α β γ δ ϵ ε ζ η ρ σ Γ Δ Θ Λ Ξ Υ Φ Ψ Ω	(size: 4 by 2)

$$\begin{pmatrix} \Theta & \delta \\ \Xi & \varepsilon \\ \delta & \beta \\ \Phi & \Xi \end{pmatrix}$$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	s-matrix		β γ	(size: 2 by 1)

$$\begin{pmatrix} \gamma \\ \beta \end{pmatrix}$$

QUESTION 31.8 (7 , 14 , 50)

An object is subjected to an external net force $\mathbf{f} = (90.0, 5.0, -3000.0)N$. Its mass is known as $m = 52.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.73, 9.6 \times 10^{-2}, 254.30)ms^{-2}$.
B. The accelaration is $(-5.03, 9.6 \times 10^{-2}, 254.30)ms^{-2}$.
C. The accelaration is $(1.73, 9.6 \times 10^{-2}, -57.692)ms^{-2}$.
D. The accelaration is $(1.73, 0.33, 254.30)ms^{-2}$.

Auto-answer:

C. The accelaration is $(1.73, 9.6 \times 10^{-2}, -57.692)ms^{-2}$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (90.0, 5.0, -3000.0)N$ and $m = 52.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(90.0, 5.0, -3000.0)N}{52.0kg} \\ &= (1.73, 9.6 \times 10^{-2}, -57.692)ms^{-2} \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	4	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	vector	3	1.73
		2	9.6×10^{-2}
		5	-57.692

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	vector	−1	20.0	
			101.0	
			10.0	90.0
		−1	2.0	
			10.1	
			1.0	5.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−3000.0
INPUT 2	real	−1	50.0	
			60.1	
			2.0	52.0

QUESTION 31.9 (9 , 16 , 70)

Abstract: Quadratic Equation constructed from the following first two random (input) integers as roots, which of course should not show in the exam papers. **end of abstract.**

Please solve the following equation:

$$3 \times x^2 - 162 \times x + 1599 = 0$$

Answer:

13, 41

End of Answer.

Solution:

Roots to the equation

$$3 \times x^2 - 162 \times x + 1599 = 0$$

are 13 and 41 .

Let us verity 13 first: $3 \times x^2 - 162 \times x + 1599 = 507 + (-2106) + (1599) = -1599 + (1599) = 0$

Then verity 41: $3 \times x^2 - 162 \times x + 1599 = 5043 + (-6642) + (1599) = -1599 + (1599) = 0$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
3	13	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		3
Calculated 2	string	1 (1 strings):	
Calculated 3	integer		-162
Calculated 4	string	1 (1 strings):	+
Calculated 5	integer		1599
Calculated 6	integer		507
Calculated 7	integer		-2106
Calculated 8	integer		-1599
Calculated 9	integer		0
Calculated 10	integer		5043

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		-6642
Calculated 12	integer		-1599
Calculated 13	integer		0

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$-11, 30, 4$	13
INPUT 2	integer		$-31, 60, 3$	41
INPUT 3	integer		$-15, 15, 2$	3

Here are still some constants for use:

Constant	Symbol	Value
Mass of proton	m_p	$1.6726231 \times 10^{-27}$ kg
Boltzmann's constant	k	1.381×10^{-23} J/K

Thank you very much for answering these questions!

Please be advised that in this paper there are questions from 31.1 through 31.9. And any one of them may contain more than one sub-question, thus the total number of sub-questions here is around 14, of which 13 should be answered.

PAPER TAIL GENERATED.

***** END OF PAPER, THANKS *****

By: 239 (26 , 34)

THIS IS THE JOURNAL FOR PAPER NUMBER 32

THIS IS AN EXAMPLE OF PERSONALIZED TESTS.

If needed, please use the following constants.

Constant	Symbol	Value
Acceleration due to earth's gravity	g	9.80 m/s^2
Avogadro's number	N_A	6.0221367×10^{23} mol^{-1}
Boltzmann's constant	k	1.380658×10^{-23} J/K
Coulomb's constant	k	8.99×10^{9} N·m^2/C^2
Electron charge magnitiude	e	$1.60217733 \times 10^{-19}$ C
Permeability of free space	μ_0	$1.25663706 \times 10^{-6}$ T·m/A
Permittivity of free space	ϵ_0	$8.854187817 \times 10^{-12}$ C^2/(N·m^2)
Pi	π	3.14159265
Planck's constant	h	$6.6260755 \times 10^{-34}$ J·s
Mass of electron	m_e	$9.1093897 \times 10^{-31}$ kg
Mass of neutron	m_n	$1.6749286 \times 10^{-27}$ kg
Mass of proton	m_p	$1.6726231 \times 10^{-27}$ kg
Speed of light in vacuum	c	299792458. m/s
Universal gravitational constant	G	6.67259×10^{-11} N·m^2/kg^2
Universal gas constant	R	8.314510 J/(mol·K)

Please be advised that in this paper there are questions from 32.1 through 32.9. And any one of them may contain more than one sub-question, thus the total number of sub-questions here is around 14, of which 13 should be answered.

PAPER TITLE GENERATED.

In this paper, big questions will be generated in the following order:
1 (6) , 2 (5) , 3 (3) , 4 (2) , 5 (4) , 6 (1) , 7 (8) , 8 (7) , 9 (9) .

QUESTION 32.1 (6)

Please answer ONLY 5 of the following 6 questions (Questions 32.1.1 through 32.1.6).

Here are still some constants for use in the following questions:

Constant	Symbol	Value
Boltzmann's constant	k	1.381×10^{-23} J/K
Avogadro's number	N_A	6.022×10^{23} mol^{-1}
Mass of electron	m_e	$9.1093897 \times 10^{-31}$ kg

In this big question of CHOOSE structure, 6 questions will be generated: 1 (8 , 23) , 2 (9 , 24) , 3 (12 , 27) , 4 (7 , 22) , 5 (6 , 21) , 6 (11 , 26) .

Question 32.1.1 (6 , 8 , 23)

An object is subjected to an external net force $\mathbf{f} = (20.0, 9.0, -4000.0)N$. Its mass is known as $m = 58.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(0.34483ms^{-2}, 0.15517ms^{-2}, -893793.km/h^2)$.
B. The accelaration is $(1.2318ms^{-2}, 0.65111ms^{-2}, -893793.km/h^2)$.
C. The accelaration is $(0.34483ms^{-2}, 0.65111ms^{-2}, 4.0267 \times 10^6 km/h^2)$.
D. The accelaration is $(1.2318ms^{-2}, 0.15517ms^{-2}, 4.0267 \times 10^6 km/h^2)$.
E. none of these.

Auto-answer:

A. The accelaration is $(0.34483ms^{-2}, 0.15517ms^{-2}, -893793.km/h^2)$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (20.0, 9.0, -4000.0)N$ and $m = 58.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(20.0, 9.0, -4000.0)N}{58.0kg} \\
&= (0.34483, 0.15517, -68.966)ms^{-2} \\
&= (4469.0, 2011.0, -893793.)km/h^2.
\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	5	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	0.34483
Calculated 2	real	5	0.15517
Calculated 3	real	5	−68.966
Calculated 4	real	5	4469.0
Calculated 5	real	5	2011.0
Calculated 6	real	5	−893793.

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	−1	20.0 101.0 10.0	 20.0
INPUT 2	real	−1	2.0 10.1 1.0	 9.0
INPUT 3	real	−1	−2000.0 −10001.0 −1000.0	 −4000.0

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-1	50.0 60.1 2.0	 58.0

Question 32.1.2 (6 , 9 , 24)

Let us use Newton's Law of Universal Gravitation to calculate the force of the Sun acting on the eight planets. Let us suppose the mass of the Sun is $7.00 \times 10^{24} kg$. With the mass and the distance to the Sun of each planet in the following table, please fill the blanks for the forces.

The Planet	Mass (kg)	Distanace from Sun (m)	The Force (N)
Mercury	$8.00000000 \times 10^{24}$	$3.000000000 \times 10^{24}$	
Venus	4.00×10^{24}	1.000×10^{25}	
Earth	3.00×10^{24}	5.00×10^{24}	
Mars	3.00×10^{24}	1.000×10^{25}	
Jupiter	1.000×10^{25}	4.00×10^{24}	
Saturn	4.00×10^{24}	8.00×10^{24}	
Uranus	4.00×10^{24}	2.00×10^{24}	
Neptune	3.00×10^{24}	5.00×10^{24}	

Solution:

By using Newton's Law of Universal Gravitation:

$$F = G\frac{(Sun's\ \ mass) \times (Planet's\ \ mass)}{(distance)^2},$$

where $G = 6.67 \times 10^{-11} Nm^2(kg)^{-2}$, the forces can be easily calculated as

The Planet	Mass (kg)	Distanace from Sun (m)	The Force (N)
Mercury	$8.00000000 \times 10^{24}$	$3.000000000 \times 10^{24}$	4.15×10^{-10}
Venus	4.00×10^{24}	1.000×10^{25}	1.87×10^{-11}
Earth	3.00×10^{24}	5.00×10^{24}	5.60×10^{-11}
Mars	3.00×10^{24}	1.000×10^{25}	1.40×10^{-11}
Jupiter	1.000×10^{25}	4.00×10^{24}	2.92×10^{-10}
Saturn	4.00×10^{24}	8.00×10^{24}	2.92×10^{-11}
Uranus	4.00×10^{24}	2.00×10^{24}	4.67×10^{-10}
Neptune	3.00×10^{24}	5.00×10^{24}	5.60×10^{-11}

End of Solution.

Answer:

By using Newton's Law of Universal Gravitation:

$$F = G\frac{(Sun's\ \ mass) \times (Planet's\ \ mass)}{(distance)^2},$$

where $G = 6.67 \times 10^{-11} Nm^2(kg)^{-2}$, the forces can be easily calculated as

The Planet	Mass (kg)	Distanace from Sun (m)	The Force (N)
Mercury	$8.00000000 \times 10^{24}$	$3.000000000 \times 10^{24}$	4.15×10^{-10}
Venus	4.00×10^{24}	1.000×10^{25}	1.87×10^{-11}
Earth	3.00×10^{24}	5.00×10^{24}	5.60×10^{-11}
Mars	3.00×10^{24}	1.000×10^{25}	1.40×10^{-11}
Jupiter	1.000×10^{25}	4.00×10^{24}	$2.92 \times 10^{-10}3$
Saturn	4.00×10^{24}	8.00×10^{24}	2.92×10^{-11}
Uranus	4.00×10^{24}	2.00×10^{24}	4.67×10^{-10}
Neptune	3.00×10^{24}	5.00×10^{24}	5.60×10^{-11}

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
19	8	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	3	4.15×10^{-10}
Calculated 2	real	3	1.87×10^{-11}
Calculated 3	real	3	5.60×10^{-11}
Calculated 4	real	3	1.40×10^{-11}
Calculated 5	real	3	2.92×10^{-10}
Calculated 6	real	3	2.92×10^{-11}
Calculated 7	real	3	4.67×10^{-10}
Calculated 8	real	3	5.60×10^{-11}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	7.00×10^{24}
INPUT 2	real	16	$2.00000000 \times 10^{24}$ $1.010000000 \times 10^{25}$ $1.00000000 \times 10^{24}$	$8.00000000 \times 10^{24}$
INPUT 3	real	15	$2.000000000 \times 10^{24}$ $1.0100000000 \times 10^{25}$ $1.000000000 \times 10^{24}$	$3.000000000 \times 10^{24}$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	4.00×10^{24}
INPUT 5	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	1.000×10^{25}
INPUT 6	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	3.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 7	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	5.00×10^{24}
INPUT 8	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	3.00×10^{24}
INPUT 9	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	1.000×10^{25}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 10	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	1.000×10^{25}
INPUT 11	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	4.00×10^{24}
INPUT 12	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	4.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 13	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	8.00×10^{24}
INPUT 14	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	4.00×10^{24}
INPUT 15	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	2.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 16	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	3.00×10^{24}
INPUT 17	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	5.00×10^{24}
INPUT 18	real	-13	6.67×10^{-11} 6.67×10^{-11} 1.00×10^{-11}	6.67×10^{-11}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 19	real	-13	6.67×10^{-11} 6.67×10^{-11} 1.00×10^{-11}	6.67×10^{-11}

Question 32.1.3 (6 , 12 , 27)

In a hotel, the possiblity of non-smoking customer is $a = 0.580$, and the

possiblity of equal-or-above 30 years old customer is $b = 0.3200$. Please fill the following form.

Customer	Possibility
smoking and equal-or-above 30 years old	
smoking and under 30 years old	
non-smoking and equal-or-above 30 years old	
non-smoking and under 30 years old	

Solution:

Since the possiblity of non-smoking customer is $a = 0.580$, and the possiblity of equal-or-above 30 years old customer is $b = 0.3200$, the possiblity of smoking customer is $c = 1.0 - a = 1.0 - 0.580 = 0.420$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - 0.3200 = 0.6800$. Then

Customer	Possibility
smoking and equal-or-above 30 years old	$0.420 \times 0.3200 = 0.134$
smoking and under 30 years old	$0.420 \times 0.6800 = 0.286$
non-smoking and equal-or-above 30 years old	$0.580 \times 0.3200 = 0.186$
non-smoking and under 30 years old	$0.580 \times 0.6800 = 0.394$

And the total summation of all possibilities is 1.000.

End of Solution.

Answer:

Customer	Possibility
smoking and equal-or-above 30 years old	0.134
smoking and under 30 years old	0.286
non-smoking and equal-or-above 30 years old	0.186
non-smoking and under 30 years old	0.394

And the total summation of all possibilities is 1.000.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	11	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	3	0.420
Calculated 2	real	4	0.6800
Calculated 3	real	3	0.420
Calculated 4	real	3	0.580
Calculated 5	real	4	0.3200
Calculated 6	real	4	0.6800
Calculated 7	real	3	0.134
Calculated 8	real	3	0.286
Calculated 9	real	3	0.186
Calculated 10	real	3	0.394
Sequential	Type	Accuracy	Calculated
Calculated 11	real	4	1.000

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	logical	.TRUE. .FALSE.	smoking non-smoking	 $<--$
INPUT 2	real	-3	1.0×10^{-2} 1.000 1.0×10^{-2}	 0.580
INPUT 3	logical	.TRUE. .FALSE.	equal-or-above 30 years old under 30 years old	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-4	2.00×10^{-2} 1.0000 2.00×10^{-2}	 0.3200

Question 32.1.4 (6 , 7 , 22)

An object is subjected to an external net force $\mathbf{f} = (80.0, 7.0, -4000.0)N$. Its mass is known as $m = 60.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration (vector) is $(43678., 1512.0, -864000.)km/h^2$.
B. The accelaration (vector) is $(17280., 1512.0, -3.6728 \times 10^6)km/h^2$.
C. The accelaration (vector) is $(83439., 1512.0, -2.5416 \times 10^6)km/h^2$.
D. The accelaration (vector) is $(17280., 1512.0, 2.5907 \times 10^6)km/h^2$.
E. The accelaration (vector) is $(43678., 1512.0, -2.5416 \times 10^6)km/h^2$.

F. The accelaration (vector) is $(17280., 1512.0, -864000.)km/h^2$.
G. The accelaration (vector) is $(59348., 1512.0, -864000.)km/h^2$.
H. The accelaration (vector) is $(59348., 1512.0, 2.5907 \times 10^6)km/h^2$.
I. The accelaration (vector) is $(17280., 1512.0, -2.5416 \times 10^6)km/h^2$.
J. The accelaration (vector) is $(43678., 1512.0, -3.6728 \times 10^6)km/h^2$.
K. The accelaration (vector) is $(83439., 1512.0, 2.5907 \times 10^6)km/h^2$.
L. The accelaration (vector) is $(59348., 1512.0, -3.6728 \times 10^6)km/h^2$.

Auto-answer:

F. The accelaration (vector) is $(17280., 1512.0, -864000.)km/h^2$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (80.0, 7.0, -4000.0)N$ and $m = 60.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(80.0, 7.0, -4000.0)N}{60.0kg} \\ &= (1.3333, 0.11667, -66.667)ms^{-2} \\ &= (17280., 1512.0, -864000.)km/h^2. \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	12	2	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.3333
Calculated 2	real	5	0.11667
Calculated 3	real	5	−66.667
Calculated 4	real	5	17280.
Calculated 5	real	5	1512.0
Calculated 6	real	5	−864000.

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	−1	20.0 101.0 10.0	 80.0
INPUT 2	real	−1	2.0 10.1 1.0	 7.0
INPUT 3	real	−1	−2000.0 −10001.0 −1000.0	 −4000.0
Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−1	50.0 60.1 2.0	 60.0

Question 32.1.5 (6 , 6 , 21)

An object is subjected to an external net force $\mathbf{f} = (70.0, 4.0, -3000.0)N$. Its mass is known as $m = 56.0kg$. Please calculate its accelaration.

Answer:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (70.0, 4.0, -3000.0)N$ and $m = 56.0kg$, bring them into the above equation, then we get

$$\begin{aligned}\mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(70.0, 4.0, -3000.0)N}{56.0kg} \\ &= (1.2500, 7.1429 \times 10^{-2}, -53.571)ms^{-2} \\ &= (16200., 925.71, -694286.)km/h^2.\end{aligned}$$

End of Answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (70.0, 4.0, -3000.0)N$ and $m = 56.0kg$, bring them into the above equation, then we get

$$\begin{aligned}\mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(70.0, 4.0, -3000.0)N}{56.0kg} \\ &= (1.2500, 7.1429 \times 10^{-2}, -53.571)ms^{-2} \\ &= (16200., 925.71, -694286.)km/h^2.\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.2500
Calculated 2	real	5	7.1429×10^{-2}
Calculated 3	real	5	-53.571
Calculated 4	real	5	16200.
Calculated 5	real	5	925.71
Calculated 6	real	5	$-694286.$

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	-1	20.0 101.0 10.0	 70.0
INPUT 2	real	-1	2.0 10.1 1.0	 4.0
INPUT 3	real	-1	-2000.0 -10001.0 -1000.0	 -3000.0
Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-1	50.0 60.1 2.0	 56.0

Question 32.1.6 (6 , 11 , 26)

In a hotel, the possiblity of smoking customer is $a = 0.400$, and the possiblity of equal or above 30 years old customer is $b = 0.5400$. Please calculate the possiblity of non-smoking and under 30 years old customer.

Solution:

Since the possiblity of smoking customer is $a = 0.400$, and the possiblity of equal or above 30 years old customer is $b = 0.5400$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - 0.400 = 0.600$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - 0.5400 = 0.4600$. So the possibility of non-smoking and under 30 years old customer is $c \times d = 0.276$.

End of Solution.

Answer:

The possibility of non-smoking and under 30 years old customer is $(1-a)(1-b) = 0.276$.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	3	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	3	0.600
Calculated 2	real	4	0.4600
Calculated 3	real	3	0.276

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	logical	.TRUE. .FALSE.	smoking non-smoking	$<--$
INPUT 2	real	-3	1.0×10^{-2} 1.000 1.0×10^{-2}	 0.400
INPUT 3	logical	.TRUE. .FALSE.	equal or above 30 years old under 30 years old	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-4	2.00×10^{-2} 1.0000 2.00×10^{-2}	 0.5400

You have done all the above? A very good beginning, please go ahead. More constants the Mass of electron m_e= 9.109390 $\times 10^{-31}$ kg , Universal gas constant R= 8.315 J/(mol·K) , e= 1.60217733 $\times 10^{-19}$ C , and m_p= 1.6726231 $\times 10^{-27}$ kg may be very helpful.

QUESTION 32.2 (5 , 5 , 5)

If any one of the following statements is correct, please fill the box ahead of it with T . If wrong, fill with F.

Your answer	

1. 79 is an even number.

Your answer	

2. Montreal is in Ontario province.

Your answer	

3. $\mathbf{F} = m\mathbf{a}$ is a mathmatical form of the Newton's Second Law.

Answer:

The correct answer	F

1. 79 is an even number.

The correct answer	F

2. Montreal is in Ontario province.

The correct answer	T

3. $\mathbf{F} = m\mathbf{a}$ is a mathmatical form of the Newton's Second Law.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
6	3	0	0	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	string	1 (1 strings):	F
Calculated 2	string	1 (1 strings):	F
Calculated 3	string	1 (1 strings):	T

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 100, 1$	79
INPUT 2	string		even odd	$<--$
INPUT 3	string		Toronto Kingston Montreal Hull	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	string		Ontario Quebec	$<--$
INPUT 5	string		$\mathbf{F} = m\mathbf{a}$ $\|\mathbf{F}\| = Gm_1m_2r^{-2}$	$<--$
INPUT 6	string		the Newton's Second Law Newton's Law of Universal Gravitation	$<--$

QUESTION 32.3 (3 , 3 , 3)

Please choose the correct one from the following statements:

A. Canada has 10 provinces and 3 territories.
B. Canada has 35 provinces and 34 territories.
C. Canada has 33 provinces and 38 territories.
D. Canada has 36 provinces and 35 territories.
E. Canada has 37 provinces and 37 territories.
F. None of above.

Auto-answer:

A. Canada has 10 provinces and 3 territories.

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
0	20	6 simple	6	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		10
Calculated 2	integer		3
Calculated 3	integer		23
Calculated 4	integer		24
Calculated 5	integer		25
Calculated 6	integer		26
Calculated 7	integer		27
Calculated 8	integer		28
Calculated 9	integer		29
Calculated 10	integer		30
Sequential	Type	Accuracy	Calculated
Calculated 11	integer		31
Calculated 12	integer		32
Calculated 13	integer		33
Calculated 14	integer		34
Calculated 15	integer		35
Calculated 16	integer		36
Calculated 17	integer		37
Calculated 18	integer		38
Calculated 19	integer		39
Calculated 20	integer		40

All inputs:

QUESTION 32.4 (2 , 2 , 2)

An object is subjected to an external net force $\mathbf{f} = (70.000, 4.0000, -3000.0)N$. Its mass is known as $m = 54.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(-3.5419ms^{-2}, 960.00km/h^2, 125.67ms^{-2})$.
B. The accelaration is $(-3.5419ms^{-2}, 4371.4km/h^2, -55.556ms^{-2})$.
C. The accelaration is $(1.2963ms^{-2}, 960.00km/h^2, -55.556ms^{-2})$.
D. The accelaration is $(1.2963ms^{-2}, 4371.4km/h^2, 125.67ms^{-2})$.
E. The accelaration is $(1.2963ms^{-2}, 4371.4km/h^2, -55.556ms^{-2})$.
F. The accelaration is $(-3.5419ms^{-2}, 960.00km/h^2, -55.556ms^{-2})$.
G. None of these.

Auto-answer:

C. The accelaration is $(1.2963ms^{-2}, 960.00km/h^2, -55.556ms^{-2})$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (70.000, 4.0000, -3000.0)N$ and $m = 54.0000kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(70.000, 4.0000, -3000.0)N}{54.0000kg} \\
&= (1.2963, 7.4074 \times 10^{-2}, -55.556)ms^{-2} \\
&= (16800., 960.00, -720000.)km/h^2.
\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	7	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.2963
Calculated 2	real	5	7.4074×10^{-2}
Calculated 3	real	5	-55.556
Calculated 4	real	5	16800.
Calculated 5	real	5	960.00
Calculated 6	real	5	$-720000.$

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	−3	20.000 101.000 10.000	 70.000
INPUT 2	real	−4	2.0000 10.1000 1.0000	 4.0000
INPUT 3	real	−1	−2000.0 −10001.0 −1000.0	 −3000.0

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−4	50.0000 60.1000 2.0000	 54.0000

QUESTION 32.5 (4 , 4 , 4)

Considering case-insensitivity, please match the following same strings.

Column Left	Column Right	Your choinces
A. yjh	b	
B. er	YJH	
C. A= 2/ 2	ER	
D. B	a= 1	
E. asdf(:)	ASDF(:)	

Auto-answer:

Column Left	Column Right	Answers
A. yjh	b	**D.**
B. er	YJH	**A.**
C. A= 2/ 2	ER	**B.**
D. B	a= 1	**C.**
E. asdf(:)	ASDF(:)	**E.**

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	0	16	5	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		1

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		2, 8, 2	2
INPUT 2	integer		2, 3, 2	2

QUESTION 32.6 (1 , 1 , 1)

Abstract: This is a simple Newton's Second Law calculation multi-choice problem. **end of abstract.**

An object is subjected to an external net force $\mathbf{f} = (100.0, 6.0, -7000.0)N$. Its mass is known as $m = 60.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.67, 0.10, 499.53)ms^{-2}$.
B. The accelaration is $(1.67, 0.10, -116.67)ms^{-2}$.
C. The accelaration is $(1.67, -0.30, 499.53)ms^{-2}$.
D. The accelaration is $(4.24, -0.30, -116.67)ms^{-2}$.
E. The accelaration is $(4.24, 0.10, 499.53)ms^{-2}$.
F. The accelaration is $(4.24, 0.10, -116.67)ms^{-2}$.
G. The accelaration is $(4.24, -0.30, 499.53)ms^{-2}$.
H. The accelaration is $(1.67, -0.30, -116.67)ms^{-2}$.

Auto-answer:

B. The accelaration is $(1.67, 0.10, -116.67)ms^{-2}$.

End of auto-answer.

Answer:

The correct answer from the choices is
B. The accelaration is $(1.67, 0.10, -116.67)ms^{-2}$.

End of Answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (100.0, 6.0, -7000.0)N$ and $m = 60.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(100.0, 6.0, -7000.0)N}{60.0000kg} \\ &= (1.67, 0.10, -116.67)ms^{-2} \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	8	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	vector	3	1.67
		2	0.10
		5	−116.67

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	vector	−1	20.0	
			101.0	
			10.0	100.0
		−1	2.0	
			10.1	
			1.0	6.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−7000.0
INPUT 2	real	−4	50.0000	
			60.1000	
			2.0000	60.0000

You have done all the above? Excellent! Not much left, please continue.

QUESTION 32.7 (8 , 15 , 60)

$$\begin{pmatrix} 5 & 4 & 6 & 4 \\ 6 & 6 & 6 & 4 \\ 5 & 4 & 4 & 6 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} =?$$

$$\begin{pmatrix} \alpha & \Delta \\ \sigma & \Gamma \\ \Lambda & \delta \\ \Xi & \varepsilon \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} =?$$

Answer:

$$\begin{pmatrix} 5 & 4 & 6 & 4 \\ 6 & 6 & 6 & 4 \\ 5 & 4 & 4 & 6 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} = \begin{pmatrix} 38 \\ 44 \\ 38 \end{pmatrix}$$

$$\begin{pmatrix} \alpha & \Delta \\ \sigma & \Gamma \\ \Lambda & \delta \\ \Xi & \varepsilon \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} = \begin{pmatrix} \alpha \times \beta + \Delta \times \beta \\ \sigma \times \beta + \Gamma \times \beta \\ \Lambda \times \beta + \delta \times \beta \\ \Xi \times \beta + \varepsilon \times \beta \end{pmatrix}$$

End of Answer.

Solution:

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	2	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	i-matrix		(size: 3 by 1)

38
44
38

Sequential	Type	Accuracy	Calculated
Calculated 2	s-matrix		(size: 4 by 1)

$$\begin{pmatrix} \alpha \times \beta + \Delta \times \beta \\ \sigma \times \beta + \Gamma \times \beta \\ \Lambda \times \beta + \delta \times \beta \\ \Xi \times \beta + \varepsilon \times \beta \end{pmatrix}$$

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	i-matrix		$4, 7, 1$	(size: 3 by 4)

5 4 6 4
6 6 6 4
5 4 4 6

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 2	i-matrix		$2, 2, 1$	(size: 4 by 1)

2
2
2
2

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 3	s-matrix		α β γ δ ϵ ε ζ η ρ σ Γ Δ Θ Λ Ξ Υ Φ Ψ Ω	(size: 4 by 2)

$$\begin{pmatrix} \alpha & \Delta \\ \sigma & \Gamma \\ \Lambda & \delta \\ \Xi & \varepsilon \end{pmatrix}$$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	s-matrix		β γ	 (size: 2 by 1)

$$\begin{pmatrix} \beta \\ \beta \end{pmatrix}$$

QUESTION 32.8 (7 , 14 , 50)

An object is subjected to an external net force $\mathbf{f} = (40.0, 8.0, -5000.0)N$. Its mass is known as $m = 60.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(0.667, 0.13, -83.333)ms^{-2}$.
B. The accelaration is $(0.667, 0.13, 416.31)ms^{-2}$.
C. The accelaration is $(0.667, 0.31, 416.31)ms^{-2}$.
D. The accelaration is $(3.26, 0.13, -83.333)ms^{-2}$.

Auto-answer:

A. The accelaration is $(0.667, 0.13, -83.333)ms^{-2}$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (40.0, 8.0, -5000.0)N$ and $m = 60.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(40.0, 8.0, -5000.0)N}{60.0kg} \\ &= (0.667, 0.13, -83.333)ms^{-2} \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	4	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	vector	3	0.667
		2	0.13
		5	−83.333

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	vector	−1	20.0	
			101.0	
			10.0	40.0
		−1	2.0	
			10.1	
			1.0	8.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−5000.0
INPUT 2	real	−1	50.0	
			60.1	
			2.0	60.0

QUESTION 32.9 (9 , 16 , 70)

Abstract: Quadratic Equation constructed from the following first two random (input) integers as roots, which of course should not show in the exam papers. **end of abstract.**

Please solve the following equation:

$$9 \times x^2 - 486 \times x + 4797 = 0$$

Answer:

13, 41

End of Answer.

Solution:

Roots to the equation

$$9 \times x^2 - 486 \times x + 4797 = 0$$

are 13 and 41 .

Let us verity 13 first: $9 \times x^2 - 486 \times x + 4797 = 1521 + (-6318) + (4797) = -4797 + (4797) = 0$

Then verity 41: $9 \times x^2 - 486 \times x + 4797 = 15129 + (-19926) + (4797) = -4797 + (4797) = 0$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
3	13	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		9
Calculated 2	string	1 (1 strings):	
Calculated 3	integer		−486
Calculated 4	string	1 (1 strings):	+
Calculated 5	integer		4797
Calculated 6	integer		1521
Calculated 7	integer		−6318
Calculated 8	integer		−4797
Calculated 9	integer		0
Calculated 10	integer		15129

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		−19926
Calculated 12	integer		−4797
Calculated 13	integer		0

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$-11, 30, 4$	13
INPUT 2	integer		$-31, 60, 3$	41
INPUT 3	integer		$-15, 15, 2$	9

Here are still some constants for use:

Constant	Symbol	Value
Mass of proton	m_p	$1.6726231 \times 10^{-27}$ kg
Boltzmann's constant	k	1.381×10^{-23} J/K

Thank you very much for answering these questions!

Please be advised that in this paper there are questions from 32.1 through 32.9. And any one of them may contain more than one sub-question, thus the total number of sub-questions here is around 14, of which 13 should be answered.

PAPER TAIL GENERATED.

***** END OF PAPER, THANKS *****

By: 239 (26 , 34)

THIS IS THE JOURNAL FOR PAPER NUMBER 33

THIS IS AN EXAMPLE OF PERSONALIZED TESTS.

If needed, please use the following constants.

Constant	Symbol	Value
Acceleration due to earth's gravity	g	9.80 m/s^2
Avogadro's number	N_A	6.0221367×10^{23} mol^{-1}
Boltzmann's constant	k	1.380658×10^{-23} J/K
Coulomb's constant	k	8.99×10^{9} N·m^2/C^2
Electron charge magnitiude	e	$1.60217733 \times 10^{-19}$ C
Permeability of free space	μ_0	$1.25663706 \times 10^{-6}$ T·m/A
Permittivity of free space	ϵ_0	$8.854187817 \times 10^{-12}$ C^2/(N·m^2)
Pi	π	3.14159265
Planck's constant	h	$6.6260755 \times 10^{-34}$ J·s
Mass of electron	m_e	$9.1093897 \times 10^{-31}$ kg
Mass of neutron	m_n	$1.6749286 \times 10^{-27}$ kg
Mass of proton	m_p	$1.6726231 \times 10^{-27}$ kg
Speed of light in vacuum	c	299792458. m/s
Universal gravitational constant	G	6.67259×10^{-11} N·m^2/kg^2
Universal gas constant	R	8.314510 J/(mol·K)

Please be advised that in this paper there are questions from 33.1 through 33.9. And any one of them may contain more than one sub-question, thus the total number of sub-questions here is around 14, of which 13 should be answered.

PAPER TITLE GENERATED.

In this paper, big questions will be generated in the following order:
1 (6) , 2 (4) , 3 (3) , 4 (2) , 5 (1) , 6 (5) , 7 (7) , 8 (8) , 9 (9) .

QUESTION 33.1 (6)

Please answer ONLY 5 of the following 6 questions (Questions 33.1.1 through 33.1.6).

Here are still some constants for use in the following questions:

Constant	Symbol	Value
Boltzmann's constant	k	1.381×10^{-23} J/K
Avogadro's number	N_A	6.022×10^{23} mol^{-1}
Mass of electron	m_e	$9.1093897 \times 10^{-31}$ kg

In this big question of CHOOSE structure, 6 questions will be generated: 1 (7 , 22) , 2 (9 , 24) , 3 (10 , 25) , 4 (13 , 28) , 5 (11 , 26) , 6 (12 , 27) .

Question 33.1.1 (6 , 7 , 22)

An object is subjected to an external net force $\mathbf{f} = (40.0, 9.0, -5000.0)N$. Its mass is known as $m = 54.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration (vector) is $(9600.0, 2160.0, 3.6777 \times 10^6)km/h^2$.
B. The accelaration (vector) is $(24833., 2160.0, 2.8815 \times 10^6)km/h^2$.
C. The accelaration (vector) is $(38641., 2160.0, 2.8815 \times 10^6)km/h^2$.
D. The accelaration (vector) is $(38641., 2160.0, 4.0996 \times 10^6)km/h^2$.
E. The accelaration (vector) is $(24833., 2160.0, 4.0996 \times 10^6)km/h^2$.
F. The accelaration (vector) is $(34199., 2160.0, 2.8815 \times 10^6)km/h^2$.
G. The accelaration (vector) is $(34199., 2160.0, 4.0996 \times 10^6)km/h^2$.
H. The accelaration (vector) is $(9600.0, 2160.0, 2.8815 \times 10^6)km/h^2$.
I. The accelaration (vector) is $(9600.0, 2160.0, 4.0996 \times 10^6)km/h^2$.
J. The accelaration (vector) is $(9600.0, 2160.0, -1.2000 \times 10^6)km/h^2$.
K. The accelaration (vector) is $(38641., 2160.0, -1.2000 \times 10^6)km/h^2$.
L. The accelaration (vector) is $(34199., 2160.0, -1.2000 \times 10^6)km/h^2$.

Auto-answer:

J. The accelaration (vector) is $(9600.0, 2160.0, -1.2000 \times 10^6)km/h^2$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (40.0, 9.0, -5000.0)N$ and $m = 54.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(40.0, 9.0, -5000.0)N}{54.0kg} \\
&= (0.74074, 0.16667, -92.593)ms^{-2} \\
&= (9600.0, 2160.0, -1.2000 \times 10^6)km/h^2.
\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	12	2	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	0.74074
Calculated 2	real	5	0.16667
Calculated 3	real	5	−92.593
Calculated 4	real	5	9600.0
Calculated 5	real	5	2160.0
Calculated 6	real	5	-1.2000×10^6

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	−1	20.0 101.0 10.0	 40.0
INPUT 2	real	−1	2.0 10.1 1.0	 9.0
INPUT 3	real	−1	−2000.0 −10001.0 −1000.0	 −5000.0

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−1	50.0 60.1 2.0	 54.0

Question 33.1.2 (6 , 9 , 24)

Let us use Newton's Law of Universal Gravitation to calculate the force of the Sun acting on the eight planets. Let us suppose the mass of the Sun is $5.00 \times 10^{24} kg$. With the mass and the distance to the Sun of each planet in the following table, please fill the blanks for the forces.

The Planet	Mass (kg)	Distanace from Sun (m)	The Force (N)
Mercury	$7.00000000 \times 10^{24}$	$7.000000000 \times 10^{24}$	
Venus	8.00×10^{24}	8.00×10^{24}	
Earth	5.00×10^{24}	3.00×10^{24}	
Mars	9.00×10^{24}	6.00×10^{24}	
Jupiter	5.00×10^{24}	2.00×10^{24}	
Saturn	9.00×10^{24}	3.00×10^{24}	
Uranus	4.00×10^{24}	4.00×10^{24}	
Neptune	6.00×10^{24}	5.00×10^{24}	

Solution:

By using Newton's Law of Universal Gravitation:

$$F = G\frac{(Sun's\ \ mass) \times (Planet's\ \ mass)}{(distance)^2},$$

where $G = 6.67 \times 10^{-11} Nm^2(kg)^{-2}$, the forces can be easily calculated as

The Planet	Mass (kg)	Distanace from Sun (m)	The Force (N)
Mercury	$7.00000000 \times 10^{24}$	$7.000000000 \times 10^{24}$	4.76×10^{-11}
Venus	8.00×10^{24}	8.00×10^{24}	4.17×10^{-11}
Earth	5.00×10^{24}	3.00×10^{24}	1.85×10^{-10}
Mars	9.00×10^{24}	6.00×10^{24}	8.34×10^{-11}
Jupiter	5.00×10^{24}	2.00×10^{24}	4.17×10^{-10}
Saturn	9.00×10^{24}	3.00×10^{24}	3.33×10^{-10}
Uranus	4.00×10^{24}	4.00×10^{24}	8.34×10^{-11}
Neptune	6.00×10^{24}	5.00×10^{24}	8.00×10^{-11}

End of Solution.

Answer:

By using Newton's Law of Universal Gravitation:

$$F = G\frac{(Sun's\ \ mass) \times (Planet's\ \ mass)}{(distance)^2},$$

where $G = 6.67 \times 10^{-11} Nm^2(kg)^{-2}$, the forces can be easily calculated as

The Planet	Mass (kg)	Distanace from Sun (m)	The Force (N)
Mercury	$7.00000000 \times 10^{24}$	$7.000000000 \times 10^{24}$	4.76×10^{-11}
Venus	8.00×10^{24}	8.00×10^{24}	4.17×10^{-11}
Earth	5.00×10^{24}	3.00×10^{24}	1.85×10^{-10}
Mars	9.00×10^{24}	6.00×10^{24}	8.34×10^{-11}
Jupiter	5.00×10^{24}	2.00×10^{24}	$4.17 \times 10^{-10}3$
Saturn	9.00×10^{24}	3.00×10^{24}	3.33×10^{-10}
Uranus	4.00×10^{24}	4.00×10^{24}	8.34×10^{-11}
Neptune	6.00×10^{24}	5.00×10^{24}	8.00×10^{-11}

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
19	8	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	3	4.76×10^{-11}
Calculated 2	real	3	4.17×10^{-11}
Calculated 3	real	3	1.85×10^{-10}
Calculated 4	real	3	8.34×10^{-11}
Calculated 5	real	3	4.17×10^{-10}
Calculated 6	real	3	3.33×10^{-10}
Calculated 7	real	3	8.34×10^{-11}
Calculated 8	real	3	8.00×10^{-11}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	5.00×10^{24}
INPUT 2	real	16	$2.00000000 \times 10^{24}$ $1.010000000 \times 10^{25}$ $1.00000000 \times 10^{24}$	$7.00000000 \times 10^{24}$
INPUT 3	real	15	$2.000000000 \times 10^{24}$ $1.0100000000 \times 10^{25}$ $1.000000000 \times 10^{24}$	$7.000000000 \times 10^{24}$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	8.00×10^{24}
INPUT 5	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	8.00×10^{24}
INPUT 6	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	5.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 7	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	3.00×10^{24}
INPUT 8	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	9.00×10^{24}
INPUT 9	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	6.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 10	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	5.00×10^{24}
INPUT 11	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	2.00×10^{24}
INPUT 12	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	9.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 13	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	3.00×10^{24}
INPUT 14	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	4.00×10^{24}
INPUT 15	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	4.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 16	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	6.00×10^{24}
INPUT 17	real	22	2.00×10^{24} 1.010×10^{25} 1.00×10^{24}	5.00×10^{24}
INPUT 18	real	-13	6.67×10^{-11} 6.67×10^{-11} 1.00×10^{-11}	6.67×10^{-11}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 19	real	-13	6.67×10^{-11} 6.67×10^{-11} 1.00×10^{-11}	6.67×10^{-11}

Question 33.1.3 (6 , 10 , 25)

See the following picture.
Which one of the following is missing in it?

A. A truck
B. A frisbee
C. Lawn
D. An air-boat
E. A table
F. Not any of aboves.

Auto-answer:

A. A truck

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
0	0	6 simple	6	0	yes	no

Calculated values:

All inputs:

Question 33.1.4 (6 , 13 , 28)

What is the operation between $a = 7$ and $b = 8$: $a \times b =$? Please also calculate it.

Answer:

7;

8;

The operation is MULTIPLICATION and the result is 56.000.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
3	2	0	0	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	string	1 (1 strings):	MULTIPLICATION
Calculated 2	real	5	56.000

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 10, 2$	7
INPUT 2	integer		$2, 10, 2$	8
INPUT 3	string		$+$ $-$ $\times$ $\div$	$<--$

Question 33.1.5 (6 , 11 , 26)

In a hotel, the possiblity of non-smoking customer is $a = 0.580$, and the possiblity of under 30 years old customer is $b = 4.00 \times 10^{-2}$. Please calculate the possiblity of smoking and equal or above 30 years old customer.

Solution:

Since the possiblity of non-smoking customer is $a = 0.580$, and the possiblity of under 30 years old customer is $b = 4.00 \times 10^{-2}$, the possiblity of smoking customer is $c = 1.0 - a = 1.0 - 0.580 = 0.420$ and the possiblity of equal or above 30 years old customer is $d = 1.0 - b = 1.0 - 4.00 \times 10^{-2} = 0.9600$. So the possibility of smoking and equal or above 30 years old customer is $c \times d = 0.403$.

End of Solution.

Answer:

The possibility of smoking and equal or above 30 years old customer is

$(1-a)(1-b) = 0.403$.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	3	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	3	0.420
Calculated 2	real	4	0.9600
Calculated 3	real	3	0.403

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	logical	.TRUE. .FALSE.	smoking non-smoking	 $<--$
INPUT 2	real	-3	1.0×10^{-2} 1.000 1.0×10^{-2}	 0.580
INPUT 3	logical	.TRUE. .FALSE.	equal or above 30 years old under 30 years old	 $<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-4	2.00×10^{-2} 1.0000 2.00×10^{-2}	 4.00×10^{-2}

Question 33.1.6 (6 , 12 , 27)

In a hotel, the possiblity of smoking customer is $a = 0.890$, and the possiblity of equal-or-above 30 years old customer is $b = 0.6400$. Please fill the following form.

Customer	Possibility
smoking and equal-or-above 30 years old	
smoking and under 30 years old	
non-smoking and equal-or-above 30 years old	
non-smoking and under 30 years old	

Solution:

Since the possiblity of smoking customer is $a = 0.890$, and the possiblity of equal-or-above 30 years old customer is $b = 0.6400$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - 0.890 = 0.110$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - 0.6400 = 0.3600$. Then

Customer	Possibility
smoking and equal-or-above 30 years old	$0.890 \times 0.6400 = 0.570$
smoking and under 30 years old	$0.890 \times 0.3600 = 0.320$
non-smoking and equal-or-above 30 years old	$0.110 \times 0.6400 = 7.04 \times 10^{-2}$
non-smoking and under 30 years old	$0.110 \times 0.3600 = 3.96 \times 10^{-2}$

And the total summation of all possibilities is 1.000.

End of Solution.

Answer:

Customer	Possibility
smoking and equal-or-above 30 years old	0.570
smoking and under 30 years old	0.320
non-smoking and equal-or-above 30 years old	7.04×10^{-2}
non-smoking and under 30 years old	3.96×10^{-2}

And the total summation of all possibilities is 1.000.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	11	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	3	0.110
Calculated 2	real	4	0.3600
Calculated 3	real	3	0.890
Calculated 4	real	3	0.110
Calculated 5	real	4	0.6400
Calculated 6	real	4	0.3600
Calculated 7	real	3	0.570
Calculated 8	real	3	0.320
Calculated 9	real	3	7.04×10^{-2}
Calculated 10	real	3	3.96×10^{-2}

Sequential	Type	Accuracy	Calculated
Calculated 11	real	4	1.000

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	logical	.TRUE. .FALSE.	smoking non-smoking	$<--$
INPUT 2	real	-3	1.0×10^{-2} 1.000 1.0×10^{-2}	 0.890
INPUT 3	logical	.TRUE. .FALSE.	equal-or-above 30 years old under 30 years old	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-4	2.00×10^{-2} 1.0000 2.00×10^{-2}	 0.6400

You have done all the above? A very good beginning, please go ahead. More constants the Mass of electron m_e= 9.109390 $\times 10^{-31}$ kg , Universal gas constant R= 8.315 J/(mol·K) , e= 1.60217733 $\times 10^{-19}$ C , and m_p= 1.6726231 $\times 10^{-27}$ kg may be very helpful.

QUESTION 33.2 (4 , 4 , 4)

Considering case-insensitivity, please match the following same strings.

Column Left	Column Right	Your choinces
A. asdf(:)	c	
B. C	ER	
C. Er	b	
D. B	ASDF(:)	
E. A	a	

Auto-answer:

Column Left	Column Right	Answers
A. asdf(:)	c	**B.**
B. C	ER	**C.**
C. Er	b	**D.**
D. B	ASDF(:)	**A.**
E. A	a	**E.**

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	0	16	5	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		1

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$2, 8, 2$	2
INPUT 2	integer		$2, 3, 2$	2

QUESTION 33.3 (3 , 3 , 3)

Please choose the correct one from the following statements:

A. Canada has 36 provinces and 35 territories.
B. Canada has 10 provinces and 3 territories.
C. Canada has 33 provinces and 38 territories.
D. Canada has 37 provinces and 37 territories.
E. Canada has 34 provinces and 39 territories.
F. None of above.

Auto-answer:

B. Canada has 10 provinces and 3 territories.

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
0	20	6 simple	6	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		10
Calculated 2	integer		3
Calculated 3	integer		23
Calculated 4	integer		24
Calculated 5	integer		25
Calculated 6	integer		26
Calculated 7	integer		27
Calculated 8	integer		28
Calculated 9	integer		29
Calculated 10	integer		30

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		31
Calculated 12	integer		32
Calculated 13	integer		33
Calculated 14	integer		34
Calculated 15	integer		35
Calculated 16	integer		36
Calculated 17	integer		37
Calculated 18	integer		38
Calculated 19	integer		39
Calculated 20	integer		40

All inputs:

QUESTION 33.4 (2 , 2 , 2)

An object is subjected to an external net force $\mathbf{f} = (60.000, 4.0000, -8000.0)N$. Its mass is known as $m = 54.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(2.8796ms^{-2}, 960.00km/h^2, -689.97ms^{-2})$.
B. The accelaration is $(2.8796ms^{-2}, 960.00km/h^2, -148.15ms^{-2})$.
C. The accelaration is $(1.1111ms^{-2}, 960.00km/h^2, -689.97ms^{-2})$.
D. The accelaration is $(1.1111ms^{-2}, -4116.1km/h^2, -148.15ms^{-2})$.
E. The accelaration is $(1.1111ms^{-2}, 960.00km/h^2, -148.15ms^{-2})$.
F. The accelaration is $(2.8796ms^{-2}, -4116.1km/h^2, -148.15ms^{-2})$.
G. None of these.

Auto-answer:

E. The accelaration is $(1.1111ms^{-2}, 960.00km/h^2, -148.15ms^{-2})$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (60.000, 4.0000, -8000.0)N$ and $m = 54.0000kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(60.000, 4.0000, -8000.0)N}{54.0000kg} \\
&= (1.1111, 7.4074 \times 10^{-2}, -148.15)ms^{-2} \\
&= (14400., 960.00, -1.9200 \times 10^{6})km/h^2.
\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	7	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.1111
Calculated 2	real	5	7.4074×10^{-2}
Calculated 3	real	5	-148.15
Calculated 4	real	5	14400.
Calculated 5	real	5	960.00
Calculated 6	real	5	-1.9200×10^{6}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	−3	20.000 101.000 10.000	 60.000
INPUT 2	real	−4	2.0000 10.1000 1.0000	 4.0000
INPUT 3	real	−1	−2000.0 −10001.0 −1000.0	 −8000.0
Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−4	50.0000 60.1000 2.0000	 54.0000

QUESTION 33.5 (1 , 1 , 1)

Abstract: This is a simple Newton's Second Law calculation multi-choice problem. **end of abstract.**

An object is subjected to an external net force $\mathbf{f} = (50.0, 4.0, -2000.0)N$. Its mass is known as $m = 60.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(0.833, 6.7 \times 10^{-2}, 159.20)ms^{-2}$.
B. The accelaration is $(0.833, 0.28, -33.333)ms^{-2}$.
C. The accelaration is $(0.833, 6.7 \times 10^{-2}, -33.333)ms^{-2}$.
D. The accelaration is $(2.49, 0.28, -33.333)ms^{-2}$.
E. The accelaration is $(2.49, 6.7 \times 10^{-2}, -33.333)ms^{-2}$.
F. The accelaration is $(2.49, 0.28, 159.20)ms^{-2}$.
G. The accelaration is $(2.49, 6.7 \times 10^{-2}, 159.20)ms^{-2}$.
H. The accelaration is $(0.833, 0.28, 159.20)ms^{-2}$.

Auto-answer:

C. The accelaration is $(0.833, 6.7 \times 10^{-2}, -33.333)ms^{-2}$.

End of auto-answer.

Answer:

The correct answer from the choices is
C. The accelaration is $(0.833, 6.7 \times 10^{-2}, -33.333)ms^{-2}$.

End of Answer.
Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (50.0, 4.0, -2000.0)N$ and $m = 60.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(50.0, 4.0, -2000.0)N}{60.0000kg} \\ &= (0.833, 6.7 \times 10^{-2}, -33.333)ms^{-2} \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	8	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	vector	3	0.833
		2	6.7×10^{-2}
		5	-33.333

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	vector	−1	20.0	
			101.0	
			10.0	50.0
		−1	2.0	
			10.1	
			1.0	4.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−2000.0
INPUT 2	real	−4	50.0000	
			60.1000	
			2.0000	60.0000

QUESTION 33.6 (5 , 5 , 5)

If any one of the following statements is correct, please fill the box ahead of it with T . If wrong, fill with F.

Your answer	

1. 9 is an even number.

Your answer	

2. Toronto is in Ontario province.

Your answer	

3. $\mathbf{F} = m\mathbf{a}$ is a mathmatical form of the Newton's Second Law.

Answer:

The correct answer	F

1. 9 is an even number.

The correct answer	T

2. Toronto is in Ontario province.

The correct answer	T

3. $\mathbf{F} = m\mathbf{a}$ is a mathmatical form of the Newton's Second Law.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
6	3	0	0	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	string	1 (1 strings):	F
Calculated 2	string	1 (1 strings):	T
Calculated 3	string	1 (1 strings):	T

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 100, 1$	9
INPUT 2	string		even odd	$<--$
INPUT 3	string		Toronto Kingston Montreal Hull	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	string		Ontario Quebec	$<--$
INPUT 5	string		$\mathbf{F} = m\mathbf{a}$ $\|\mathbf{F}\| = Gm_1m_2r^{-2}$	$<--$
INPUT 6	string		the Newton's Second Law Newton's Law of Universal Gravitation	$<--$

You have done all the above? Excellent! Not much left, please continue.

QUESTION 33.7 (7 , 14 , 50)

An object is subjected to an external net force $\mathbf{f} = (70.0, 9.0, -7000.0)N$. Its mass is known as $m = 58.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.21, 0.16, -120.69)ms^{-2}$.

B. The accelaration is $(4.23, 0.58, -285.99)ms^{-2}$.

C. The accelaration is $(1.21, 0.16, -285.99)ms^{-2}$.
D. The accelaration is $(4.23, 0.58, -120.69)ms^{-2}$.

Auto-answer:

A. The accelaration is $(1.21, 0.16, -120.69)ms^{-2}$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (70.0, 9.0, -7000.0)N$ and $m = 58.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(70.0, 9.0, -7000.0)N}{58.0kg} \\ &= (1.21, 0.16, -120.69)ms^{-2} \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	4	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	vector	3	1.21
		2	0.16
		5	−120.69

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	vector	-1	20.0	
			101.0	
			10.0	70.0
		-1	2.0	
			10.1	
			1.0	9.0
		-1	-2000.0	
			-10001.0	
			-1000.0	-7000.0
INPUT 2	real	-1	50.0	
			60.1	
			2.0	58.0

QUESTION 33.8 (8 , 15 , 60)

$$\begin{pmatrix} 5 & 6 & 6 & 4 \\ 4 & 5 & 6 & 6 \\ 7 & 5 & 4 & 5 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} =?$$

$$\begin{pmatrix} \Theta & \Lambda \\ \gamma & \delta \\ \Lambda & \varepsilon \\ \alpha & \Xi \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} =?$$

Answer:

$$\begin{pmatrix} 5 & 6 & 6 & 4 \\ 4 & 5 & 6 & 6 \\ 7 & 5 & 4 & 5 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} = \begin{pmatrix} 42 \\ 42 \\ 42 \end{pmatrix}$$

$$\begin{pmatrix} \Theta & \Lambda \\ \gamma & \delta \\ \Lambda & \varepsilon \\ \alpha & \Xi \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} = \begin{pmatrix} \Theta \times \beta + \Lambda \times \beta \\ \gamma \times \beta + \delta \times \beta \\ \Lambda \times \beta + \varepsilon \times \beta \\ \alpha \times \beta + \Xi \times \beta \end{pmatrix}$$

End of Answer.

Solution:

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	2	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	i-matrix		(size: 3 by 1)

42
42
42

Sequential	Type	Accuracy	Calculated
Calculated 2	s-matrix		(size: 4 by 1)

$$\begin{pmatrix} \Theta \times \beta + \Lambda \times \beta \\ \gamma \times \beta + \delta \times \beta \\ \Lambda \times \beta + \varepsilon \times \beta \\ \alpha \times \beta + \Xi \times \beta \end{pmatrix}$$

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	i-matrix		$4, 7, 1$	(size: 3 by 4)

5 6 6 4
4 5 6 6
7 5 4 5

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 2	i-matrix		$2, 2, 1$	(size: 4 by 1)

2
2
2
2

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 3	s-matrix		α β γ δ ϵ ε ζ η ρ σ Γ Δ Θ Λ Ξ Υ Φ Ψ Ω	(size: 4 by 2)

$$\begin{pmatrix} \Theta & \Lambda \\ \gamma & \delta \\ \Lambda & \varepsilon \\ \alpha & \Xi \end{pmatrix}$$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	s-matrix		β γ	(size: 2 by 1)

$$\begin{pmatrix} \beta \\ \beta \end{pmatrix}$$

QUESTION 33.9 (9 , 16 , 70)

Abstract: Quadratic Equation constructed from the following first two random (input) integers as roots, which of course should not show in the exam papers. **end of abstract.**

Please solve the following equation:

$$-11 \times x^2 + 737 \times x - 12122 = 0$$

Answer:

29, 38

End of Answer.

Solution:

Roots to the equation

$$-11 \times x^2 + 737 \times x - 12122 = 0$$

are 29 and 38 .

Let us verity 29 first: $-11 \times x^2 + 737 \times x - 12122 = -9251 + (21373) + (-12122) = 12122 + (-12122) = 0$

Then verity 38: $-11 \times x^2 + 737 \times x - 12122 = -15884 + (28006) + (-12122) = 12122 + (-12122) = 0$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
3	13	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		−11
Calculated 2	string	1 (1 strings):	+
Calculated 3	integer		737
Calculated 4	string	1 (1 strings):	
Calculated 5	integer		−12122
Calculated 6	integer		−9251
Calculated 7	integer		21373
Calculated 8	integer		12122
Calculated 9	integer		0
Calculated 10	integer		−15884

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		28006
Calculated 12	integer		12122
Calculated 13	integer		0

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$-11, 30, 4$	29
INPUT 2	integer		$-31, 60, 3$	38
INPUT 3	integer		$-15, 15, 2$	-11

Here are still some constants for use:

Constant	Symbol	Value
Mass of proton	m_p	$1.6726231 \times 10^{-27}$ kg
Boltzmann's constant	k	1.381×10^{-23} J/K

Thank you very much for answering these questions!

Please be advised that in this paper there are questions from 33.1 through 33.9. And any one of them may contain more than one sub-question, thus the total number of sub-questions here is around 14, of which 13 should be answered.

PAPER TAIL GENERATED.

***** END OF PAPER, THANKS *****

By: 239 (26 , 34)

THIS IS THE JOURNAL FOR PAPER NUMBER 34

THIS IS AN EXAMPLE OF PERSONALIZED TESTS.

If needed, please use the following constants.

Constant	Symbol	Value
Acceleration due to earth's gravity	g	9.80 m/s^2
Avogadro's number	N_A	6.0221367×10^{23} mol^{-1}
Boltzmann's constant	k	1.380658×10^{-23} J/K
Coulomb's constant	k	8.99×10^{9} N·m^2/C^2
Electron charge magnitiude	e	$1.60217733 \times 10^{-19}$ C
Permeability of free space	μ_0	$1.25663706 \times 10^{-6}$ T·m/A
Permittivity of free space	ϵ_0	$8.854187817 \times 10^{-12}$ C^2/(N·m^2)
Pi	π	3.14159265
Planck's constant	h	$6.6260755 \times 10^{-34}$ J·s
Mass of electron	m_e	$9.1093897 \times 10^{-31}$ kg
Mass of neutron	m_n	$1.6749286 \times 10^{-27}$ kg
Mass of proton	m_p	$1.6726231 \times 10^{-27}$ kg
Speed of light in vacuum	c	299792458. m/s
Universal gravitational constant	G	6.67259×10^{-11} N·m^2/kg^2
Universal gas constant	R	8.314510 J/(mol·K)

Please be advised that in this paper there are questions from 34.1 through 34.9. And any one of them may contain more than one sub-question, thus the total number of sub-questions here is around 14, of which 13 should be answered.

PAPER TITLE GENERATED.

In this paper, big questions will be generated in the following order:
1 (6) , 2 (5) , 3 (3) , 4 (1) , 5 (4) , 6 (2) , 7 (8) , 8 (7) , 9 (9) .

QUESTION 34.1 (6)

Please answer ONLY 5 of the following 6 questions (Questions 34.1.1 through 34.1.6).

Here are still some constants for use in the following questions:

Constant	Symbol	Value
Boltzmann's constant	k	1.381×10^{-23} J/K
Avogadro's number	N_A	6.022×10^{23} mol^{-1}
Mass of electron	m_e	$9.1093897 \times 10^{-31}$ kg

In this big question of CHOOSE structure, 6 questions will be generated: 1 (6 , 21) , 2 (11 , 26) , 3 (12 , 27) , 4 (8 , 23) , 5 (7 , 22) , 6 (13 , 28) .

Question 34.1.1 (6 , 6 , 21)

An object is subjected to an external net force $\mathbf{f} = (80.0, 4.0, -2000.0)N$. Its mass is known as $m = 52.0kg$. Please calculate its accelaration.

Answer:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (80.0, 4.0, -2000.0)N$ and $m = 52.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(80.0, 4.0, -2000.0)N}{52.0kg} \\ &= (1.5385, 7.6923 \times 10^{-2}, -38.462)ms^{-2} \\ &= (19938., 996.92, -498462.)km/h^2. \end{aligned}$$

End of Answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (80.0, 4.0, -2000.0)N$ and $m = 52.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(80.0, 4.0, -2000.0)N}{52.0kg} \\
&= (1.5385, 7.6923 \times 10^{-2}, -38.462)ms^{-2} \\
&= (19938., 996.92, -498462.)km/h^2.
\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.5385
Calculated 2	real	5	7.6923×10^{-2}
Calculated 3	real	5	-38.462
Calculated 4	real	5	19938.
Calculated 5	real	5	996.92
Calculated 6	real	5	$-498462.$

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	-1	20.0 101.0 10.0	 80.0
INPUT 2	real	-1	2.0 10.1 1.0	 4.0
INPUT 3	real	-1	-2000.0 -10001.0 -1000.0	 -2000.0

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−1	50.0 60.1 2.0	 52.0

Question 34.1.2 (6 , 11 , 26)

In a hotel, the possiblity of smoking customer is $a = 0.290$, and the possiblity of equal or above 30 years old customer is $b = 0.3200$. Please calculate the possiblity of non-smoking and under 30 years old customer.

Solution:

Since the possiblity of smoking customer is $a = 0.290$, and the possiblity of equal or above 30 years old customer is $b = 0.3200$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - 0.290 = 0.710$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - 0.3200 = 0.6800$. So the possibility of non-smoking and under 30 years old customer is $c \times d = 0.483$.

End of Solution.

Answer:

The possibility of non-smoking and under 30 years old customer is $(1 - a)(1 - b) = 0.483$.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	3	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	3	0.710
Calculated 2	real	4	0.6800
Calculated 3	real	3	0.483

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	logical	.TRUE. .FALSE.	smoking non-smoking	$<--$
INPUT 2	real	-3	1.0×10^{-2} 1.000 1.0×10^{-2}	 0.290
INPUT 3	logical	.TRUE. .FALSE.	equal or above 30 years old under 30 years old	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-4	2.00×10^{-2} 1.0000 2.00×10^{-2}	 0.3200

Question 34.1.3 (6 , 12 , 27)

In a hotel, the possiblity of smoking customer is $a = 0.480$, and the possiblity of equal-or-above 30 years old customer is $b = 0.4400$. Please fill the following form.

Customer	Possibility
smoking and equal-or-above 30 years old	
smoking and under 30 years old	
non-smoking and equal-or-above 30 years old	
non-smoking and under 30 years old	

Solution:

Since the possiblity of smoking customer is $a = 0.480$, and the possiblity of equal-or-above 30 years old customer is $b = 0.4400$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - 0.480 = 0.520$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - 0.4400 = 0.5600$. Then

Customer	Possibility
smoking and equal-or-above 30 years old	$0.480 \times 0.4400 = 0.211$
smoking and under 30 years old	$0.480 \times 0.5600 = 0.269$
non-smoking and equal-or-above 30 years old	$0.520 \times 0.4400 = 0.229$
non-smoking and under 30 years old	$0.520 \times 0.5600 = 0.291$

And the total summation of all possibilities is 1.000.

End of Solution.

Answer:

Customer	Possibility
smoking and equal-or-above 30 years old	0.211
smoking and under 30 years old	0.269
non-smoking and equal-or-above 30 years old	0.229
non-smoking and under 30 years old	0.291

And the total summation of all possibilities is 1.000.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	11	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	3	0.520
Calculated 2	real	4	0.5600
Calculated 3	real	3	0.480
Calculated 4	real	3	0.520
Calculated 5	real	4	0.4400
Calculated 6	real	4	0.5600
Calculated 7	real	3	0.211
Calculated 8	real	3	0.269
Calculated 9	real	3	0.229
Calculated 10	real	3	0.291
Sequential	Type	Accuracy	Calculated
Calculated 11	real	4	1.000

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	logical	.TRUE. .FALSE.	smoking non-smoking	$<--$
INPUT 2	real	-3	1.0×10^{-2} 1.000 1.0×10^{-2}	 0.480
INPUT 3	logical	.TRUE. .FALSE.	equal-or-above 30 years old under 30 years old	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-4	2.00×10^{-2} 1.0000 2.00×10^{-2}	 0.4400

Question 34.1.4 (6 , 8 , 23)

An object is subjected to an external net force $\mathbf{f} = (20.0, 4.0, -8000.0)N$. Its mass is known as $m = 54.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(0.37037ms^{-2}, 0.33040ms^{-2}, 6.8548 \times 10^6 km/h^2)$.
B. The accelaration is $(0.37037ms^{-2}, 7.4074 \times 10^{-2}ms^{-2}, 6.8548 \times 10^6 km/h^2)$.
C. The accelaration is $(0.37037ms^{-2}, 0.33040ms^{-2}, -1.9200 \times 10^6 km/h^2)$.
D. The accelaration is $(0.95015ms^{-2}, 0.33040ms^{-2}, 6.8548 \times 10^6 km/h^2)$.
E. none of these.

Auto-answer:

E. none of these.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (20.0, 4.0, -8000.0)N$ and $m = 54.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(20.0, 4.0, -8000.0)N}{54.0kg} \\ &= (0.37037, 7.4074 \times 10^{-2}, -148.15)ms^{-2} \\ &= (4800.0, 960.00, -1.9200 \times 10^6)km/h^2. \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	5	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	0.37037
Calculated 2	real	5	7.4074×10^{-2}
Calculated 3	real	5	-148.15
Calculated 4	real	5	4800.0
Calculated 5	real	5	960.00
Calculated 6	real	5	-1.9200×10^{6}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	-1	20.0 101.0 10.0	20.0
INPUT 2	real	-1	2.0 10.1 1.0	4.0
INPUT 3	real	-1	-2000.0 -10001.0 -1000.0	-8000.0
Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-1	50.0 60.1 2.0	54.0

Question 34.1.5 (6 , 7 , 22)

An object is subjected to an external net force $\mathbf{f} = (30.0, 9.0, -9000.0)N$. Its mass is known as $m = 52.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration (vector) is $(7476.9, 2243.1, 7.6349 \times 10^{6})km/h^2$.
B. The accelaration (vector) is $(22007., 2243.1, 6.8282 \times 10^{6})km/h^2$.
C. The accelaration (vector) is $(27105., 2243.1, -2.2431 \times 10^{6})km/h^2$.
D. The accelaration (vector) is $(7476.9, 2243.1, -2.2431 \times 10^{6})km/h^2$.
E. The accelaration (vector) is $(23622., 2243.1, 6.8282 \times 10^{6})km/h^2$.
F. The accelaration (vector) is $(27105., 2243.1, 7.6349 \times 10^{6})km/h^2$.

G. The accelaration (vector) is $(22007., 2243.1, 7.6349 \times 10^6)km/h^2$.
H. The accelaration (vector) is $(27105., 2243.1, 8.9406 \times 10^6)km/h^2$.
I. The accelaration (vector) is $(23622., 2243.1, -2.2431 \times 10^6)km/h^2$.
J. The accelaration (vector) is $(22007., 2243.1, -2.2431 \times 10^6)km/h^2$.
K. The accelaration (vector) is $(7476.9, 2243.1, 6.8282 \times 10^6)km/h^2$.
L. The accelaration (vector) is $(23622., 2243.1, 8.9406 \times 10^6)km/h^2$.

Auto-answer:

D. The accelaration (vector) is $(7476.9, 2243.1, -2.2431 \times 10^6)km/h^2$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (30.0, 9.0, -9000.0)N$ and $m = 52.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(30.0, 9.0, -9000.0)N}{52.0kg} \\ &= (0.57692, 0.17308, -173.08)ms^{-2} \\ &= (7476.9, 2243.1, -2.2431 \times 10^6)km/h^2. \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	12	2	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	0.57692
Calculated 2	real	5	0.17308
Calculated 3	real	5	-173.08
Calculated 4	real	5	7476.9
Calculated 5	real	5	2243.1
Calculated 6	real	5	-2.2431×10^6

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	-1	20.0 101.0 10.0	 30.0
INPUT 2	real	-1	2.0 10.1 1.0	 9.0
INPUT 3	real	-1	-2000.0 -10001.0 -1000.0	 -9000.0
Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-1	50.0 60.1 2.0	 52.0

Question 34.1.6 (6 , 13 , 28)

What is the operation between $a = 1$ and $b = 4$: $a \times b =$? Please also calculate it.

Answer:

1;
4;
The operation is MULTIPLICATION and the result is 4.0000.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
3	2	0	0	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	string	1 (1 strings):	MULTIPLICATION
Calculated 2	real	5	4.0000

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 10, 2$	1
INPUT 2	integer		$2, 10, 2$	4
INPUT 3	string		$+$ $-$ $\times$ $\div$	 $<--$

You have done all the above? A very good beginning, please go ahead. More constants the Mass of electron m_e= 9.109390×10^{-31} kg , Universal gas constant R= 8.315 J/(mol·K) , e= $1.60217733 \times 10^{-19}$ C , and m_p= $1.6726231 \times 10^{-27}$ kg may be very helpful.

QUESTION 34.2 (5 , 5 , 5)

If any one of the following statements is correct, please fill the box ahead of it with T . If wrong, fill with F.

Your answer		1. 74 is an even number.
Your answer		2. Toronto is in Ontario province.
Your answer		3. $\|\mathbf{F}\| = Gm_1m_2r^{-2}$ is a mathmatical form of Newton's Law of Universal Gravitation.

Answer:

The correct answer	T	1. 74 is an even number.

The correct answer	T

2. Toronto is in Ontario province.

The correct answer	T

3. $|\mathbf{F}| = Gm_1m_2r^{-2}$ is a mathmatical form of Newton's Law of Universal Gravitation.

End of Answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
6	3	0	0	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	string	1 (1 strings):	T
Calculated 2	string	1 (1 strings):	T
Calculated 3	string	1 (1 strings):	T

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 100, 1$	74
INPUT 2	string		even odd	$<--$
INPUT 3	string		Toronto Kingston Montreal Hull	$<--$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	string		Ontario Quebec	$<--$
INPUT 5	string		$\mathbf{F} = m\mathbf{a}$ $\|\mathbf{F}\| = Gm_1m_2r^{-2}$	$<--$
INPUT 6	string		the Newton's Second Law Newton's Law of Universal Gravitation	$<--$

QUESTION 34.3 (3 , 3 , 3)

Please choose the correct one from the following statements:

A. Canada has 34 provinces and 39 territories.

B. Canada has 37 provinces and 37 territories.
C. Canada has 36 provinces and 35 territories.
D. Canada has 33 provinces and 38 territories.
E. Canada has 10 provinces and 3 territories.
F. None of above.

Auto-answer:

E. Canada has 10 provinces and 3 territories.

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
0	20	6 simple	6	0	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		10
Calculated 2	integer		3
Calculated 3	integer		23
Calculated 4	integer		24
Calculated 5	integer		25
Calculated 6	integer		26
Calculated 7	integer		27
Calculated 8	integer		28
Calculated 9	integer		29
Calculated 10	integer		30
Sequential	Type	Accuracy	Calculated
Calculated 11	integer		31
Calculated 12	integer		32
Calculated 13	integer		33
Calculated 14	integer		34
Calculated 15	integer		35
Calculated 16	integer		36
Calculated 17	integer		37
Calculated 18	integer		38
Calculated 19	integer		39
Calculated 20	integer		40

All inputs:

QUESTION 34.4 (1 , 1 , 1)

Abstract: This is a simple Newton's Second Law calculation multi-choice problem. **end of abstract.**

An object is subjected to an external net force $\mathbf{f} = (90.0, 8.0, -4000.0)N$. Its mass is known as $m = 58.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(4.69, 0.14, 247.31)ms^{-2}$.
B. The accelaration is $(1.55, 0.43, -68.966)ms^{-2}$.
C. The accelaration is $(4.69, 0.43, 247.31)ms^{-2}$.
D. The accelaration is $(4.69, 0.14, -68.966)ms^{-2}$.
E. The accelaration is $(1.55, 0.43, 247.31)ms^{-2}$.
F. The accelaration is $(1.55, 0.14, 247.31)ms^{-2}$.
G. The accelaration is $(1.55, 0.14, -68.966)ms^{-2}$.
H. The accelaration is $(4.69, 0.43, -68.966)ms^{-2}$.

Auto-answer:

G. The accelaration is $(1.55, 0.14, -68.966)ms^{-2}$.

End of auto-answer.

Answer:

The correct answer from the choices is
G. The accelaration is $(1.55, 0.14, -68.966)ms^{-2}$.

End of Answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (90.0, 8.0, -4000.0)N$ and $m = 58.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(90.0, 8.0, -4000.0)N}{58.0000kg} \\ &= (1.55, 0.14, -68.966)ms^{-2} \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	8	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	vector	3	1.55
		2	0.14
		5	−68.966

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	vector	−1	20.0	
			101.0	
			10.0	90.0
		−1	2.0	
			10.1	
			1.0	8.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−4000.0
INPUT 2	real	−4	50.0000	
			60.1000	
			2.0000	58.0000

QUESTION 34.5 (4 , 4 , 4)

Considering case-insensitivity, please match the following same strings.

Column Left	Column Right	Your choinces
A. asdf(:)	a	
B. Er	b	
C. A	eR	
D. B	ASDF(:)	
E. A= 4/ 2	a= 2	

Auto-answer:

Column Left	Column Right	Answers
A. asdf(:)	a	**C.**
B. Er	b	**D.**
C. A	eR	**B.**
D. B	ASDF(:)	**A.**
E. A= 4/ 2	a= 2	**E.**

End of auto-answer.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	0	16	5	yes	no

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		2

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$2, 8, 2$	4
INPUT 2	integer		$2, 3, 2$	2

QUESTION 34.6 (2 , 2 , 2)

An object is subjected to an external net force $\mathbf{f} = (70.000, 3.0000, -9000.0)N$. Its mass is known as $m = 50.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.4000ms^{-2}, -3171.4km/h^2, -180.00ms^{-2})$.
B. The accelaration is $(1.4000ms^{-2}, 777.60km/h^2, -180.00ms^{-2})$.
C. The accelaration is $(5.5031ms^{-2}, -3171.4km/h^2, 798.44ms^{-2})$.
D. The accelaration is $(1.4000ms^{-2}, -3171.4km/h^2, 798.44ms^{-2})$.
E. The accelaration is $(5.5031ms^{-2}, 777.60km/h^2, 798.44ms^{-2})$.
F. The accelaration is $(1.4000ms^{-2}, 777.60km/h^2, 798.44ms^{-2})$.
G. None of these.

Auto-answer:

B. The accelaration is $(1.4000ms^{-2}, 777.60km/h^2, -180.00ms^{-2})$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (70.000, 3.0000, -9000.0)N$ and $m = 50.0000kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(70.000, 3.0000, -9000.0)N}{50.0000kg} \\
&= (1.4000, 6.0000 \times 10^{-2}, -180.00)ms^{-2} \\
&= (18144., 777.60, -2.3328 \times 10^{6})km/h^{2}.
\end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	6	7	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.4000
Calculated 2	real	5	6.0000×10^{-2}
Calculated 3	real	5	-180.00
Calculated 4	real	5	18144.
Calculated 5	real	5	777.60
Calculated 6	real	5	-2.3328×10^{6}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	−3	20.000 101.000 10.000	 70.000
INPUT 2	real	−4	2.0000 10.1000 1.0000	 3.0000
INPUT 3	real	−1	−2000.0 −10001.0 −1000.0	 −9000.0

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−4	50.0000 60.1000 2.0000	 50.0000

You have done all the above? Excellent! Not much left, please continue.

QUESTION 34.7 (8 , 15 , 60)

$$\begin{pmatrix} 5 & 4 & 4 & 6 \\ 6 & 4 & 6 & 4 \\ 5 & 4 & 5 & 5 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} =?$$

$$\begin{pmatrix} \Delta & \rho \\ \eta & \rho \\ \Xi & \sigma \\ \varepsilon & \epsilon \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} =?$$

Answer:

$$\begin{pmatrix} 5 & 4 & 4 & 6 \\ 6 & 4 & 6 & 4 \\ 5 & 4 & 5 & 5 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} = \begin{pmatrix} 38 \\ 40 \\ 38 \end{pmatrix}$$

$$\begin{pmatrix} \Delta & \rho \\ \eta & \rho \\ \Xi & \sigma \\ \varepsilon & \epsilon \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} = \begin{pmatrix} \Delta \times \beta + \rho \times \beta \\ \eta \times \beta + \rho \times \beta \\ \Xi \times \beta + \sigma \times \beta \\ \varepsilon \times \beta + \epsilon \times \beta \end{pmatrix}$$

End of Answer.

Solution:

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
4	2	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	i-matrix		(size: 3 by 1)

38
40
38

Sequential	Type	Accuracy	Calculated
Calculated 2	s-matrix		(size: 4 by 1)

$$\begin{pmatrix} \Delta \times \beta + \rho \times \beta \\ \eta \times \beta + \rho \times \beta \\ \Xi \times \beta + \sigma \times \beta \\ \varepsilon \times \beta + \epsilon \times \beta \end{pmatrix}$$

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	i-matrix		$4, 7, 1$	(size: 3 by 4)

5 4 4 6
6 4 6 4
5 4 5 5

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 2	i-matrix		$2, 2, 1$	(size: 4 by 1)

2
2
2
2

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 3	s-matrix		α β γ δ ϵ ε ζ η ρ σ Γ Δ Θ Λ Ξ Υ Φ Ψ Ω	(size: 4 by 2)

$$\begin{pmatrix} \Delta & \rho \\ \eta & \rho \\ \Xi & \sigma \\ \varepsilon & \epsilon \end{pmatrix}$$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	s-matrix		β γ	(size: 2 by 1)

$$\begin{pmatrix} \beta \\ \beta \end{pmatrix}$$

QUESTION 34.8 (7 , 14 , 50)

An object is subjected to an external net force $\mathbf{f} = (80.0, 3.0, -9000.0)N$. Its mass is known as $m = 52.0kg$. Please choose the correct accelaration

from the following choices.
A. The accelaration is $(6.33, 5.8 \times 10^{-2}, -173.08)ms^{-2}$.
B. The accelaration is $(1.54, 5.8 \times 10^{-2}, 786.99)ms^{-2}$.
C. The accelaration is $(6.33, 0.17, -173.08)ms^{-2}$.
D. The accelaration is $(1.54, 5.8 \times 10^{-2}, -173.08)ms^{-2}$.

Auto-answer:

D. The accelaration is $(1.54, 5.8 \times 10^{-2}, -173.08)ms^{-2}$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

$$\mathbf{f} = m\mathbf{a}.$$

Since $\mathbf{f} = (80.0, 3.0, -9000.0)N$ and $m = 52.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(80.0, 3.0, -9000.0)N}{52.0kg} \\ &= (1.54, 5.8 \times 10^{-2}, -173.08)ms^{-2} \end{aligned}$$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
2	1	4	3	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	vector	3	1.54
		2	5.8×10^{-2}
		5	-173.08

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	vector	−1	20.0	
			101.0	
			10.0	80.0
		−1	2.0	
			10.1	
			1.0	3.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−9000.0
INPUT 2	real	−1	50.0	
			60.1	
			2.0	52.0

QUESTION 34.9 (9 , 16 , 70)

Abstract: Quadratic Equation constructed from the following first two random (input) integers as roots, which of course should not show in the exam papers. **end of abstract.**

Please solve the following equation:

$$-5 \times x^2 + 85 \times x + 300 = 0$$

Answer:

-3, 20

End of Answer.

Solution:

Roots to the equation

$$-5 \times x^2 + 85 \times x + 300 = 0$$

are -3 and 20 .

Let us verity -3 first: $-5 \times x^2 + 85 \times x + 300 = -45 + (-255) + (300) = -300 + (300) = 0$

Then verity 20: $-5 \times x^2 + 85 \times x + 300 = -2000 + (1700) + (300) = -300 + (300) = 0$

End of Solution.

Total numbers:

Inputs	Calculates	Choices	Layers	Matches	Answer	Solution
3	13	0	0	0	yes	yes

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	integer		-5
Calculated 2	string	1 (1 strings):	+
Calculated 3	integer		85
Calculated 4	string	1 (1 strings):	+
Calculated 5	integer		300
Calculated 6	integer		-45
Calculated 7	integer		-255
Calculated 8	integer		-300
Calculated 9	integer		0
Calculated 10	integer		-2000

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		1700
Calculated 12	integer		-300
Calculated 13	integer		0

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$-11, 30, 4$	-3
INPUT 2	integer		$-31, 60, 3$	20
INPUT 3	integer		$-15, 15, 2$	-5

Here are still some constants for use:

Constant	Symbol	Value
Mass of proton	m_p	$1.6726231 \times 10^{-27}$ kg
Boltzmann's constant	k	1.381×10^{-23} J/K

Thank you very much for answering these questions!

Please be advised that in this paper there are questions from 34.1 through 34.9. And any one of them may contain more than one sub-question, thus the total number of sub-questions here is around 14, of which 13 should be answered.

PAPER TAIL GENERATED.

***** END OF PAPER, THANKS *****

By: 239 (26 , 34)

STATISTICS

Initial seed for random numbers	239
First paper number	26
Last paper number	34
Total papers to be generated	9
Total marks from input file	100.00
Total actual marks	100.00
Total lines of the input file	915
Total QUESTIONs in input file	16
Total CHOOSEs in input file	1
Total NOTEs in input file	2
Total (big) questions in each paper	9
Total actual (sub)questions in each paper	14
Total (sub)questions to be answered in each paper	13

For each big question

Big question	Choose?	Questions needed	Questions from	Question IDs
1 (4 ,3.12)	No	1 (1 , 1)	1 (1 ,3.12 ,10.00)	1
2 (4 ,1.56)	No	1 (1 , 1)	2 (0 ,1.56 ,5.00)	2
3 (4 ,1.56)	No	1 (1 , 1)	3 (1 ,1.56 ,5.00)	3
4 (4 ,3.12)	No	1 (1 , 1)	4 (0 ,3.12 ,10.00)	4
5 (4 ,1.56)	No	1 (1 , 1)	5 (0 ,1.56 ,5.00)	5
6 (2 ,62.50 ,40.00)	1	6 (5 , 8)	6 (0 ,12.50 ,5.00)	21
			7 (0 ,12.50 ,5.00)	22
			8 (0 ,12.50 ,6.00)	23
			9 (0 ,12.50 ,8.00)	24
			10 (1 ,12.50 ,5.70)	25
			11 (0 ,12.50 ,12.40)	26
			12 (0 ,12.50 ,24.50)	27

Big question	Choose?	Questions needed	Questions from	Question IDs
			13 (0 ,12.50 ,67.20)	28
7 (8 ,12.50)	No	1 (1 , 1)	14 (1 ,12.50 ,40.00)	50
8 (8 ,12.50)	No	1 (1 , 1)	15 (0 ,12.50 ,40.00)	60
9 (14 ,1.56)	No	1 (1 , 1)	16 (0 ,1.56 ,5.00)	70