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(1) , 3(2) , 4(3) , 5(5) , 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 generat ed:

1(11, 26) , 2(6, 21) , 3(9, 24) , 4(13, 28) , 5(12, 27) , 6(10, 25) .

Question 26.1.1 (6, 11, 26)

In a hotel, the possiblity of smoking customer is $a = .540$, and the possiblity of equal or above 30 years old customer is $b = .6600$. Please calculate the possiblity of non-smoking and under 30 years old customer.

Solution:

Since the possiblity of smoking customer is $a = .540$, and the possiblity of equal or above 30 years old customer is $b = .6600$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - .540 = .460$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - .6600 = .3400$. So the possibility of non-smoking and under 30 years old customer is $c \times d = .156$.

End of Solution.

Answer:

The possibility of non-smoking and under 30 years old customer is $(1 - a)(1 - b) = .156$.

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	.460
Calculated 2	real	4	.3400
Calculated 3	real	3	.156

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}	 .540
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}	 .6600

Question 26.1.2 (6, 6, 21)

An object is subjected to an external net force $\mathbf{f} = (70.0, 2.0, -2000.0)N$. Its mass is known as $m = 50.0kg$. Please calculate its accelaration.

Answer:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (70.0, 2.0, -2000.0)N$ and $m = 50.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(70.0, 2.0, -2000.0)N}{50.0kg} \\ &= (1.4000, 4.0000 \times 10^{-2}, -40.000)ms^{-2} \\ &= (18144., 518.40, -518400.)km/h^2. \end{aligned}$$

End of Answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (70.0, 2.0, -2000.0)N$ and $m = 50.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(70.0, 2.0, -2000.0)N}{50.0kg} \\ &= (1.4000, 4.0000 \times 10^{-2}, -40.000)ms^{-2} \\ &= (18144., 518.40, -518400.)km/h^2. \end{aligned}$$

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	1.4000
Calculated 2	real	5	4.0000×10^{-2}
Calculated 3	real	5	-40.000
Calculated 4	real	5	18144.
Calculated 5	real	5	518.40
Calculated 6	real	5	$-518400.$

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	 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	 50.0

Question 26.1.3 (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	$6.00000000 \times 10^{24}$	$6.000000000 \times 10^{24}$	
Venus	2.00×10^{24}	4.00×10^{24}	
Earth	8.00×10^{24}	4.00×10^{24}	
Mars	7.00×10^{24}	9.00×10^{24}	
Jupiter	4.00×10^{24}	7.00×10^{24}	
Saturn	5.00×10^{24}	8.00×10^{24}	
Uranus	3.00×10^{24}	8.00×10^{24}	
Neptune	9.00×10^{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	$6.00000000 \times 10^{24}$	$6.000000000 \times 10^{24}$	3.33×10^{-11}
Venus	2.00×10^{24}	4.00×10^{24}	2.50×10^{-11}
Earth	8.00×10^{24}	4.00×10^{24}	1.00×10^{-10}
Mars	7.00×10^{24}	9.00×10^{24}	1.73×10^{-11}
Jupiter	4.00×10^{24}	7.00×10^{24}	1.63×10^{-11}
Saturn	5.00×10^{24}	8.00×10^{24}	1.56×10^{-11}
Uranus	3.00×10^{24}	8.00×10^{24}	9.38×10^{-12}
Neptune	9.00×10^{24}	4.00×10^{24}	1.13×10^{-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	$6.00000000 \times 10^{24}$	$6.000000000 \times 10^{24}$	3.33×10^{-11}
Venus	2.00×10^{24}	4.00×10^{24}	2.50×10^{-11}
Earth	8.00×10^{24}	4.00×10^{24}	1.00×10^{-10}
Mars	7.00×10^{24}	9.00×10^{24}	1.73×10^{-11}
Jupiter	4.00×10^{24}	7.00×10^{24}	$1.63 \times 10^{-11}3$
Saturn	5.00×10^{24}	8.00×10^{24}	1.56×10^{-11}
Uranus	3.00×10^{24}	8.00×10^{24}	9.38×10^{-12}
Neptune	9.00×10^{24}	4.00×10^{24}	1.13×10^{-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	3.33×10^{-11}
Calculated 2	real	3	2.50×10^{-11}
Calculated 3	real	3	1.00×10^{-10}
Calculated 4	real	3	1.73×10^{-11}
Calculated 5	real	3	1.63×10^{-11}
Calculated 6	real	3	1.56×10^{-11}
Calculated 7	real	3	9.38×10^{-12}
Calculated 8	real	3	1.13×10^{-10}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	3.00×10^{24}
INPUT 2	real	16	$2.00000000 \times 10^{24}$ $1.010000000 \times 10^{25}$ $10.0000000 \times 10^{23}$	$6.00000000 \times 10^{24}$
INPUT 3	real	15	$2.000000000 \times 10^{24}$ $1.0100000000 \times 10^{25}$ $10.00000000 \times 10^{23}$	$6.000000000 \times 10^{24}$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	2.00×10^{24}
INPUT 5	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	4.00×10^{24}
INPUT 6	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	8.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 7	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	4.00×10^{24}
INPUT 8	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	7.00×10^{24}
INPUT 9	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	9.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 10	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	4.00×10^{24}
INPUT 11	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	7.00×10^{24}
INPUT 12	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	5.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 13	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	8.00×10^{24}
INPUT 14	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	3.00×10^{24}
INPUT 15	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	8.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 16	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	9.00×10^{24}
INPUT 17	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	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 26.1.4 (6, 13, 28)

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

Answer:

5;

6;

The operation is SUBTRACTION and the result is -1.0000.

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	2 (4 strings) :	SUBTRACTION
Calculated 2	real	5	-1.0000

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 26.1.5 (6, 12, 27)

In a hotel, the possiblity of non-smoking customer is $a = .660$, and the possiblity of equal-or-above 30 years old customer is $b = .3000$. 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 $a = .660$, and the possiblity of equal-or-above 30 years old customer is $b = .3000$, the possiblity of smoking customer is $c = 1.0 - a = 1.0 - .660 = .340$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - .3000 = .7000$. Then

Customer	Possibility
smoking and equal-or-above 30 years old	$.340 \times .3000 = .102$
smoking and under 30 years old	$.340 \times .7000 = .238$
non-smoking and equal-or-above 30 years old	$.660 \times .3000 = .198$
non-smoking and under 30 years old	$.660 \times .7000 = .462$

And the total summation of all possibilities is 1.000.

End of Solution.

Answer:

Customer	Possibility
smoking and equal-or-above 30 years old	.102
smoking and under 30 years old	.238
non-smoking and equal-or-above 30 years old	.198
non-smoking and under 30 years old	.462

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	.340
Calculated 2	real	4	.7000
Calculated 3	real	3	.340
Calculated 4	real	3	.660
Calculated 5	real	4	.3000
Calculated 6	real	4	.7000
Calculated 7	real	3	.102
Calculated 8	real	3	.238
Calculated 9	real	3	.198
Calculated 10	real	3	.462

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}	 .660
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}	 .3000

Question 26.1.6 (6, 10, 25)

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

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

Auto-answer:

C. A truck
D. 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:

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 (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 $\mathbf{f} = (90.0, 9.0, -8000.0)N$. Its mass is known as $m = 50.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.80, .81, -160.00)ms^{-2}$.
B. The accelaration is $(4.24, .81, -160.00)ms^{-2}$.
C. The accelaration is $(1.80, .18, -160.00)ms^{-2}$.
D. The accelaration is $(4.24, .18, 447.95)ms^{-2}$.
E. The accelaration is $(4.24, .18, -160.00)ms^{-2}$.
F. The accelaration is $(1.80, .18, 447.95)ms^{-2}$.
G. The accelaration is $(1.80, .81, 447.95)ms^{-2}$.
H. The accelaration is $(4.24, .81, 447.95)ms^{-2}$.

Auto-answer:

C. The accelaration is $(1.80, .18, -160.00)ms^{-2}$.

End of auto-answer.

Answer:

The correct answer from the choices is
C. The accelaration is $(1.80, .18, -160.00)ms^{-2}$.

End of Answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (90.0, 9.0, -8000.0)N$ and $m = 50.0000kg$, bring them into the above equation, then we get

$$\begin{aligned}\mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(90.0, 9.0, -8000.0)N}{50.0000kg} \\ &= (1.80, .18, -160.00)ms^{-2}\end{aligned}$$

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	1.80
		2	.18
		5	−160.00

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	−8000.0
INPUT 2	real	−4	50.0000	
			60.1000	
			2.0000	50.0000

QUESTION 26.3 (2, 2, 2)

An object is subjected to an external net force $\mathbf{f} = (80.000, 5.0000, -9000.0)N$. Its mass is known as $m = 58.0000kg$. Please choose the correct accelaration

from the following choices.
A. The accelaration is $(1.3793ms^{-2}, 1117.2km/h^2, -155.17ms^{-2})$.
B. The accelaration is $(5.7113ms^{-2}, 3858.5km/h^2, -155.17ms^{-2})$.
C. The accelaration is $(1.3793ms^{-2}, 3858.5km/h^2, 533.37ms^{-2})$.
D. The accelaration is $(5.7113ms^{-2}, 1117.2km/h^2, 533.37ms^{-2})$.
E. The accelaration is $(1.3793ms^{-2}, 3858.5km/h^2, -155.17ms^{-2})$.
F. The accelaration is $(1.3793ms^{-2}, 1117.2km/h^2, 533.37ms^{-2})$.
G. None of these.

Auto-answer:

A. The accelaration is $(1.3793ms^{-2}, 1117.2km/h^2, -155.17ms^{-2})$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (80.000, 5.0000, -9000.0)N$ and $m = 58.0000kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(80.000, 5.0000, -9000.0)N}{58.0000kg} \\
&= (1.3793, 8.6207 \times 10^{-2}, -155.17)ms^{-2} \\
&= (17876., 1117.2, -2.0110 \times 10^{6})km/h^2.
\end{aligned}$$

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	1.3793
Calculated 2	real	5	8.6207×10^{-2}
Calculated 3	real	5	-155.17
Calculated 4	real	5	17876.
Calculated 5	real	5	1117.2
Calculated 6	real	5	-2.0110×10^{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	 5.0000
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	 58.0000

QUESTION 26.4 (3, 3, 3)

Please choose the correct one from the following statements:

A. Canada has 35 provinces and 34 territories.
B. Canada has 33 provinces and 38 territories.
C. Canada has 34 provinces and 39 territories.
D. Canada has 36 provinces and 35 territories.
E. Canada has 37 provinces and 37 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 26.5 (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. 78 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 Newton's Law of Universal Gravitation.

Answer:

The correct answer	F

1. 78 is an odd number.

The correct answer	T

2. Toronto is in Ontario province.

The correct answer	F

3. $\mathbf{F} = m\mathbf{a}$ 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	2 (2 strings) :	F
Calculated 2	string	1 (2 strings) :	T
Calculated 3	string	2 (2 strings) :	F

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 100, 1$	78
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 26.6 (4, 4, 4)

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

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

Auto-answer:

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

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 $\mathbf{f} = (90.0, 7.0, -7000.0)N$. Its mass is known as $m = 58.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.55, .12, -120.69)ms^{-2}$.
B. The accelaration is $(-3.12, .39, -120.69)ms^{-2}$.
C. The accelaration is $(1.55, .39, -120.69)ms^{-2}$.
D. The accelaration is $(-3.12, .12, -120.69)ms^{-2}$.

Auto-answer:

A. The accelaration is $(1.55, .12, -120.69)ms^{-2}$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (90.0, 7.0, -7000.0)N$ and $m = 58.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(90.0, 7.0, -7000.0)N}{58.0kg} \\ &= (1.55, .12, -120.69)ms^{-2} \end{aligned}$$

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	1.55
		2	.12
		5	−120.69

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	7.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−7000.0
INPUT 2	real	−1	50.0	
			60.1	
			2.0	58.0

QUESTION 26.8 (8, 15, 60)

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

$$\begin{pmatrix} \varepsilon & \rho \\ \sigma & \beta \\ \Lambda & \Delta \\ \Omega & \Xi \end{pmatrix} \begin{pmatrix} \gamma \\ \gamma \end{pmatrix} =?$$

Answer:

$$\begin{pmatrix} 4 & 7 & 5 & 6 \\ 6 & 6 & 7 & 5 \\ 4 & 4 & 4 & 4 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} = \begin{pmatrix} 44 \\ 48 \\ 32 \end{pmatrix}$$

$$\begin{pmatrix} \varepsilon & \rho \\ \sigma & \beta \\ \Lambda & \Delta \\ \Omega & \Xi \end{pmatrix} \begin{pmatrix} \gamma \\ \gamma \end{pmatrix} = \begin{pmatrix} \varepsilon \times \gamma + \rho \times \gamma \\ \sigma \times \gamma + \beta \times \gamma \\ \Lambda \times \gamma + \Delta \times \gamma \\ \Omega \times \gamma + \Xi \times \gamma \end{pmatrix}$$

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)

44
48
32

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

$$\begin{pmatrix} \varepsilon \times \gamma + \rho \times \gamma \\ \sigma \times \gamma + \beta \times \gamma \\ \Lambda \times \gamma + \Delta \times \gamma \\ \Omega \times \gamma + \Xi \times \gamma \end{pmatrix}$$

All inputs:

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

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

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)

$$\begin{pmatrix} \varepsilon & \rho \\ \sigma & \beta \\ \Lambda & \Delta \\ \Omega & \Xi \end{pmatrix}$$

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

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

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:

$$7 \times x^2 - 28 \times x - 539 = 0$$

Answer:

-7, 11

End of Answer.

Solution:

Roots to the equation

$$7 \times x^2 - 28 \times x - 539 = 0$$

are -7 and 11 .

Let us verity -7 first: $7 \times x^2 - 28 \times x - 539 = 343 + (196) + (-539) = 539 + (-539) = 0$

Then verity 11: $7 \times x^2 - 28 \times x - 539 = 847 + (-308) + (-539) = 539 + (-539) = 0$

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		7
Calculated 2	string	2 (2 strings) :	
Calculated 3	integer		−28
Calculated 4	string	2 (2 strings) :	
Calculated 5	integer		−539
Calculated 6	integer		343
Calculated 7	integer		196
Calculated 8	integer		539
Calculated 9	integer		0
Calculated 10	integer		847

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		-308
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		$-31, 60, 3$	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 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(4) , 3(3) , 4(2) , 5(1) , 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 generat ed:

1(8, 23) , 2(10, 25) , 3(6, 21) , 4(11, 26) , 5(13, 28) , 6(7, 22) .

Question 27.1.1 (6, 8, 23)

An object is subjected to an external net force $\mathbf{f} = (90.0, 6.0, -3000.0)N$. Its mass is known as $m = 52.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.7308ms^{-2}, .54163ms^{-2}, -747692.km/h^2)$.
B. The accelaration is $(4.9623ms^{-2}, .54163ms^{-2}, 3.3972 \times 10^6 km/h^2)$.
C. The accelaration is $(1.7308ms^{-2}, .54163ms^{-2}, 3.3972 \times 10^6 km/h^2)$.
D. The accelaration is $(4.9623ms^{-2}, .11538ms^{-2}, 3.3972 \times 10^6 km/h^2)$.
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 $\mathbf{f} = (90.0, 6.0, -3000.0)N$ and $m = 52.0kg$, bring them into the above equation, then we get

$$\begin{aligned}\mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(90.0, 6.0, -3000.0)N}{52.0kg} \\ &= (1.7308, .11538, -57.692)ms^{-2} \\ &= (22431., 1495.4, -747692.)km/h^2.\end{aligned}$$

End of Solution.

Total numbers:

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

Calculated values:

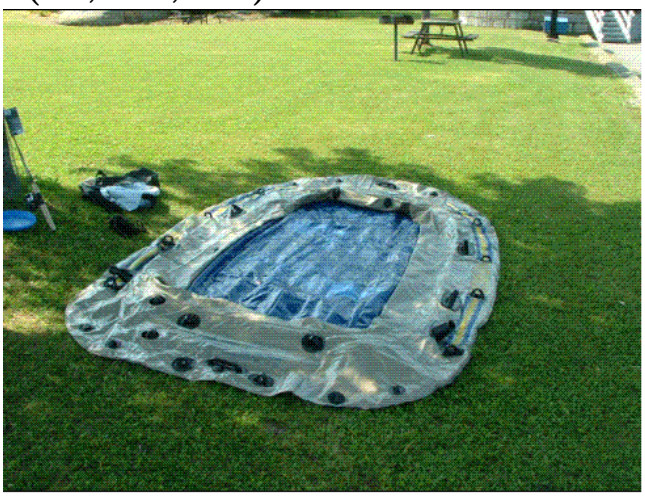
Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.7308
Calculated 2	real	5	.11538
Calculated 3	real	5	−57.692
Calculated 4	real	5	22431.
Calculated 5	real	5	1495.4
Calculated 6	real	5	−747692.

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	−1	20.0 101.0 10.0	90.0
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 27.1.2 (6, 10, 25)



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

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

Auto-answer:

C. A truck
D. 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 27.1.3 (6, 6, 21)

An object is subjected to an external net force $\mathbf{f} = (50.0, 5.0, -5000.0)N$. Its mass is known as $m = 50.0kg$. Please calculate its accelaration.

Answer:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (50.0, 5.0, -5000.0)N$ and $m = 50.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(50.0, 5.0, -5000.0)N}{50.0kg} \\
&= (1.0000, .10000, -100.00)ms^{-2} \\
&= (12960., 1296.0, -1.2960 \times 10^6)km/h^2.
\end{aligned}$$

End of Answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (50.0, 5.0, -5000.0)N$ and $m = 50.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(50.0, 5.0, -5000.0)N}{50.0kg} \\
&= (1.0000, .10000, -100.00)ms^{-2} \\
&= (12960., 1296.0, -1.2960 \times 10^6)km/h^2.
\end{aligned}$$

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	1.0000
Calculated 2	real	5	.10000
Calculated 3	real	5	-100.00
Calculated 4	real	5	12960.
Calculated 5	real	5	1296.0
Calculated 6	real	5	-1.2960×10^{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	 5.0
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	 50.0

Question 27.1.4 (6, 11, 26)

In a hotel, the possiblity of smoking customer is $a = 7.0 \times 10^{-2}$, and the possiblity of equal or above 30 years old customer is $b = .8200$. Please calculate the possiblity of non-smoking and under 30 years old customer.

Solution:

Since the possiblity of smoking customer is $a = 7.0 \times 10^{-2}$, and the possiblity of equal or above 30 years old customer is $b = .8200$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - 7.0 \times 10^{-2} = .930$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - .8200 = .1800$. So the possibility of non-smoking and under 30 years old customer is $c \times d = .167$.

End of Solution.

Answer:

The possibility of non-smoking and under 30 years old customer is $(1 - a)(1 - b) = .167$.

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	.930
Calculated 2	real	4	.1800
Calculated 3	real	3	.167

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}	 .8200

Question 27.1.5 (6, 13, 28)

What is the operation between $a = 5$ and $b = 4$: $a \times b =$? Please also calculate it.

Answer:

5;
4;
The operation is MULTIPLICATION and the result is 20.000.

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	3 (4 strings) :	MULTIPLICATION
Calculated 2	real	5	20.000

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 10, 2$	5
INPUT 2	integer		$2, 10, 2$	4
INPUT 3	string		$+$ $-$ $\times$ $\div$	 $<--$

Question 27.1.6 (6, 7, 22)

An object is subjected to an external net force $\mathbf{f} = (30.0, 3.0, -3000.0)N$. Its mass is known as $m = 52.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration (vector) is $(22208., 747.69, -2.6185 \times 10^6)km/h^2$.
B. The accelaration (vector) is $(-35808., 747.69, -1.7989 \times 10^6)km/h^2$.
C. The accelaration (vector) is $(-34372., 747.69, -2.6185 \times 10^6)km/h^2$.
D. The accelaration (vector) is $(-34372., 747.69, 2.4415 \times 10^6)km/h^2$.
E. The accelaration (vector) is $(-34372., 747.69, -747692.)km/h^2$.
F. The accelaration (vector) is $(7476.9, 747.69, -2.6185 \times 10^6)km/h^2$.

G. The accelaration (vector) is $(7476.9, 747.69, 2.4415 \times 10^6) km/h^2$.
H. The accelaration (vector) is $(-35808., 747.69, 2.4415 \times 10^6) km/h^2$.
I. The accelaration (vector) is $(7476.9, 747.69, -747692.) km/h^2$.
J. The accelaration (vector) is $(22208., 747.69, 2.4415 \times 10^6) km/h^2$.
K. The accelaration (vector) is $(22208., 747.69, -1.7989 \times 10^6) km/h^2$.
L. The accelaration (vector) is $(-35808., 747.69, -747692.) km/h^2$.

Auto-answer:

I. The accelaration (vector) is $(7476.9, 747.69, -747692.) km/h^2$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (30.0, 3.0, -3000.0)N$ and $m = 52.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(30.0, 3.0, -3000.0)N}{52.0kg} \\ &= (.57692, 5.7692 \times 10^{-2}, -57.692) ms^{-2} \\ &= (7476.9, 747.69, -747692.) km/h^2. \end{aligned}$$

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	.57692
Calculated 2	real	5	5.7692×10^{-2}
Calculated 3	real	5	-57.692
Calculated 4	real	5	7476.9
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	 30.0
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

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 27.2 (4, 4, 4)

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

Column Left	Column Right	Your choinces
A. er	b	
B. A= 6/ 2	ER	
C. B	YJH	
D. asdf(:)	a= 3	
E. yjh	ASDF(:)	

Auto-answer:

Column Left	Column Right	Answers
A. er	b	**C.**
B. A= 6/ 2	ER	**A.**
C. B	YJH	**E.**
D. asdf(:)	a= 3	**B.**
E. yjh	ASDF(:)	**D.**

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 27.3 (3, 3, 3)

Please choose the correct one from the following statements:

A. Canada has 10 provinces and 3 territories.
B. Canada has 37 provinces and 37 territories.
C. Canada has 36 provinces and 35 territories.
D. Canada has 35 provinces and 34 territories.
E. Canada has 33 provinces and 38 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 27.4 (2, 2, 2)

An object is subjected to an external net force $\mathbf{f} = (80.000, 9.0000, -9000.0)N$. Its mass is known as $m = 58.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(-6.4083ms^{-2}, 2011.0km/h^2, -748.38ms^{-2})$.

B. The accelaration is $(-6.4083ms^{-2}, 6610.6km/h^2, -748.38ms^{-2})$.

C. The accelaration is $(1.3793ms^{-2}, 2011.0km/h^2, -748.38ms^{-2})$.
D. The accelaration is $(1.3793ms^{-2}, 6610.6km/h^2, -155.17ms^{-2})$.
E. The accelaration is $(1.3793ms^{-2}, 2011.0km/h^2, -155.17ms^{-2})$.
F. The accelaration is $(-6.4083ms^{-2}, 6610.6km/h^2, -155.17ms^{-2})$.
G. None of these.

Auto-answer:

E. The accelaration is $(1.3793ms^{-2}, 2011.0km/h^2, -155.17ms^{-2})$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (80.000, 9.0000, -9000.0)N$ and $m = 58.0000kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(80.000, 9.0000, -9000.0)N}{58.0000kg} \\
&= (1.3793, .15517, -155.17)ms^{-2} \\
&= (17876., 2011.0, -2.0110 \times 10^6)km/h^2.
\end{aligned}$$

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	1.3793
Calculated 2	real	5	.15517
Calculated 3	real	5	-155.17
Calculated 4	real	5	17876.
Calculated 5	real	5	2011.0
Calculated 6	real	5	-2.0110×10^6

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	 −9000.0
Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−4	50.0000 60.1000 2.0000	 58.0000

QUESTION 27.5 (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 $\mathbf{f} = (40.0, 2.0, -2000.0)N$. Its mass is known as $m = 52.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(3.47, 3.8 \times 10^{-2}, -38.462)ms^{-2}$.
B. The accelaration is $(3.47, 3.8 \times 10^{-2}, -159.40)ms^{-2}$.
C. The accelaration is $(.769, .12, -38.462)ms^{-2}$.
D. The accelaration is $(.769, 3.8 \times 10^{-2}, -38.462)ms^{-2}$.
E. The accelaration is $(.769, 3.8 \times 10^{-2}, -159.40)ms^{-2}$.
F. The accelaration is $(3.47, .12, -159.40)ms^{-2}$.
G. The accelaration is $(3.47, .12, -38.462)ms^{-2}$.
H. The accelaration is $(.769, .12, -159.40)ms^{-2}$.

Auto-answer:

D. The accelaration is $(.769, 3.8 \times 10^{-2}, -38.462)ms^{-2}$.

End of auto-answer.

Answer:

The correct answer from the choices is

D. The accelaration is $(.769, 3.8 \times 10^{-2}, -38.462) ms^{-2}$.

End of Answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (40.0, 2.0, -2000.0)N$ and $m = 52.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(40.0, 2.0, -2000.0)N}{52.0000kg} \\ &= (.769, 3.8 \times 10^{-2}, -38.462) ms^{-2} \end{aligned}$$

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	.769
		2	3.8×10^{-2}
		5	-38.462

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	2.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−2000.0
INPUT 2	real	−4	50.0000	
			60.1000	
			2.0000	52.0000

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. 47 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. 47 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	2 (2 strings) :	F
Calculated 2	string	2 (2 strings) :	F
Calculated 3	string	1 (2 strings) :	T

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 100, 1$	47
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)

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

$$\begin{pmatrix} \zeta & \Theta \\ \Xi & \Theta \\ \eta & \gamma \\ \rho & \delta \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} =?$$

Answer:

$$\begin{pmatrix} 5 & 7 & 7 & 6 \\ 5 & 4 & 6 & 5 \\ 6 & 6 & 5 & 5 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} = \begin{pmatrix} 50 \\ 40 \\ 44 \end{pmatrix}$$

$$\begin{pmatrix} \zeta & \Theta \\ \Xi & \Theta \\ \eta & \gamma \\ \rho & \delta \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} = \begin{pmatrix} \zeta \times \beta + \Theta \times \beta \\ \Xi \times \beta + \Theta \times \beta \\ \eta \times \beta + \gamma \times \beta \\ \rho \times \beta + \delta \times \beta \end{pmatrix}$$

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)

50
40
44

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

$$\begin{pmatrix} \zeta \times \beta + \Theta \times \beta \\ \Xi \times \beta + \Theta \times \beta \\ \eta \times \beta + \gamma \times \beta \\ \rho \times \beta + \delta \times \beta \end{pmatrix}$$

All inputs:

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

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

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)

$$\begin{pmatrix} \zeta & \Theta \\ \Xi & \Theta \\ \eta & \gamma \\ \rho & \delta \end{pmatrix}$$

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 $\mathbf{f} = (80.0, 8.0, -8000.0)N$. Its mass is known as $m = 58.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(3.41, .14, 533.78)ms^{-2}$.
B. The accelaration is $(1.38, .14, -137.93)ms^{-2}$.
C. The accelaration is $(1.38, .14, 533.78)ms^{-2}$.
D. The accelaration is $(1.38, .57, 533.78)ms^{-2}$.

Auto-answer:

B. The accelaration is $(1.38, .14, -137.93)ms^{-2}$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (80.0, 8.0, -8000.0)N$ and $m = 58.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(80.0, 8.0, -8000.0)N}{58.0kg} \\ &= (1.38, .14, -137.93)ms^{-2} \end{aligned}$$

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	1.38
		2	.14
		5	−137.93

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	8.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−8000.0
INPUT 2	real	−1	50.0	
			60.1	
			2.0	58.0

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:

$$9 \times x^2 - 108 \times x - 2925 = 0$$

Answer:

25, -13

End of Answer.

Solution:

Roots to the equation

$$9 \times x^2 - 108 \times x - 2925 = 0$$

are 25 and -13 .

Let us verity 25 first: $9\times x^2-108\times x-2925 = 5625+(-2700)+(-2925) = 2925+(-2925) = 0$

Then verity -13: $9 \times x^2 - 108 \times x - 2925 = 1521 + (1404) + (-2925) = 2925 + (-2925) = 0$

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	2 (2 strings) :	
Calculated 3	integer		−108
Calculated 4	string	2 (2 strings) :	
Calculated 5	integer		−2925
Calculated 6	integer		5625
Calculated 7	integer		−2700
Calculated 8	integer		2925
Calculated 9	integer		0
Calculated 10	integer		1521

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		1404
Calculated 12	integer		2925
Calculated 13	integer		0

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$-11, 30, 4$	25
INPUT 2	integer		$-31, 60, 3$	−13
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 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(4) , 5(1) , 6(2) , 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 generat ed:

1(11, 26) , 2(7, 22) , 3(10, 25) , 4(6, 21) , 5(12, 27) , 6(9, 24) .

Question 28.1.1 (6, 11, 26)

In a hotel, the possiblity of smoking customer is $a = .580$, and the possiblity of under 30 years old customer is $b = .6200$. Please calculate the possiblity of non-smoking and equal or above 30 years old customer.

Solution:

Since the possiblity of smoking customer is $a = .580$, and the possiblity of under 30 years old customer is $b = .6200$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - .580 = .420$ and the possiblity of equal or above 30 years old customer is $d = 1.0 - b = 1.0 - .6200 = .3800$. So the possibility of non-smoking and equal or above 30 years old customer is $c \times d = .160$.

End of Solution.

Answer:

The possibility of non-smoking and equal or above 30 years old customer is $(1 - a)(1 - b) = .160$.

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	.420
Calculated 2	real	4	.3800
Calculated 3	real	3	.160

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}	 .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}	 .6200

Question 28.1.2 (6, 7, 22)

An object is subjected to an external net force $\mathbf{f} = (80.0, 4.0, -6000.0)N$. Its mass is known as $m = 58.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration (vector) is $(-79300., 893.79, 6.1195 \times 10^6)km/h^2$.
B. The accelaration (vector) is $(17876., 893.79, -6.0272 \times 10^6)km/h^2$.
C. The accelaration (vector) is $(17876., 893.79, -1.3407 \times 10^6)km/h^2$.
D. The accelaration (vector) is $(-59537., 893.79, 5.9065 \times 10^6)km/h^2$.
E. The accelaration (vector) is $(-59537., 893.79, -1.3407 \times 10^6)km/h^2$.
F. The accelaration (vector) is $(-59537., 893.79, -6.0272 \times 10^6)km/h^2$.
G. The accelaration (vector) is $(36162., 893.79, 5.9065 \times 10^6)km/h^2$.
H. The accelaration (vector) is $(17876., 893.79, 6.1195 \times 10^6)km/h^2$.
I. The accelaration (vector) is $(-79300., 893.79, -6.0272 \times 10^6)km/h^2$.
J. The accelaration (vector) is $(36162., 893.79, -1.3407 \times 10^6)km/h^2$.
K. The accelaration (vector) is $(36162., 893.79, 6.1195 \times 10^6)km/h^2$.
L. The accelaration (vector) is $(-79300., 893.79, 5.9065 \times 10^6)km/h^2$.

Auto-answer:

C. The accelaration (vector) is $(17876., 893.79, -1.3407 \times 10^6)km/h^2$.

End of auto-answer.
Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (80.0, 4.0, -6000.0)N$ and $m = 58.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(80.0, 4.0, -6000.0)N}{58.0kg} \\
&= (1.3793, 6.8966 \times 10^{-2}, -103.45)ms^{-2} \\
&= (17876., 893.79, -1.3407 \times 10^{6})km/h^2.
\end{aligned}$$

End of Solution.

Total numbers:

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

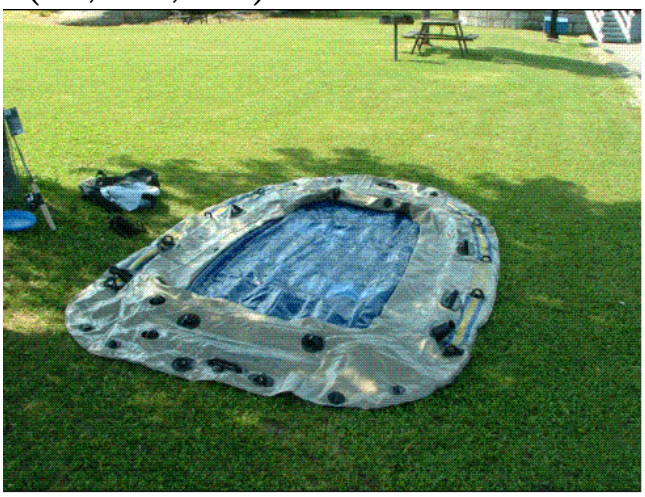
Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.3793
Calculated 2	real	5	6.8966×10^{-2}
Calculated 3	real	5	-103.45
Calculated 4	real	5	17876.
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	 80.0
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 28.1.3 (6, 10, 25)



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

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

Auto-answer:

C. An airplane
D. 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 28.1.4 (6, 6, 21)

An object is subjected to an external net force $\mathbf{f} = (70.0, 4.0, -9000.0)N$. 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 $\mathbf{f} = (70.0, 4.0, -9000.0)N$ and $m = 56.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(70.0, 4.0, -9000.0)N}{56.0kg} \\
&= (1.2500, 7.1429 \times 10^{-2}, -160.71)ms^{-2} \\
&= (16200., 925.71, -2.0829 \times 10^{6})km/h^2.
\end{aligned}$$

End of Answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (70.0, 4.0, -9000.0)N$ and $m = 56.0kg$, bring them into the above equation, then we get

$$\begin{aligned}\mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(70.0, 4.0, -9000.0)N}{56.0kg} \\ &= (1.2500, 7.1429 \times 10^{-2}, -160.71)ms^{-2} \\ &= (16200., 925.71, -2.0829 \times 10^{6})km/h^{2}.\end{aligned}$$

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	1.2500
Calculated 2	real	5	7.1429×10^{-2}
Calculated 3	real	5	-160.71
Calculated 4	real	5	16200.
Calculated 5	real	5	925.71
Calculated 6	real	5	-2.0829×10^{6}

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	 -9000.0

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

Question 28.1.5 (6, 12, 27)

In a hotel, the possiblity of smoking customer is $a = .120$, and the possiblity of equal-or-above 30 years old customer is $b = .7000$. 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 $a = .120$, and the possiblity of equal-or-above 30 years old customer is $b = .7000$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - .120 = .880$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - .7000 = .3000$. Then

Customer	Possibility
smoking and equal-or-above 30 years old	$.120 \times .7000 = 8.40 \times 10^{-2}$
smoking and under 30 years old	$.120 \times .3000 = 3.60 \times 10^{-2}$
non-smoking and equal-or-above 30 years old	$.880 \times .7000 = .616$
non-smoking and under 30 years old	$.880 \times .3000 = .264$

And the total summation of all possibilities is 1.000.

End of Solution.

Answer:

Customer	Possibility
smoking and equal-or-above 30 years old	8.40×10^{-2}
smoking and under 30 years old	3.60×10^{-2}
non-smoking and equal-or-above 30 years old	.616
non-smoking and under 30 years old	.264

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	.880
Calculated 2	real	4	.3000
Calculated 3	real	3	.120
Calculated 4	real	3	.880
Calculated 5	real	4	.7000
Calculated 6	real	4	.3000
Calculated 7	real	3	8.40×10^{-2}
Calculated 8	real	3	3.60×10^{-2}
Calculated 9	real	3	.616
Calculated 10	real	3	.264

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}	 .120
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}	 .7000

Question 28.1.6 (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 $9.00 \times 10^{24} kg$. 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	$5.00000000 \times 10^{24}$	$2.000000000 \times 10^{24}$	
Venus	6.00×10^{24}	4.00×10^{24}	
Earth	7.00×10^{24}	5.00×10^{24}	
Mars	7.00×10^{24}	7.00×10^{24}	
Jupiter	5.00×10^{24}	3.00×10^{24}	
Saturn	7.00×10^{24}	6.00×10^{24}	
Uranus	9.00×10^{24}	6.00×10^{24}	
Neptune	5.00×10^{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	$5.00000000 \times 10^{24}$	$2.000000000 \times 10^{24}$	7.50×10^{-10}
Venus	6.00×10^{24}	4.00×10^{24}	2.25×10^{-10}
Earth	7.00×10^{24}	5.00×10^{24}	1.68×10^{-10}
Mars	7.00×10^{24}	7.00×10^{24}	8.58×10^{-11}
Jupiter	5.00×10^{24}	3.00×10^{24}	3.33×10^{-10}
Saturn	7.00×10^{24}	6.00×10^{24}	1.17×10^{-10}
Uranus	9.00×10^{24}	6.00×10^{24}	1.50×10^{-10}
Neptune	5.00×10^{24}	7.00×10^{24}	6.13×10^{-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	$5.00000000 \times 10^{24}$	$2.000000000 \times 10^{24}$	7.50×10^{-10}
Venus	6.00×10^{24}	4.00×10^{24}	2.25×10^{-10}
Earth	7.00×10^{24}	5.00×10^{24}	1.68×10^{-10}
Mars	7.00×10^{24}	7.00×10^{24}	8.58×10^{-11}
Jupiter	5.00×10^{24}	3.00×10^{24}	$3.33 \times 10^{-10}3$
Saturn	7.00×10^{24}	6.00×10^{24}	1.17×10^{-10}
Uranus	9.00×10^{24}	6.00×10^{24}	1.50×10^{-10}
Neptune	5.00×10^{24}	7.00×10^{24}	6.13×10^{-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	7.50×10^{-10}
Calculated 2	real	3	2.25×10^{-10}
Calculated 3	real	3	1.68×10^{-10}
Calculated 4	real	3	8.58×10^{-11}
Calculated 5	real	3	3.33×10^{-10}
Calculated 6	real	3	1.17×10^{-10}
Calculated 7	real	3	1.50×10^{-10}
Calculated 8	real	3	6.13×10^{-11}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	9.00×10^{24}
INPUT 2	real	16	$2.00000000 \times 10^{24}$ $1.010000000 \times 10^{25}$ $10.0000000 \times 10^{23}$	$5.00000000 \times 10^{24}$
INPUT 3	real	15	$2.000000000 \times 10^{24}$ $1.0100000000 \times 10^{25}$ $10.00000000 \times 10^{23}$	$2.000000000 \times 10^{24}$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	6.00×10^{24}
INPUT 5	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	4.00×10^{24}
INPUT 6	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	7.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 7	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	5.00×10^{24}
INPUT 8	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	7.00×10^{24}
INPUT 9	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	7.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 10	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	5.00×10^{24}
INPUT 11	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	3.00×10^{24}
INPUT 12	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	7.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 13	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	6.00×10^{24}
INPUT 14	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	9.00×10^{24}
INPUT 15	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	6.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 16	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	5.00×10^{24}
INPUT 17	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	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}

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. 80 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. 80 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 (2 strings) :	T
Calculated 2	string	1 (2 strings) :	T
Calculated 3	string	2 (2 strings) :	F

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 100, 1$	80
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 28.3 (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 28.4 (4, 4, 4)

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

Column Left	Column Right	Your choinces
A. asdf(:)	b	
B. B	a	
C. yjh	YJH	
D. A	eR	
E. er	ASDF(:)	

Auto-answer:

Column Left	Column Right	Answers
A. asdf(:)	b	**B.**
B. B	a	**D.**
C. yjh	YJH	**C.**
D. A	eR	**E.**
E. er	ASDF(:)	**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 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 $\mathbf{f} = (90.0, 4.0, -3000.0)N$. Its mass is known as $m = 50.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.80, .31, -60.000)ms^{-2}$.
B. The accelaration is $(3.94, .31, 202.99)ms^{-2}$.
C. The accelaration is $(1.80, 8.0 \times 10^{-2}, 202.99)ms^{-2}$.
D. The accelaration is $(3.94, 8.0 \times 10^{-2}, -60.000)ms^{-2}$.
E. The accelaration is $(3.94, 8.0 \times 10^{-2}, 202.99)ms^{-2}$.
F. The accelaration is $(1.80, .31, 202.99)ms^{-2}$.
G. The accelaration is $(1.80, 8.0 \times 10^{-2}, -60.000)ms^{-2}$.
H. The accelaration is $(3.94, .31, -60.000)ms^{-2}$.

Auto-answer:

G. The accelaration is $(1.80, 8.0 \times 10^{-2}, -60.000)ms^{-2}$.

End of auto-answer.

Answer:

The correct answer from the choices is
G. The accelaration is $(1.80, 8.0 \times 10^{-2}, -60.000)ms^{-2}$.

End of Answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (90.0, 4.0, -3000.0)N$ and $m = 50.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(90.0, 4.0, -3000.0)N}{50.0000kg} \\ &= (1.80, 8.0 \times 10^{-2}, -60.000)ms^{-2} \end{aligned}$$

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	1.80
		2	8.0×10^{-2}
		5	-60.000

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	4.0
		-1	-2000.0	
			-10001.0	
			-1000.0	-3000.0
INPUT 2	real	-4	50.0000	
			60.1000	
			2.0000	50.0000

QUESTION 28.6 (2, 2, 2)

An object is subjected to an external net force $\mathbf{f} = (90.000, 7.0000, -8000.0)N$. Its mass is known as $m = 54.0000kg$. Please choose the correct accelaration

from the following choices.
A. The accelaration is $(1.6667ms^{-2}, -4788.6km/h^2, -424.68ms^{-2})$.
B. The accelaration is $(1.6667ms^{-2}, 1680.0km/h^2, -424.68ms^{-2})$.
C. The accelaration is $(-4.8184ms^{-2}, -4788.6km/h^2, -424.68ms^{-2})$.
D. The accelaration is $(-4.8184ms^{-2}, 1680.0km/h^2, -148.15ms^{-2})$.
E. The accelaration is $(1.6667ms^{-2}, 1680.0km/h^2, -148.15ms^{-2})$.
F. The accelaration is $(-4.8184ms^{-2}, -4788.6km/h^2, -148.15ms^{-2})$.
G. None of these.

Auto-answer:

E. The accelaration is $(1.6667ms^{-2}, 1680.0km/h^2, -148.15ms^{-2})$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (90.000, 7.0000, -8000.0)N$ and $m = 54.0000kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(90.000, 7.0000, -8000.0)N}{54.0000kg} \\
&= (1.6667, .12963, -148.15)ms^{-2} \\
&= (21600., 1680.0, -1.9200 \times 10^6)km/h^2.
\end{aligned}$$

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	1.6667
Calculated 2	real	5	.12963
Calculated 3	real	5	−148.15
Calculated 4	real	5	21600.
Calculated 5	real	5	1680.0
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	 90.000
INPUT 2	real	−4	2.0000 10.1000 1.0000	 7.0000
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

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

QUESTION 28.7 (8, 15, 60)

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

$$\begin{pmatrix} \beta & \Gamma \\ \epsilon & \beta \\ \eta & \beta \\ \Xi & \epsilon \end{pmatrix} \begin{pmatrix} \beta \\ \gamma \end{pmatrix} =?$$

Answer:

$$\begin{pmatrix} 6 & 5 & 6 & 4 \\ 4 & 5 & 4 & 6 \\ 5 & 6 & 5 & 4 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} = \begin{pmatrix} 42 \\ 38 \\ 40 \end{pmatrix}$$

$$\begin{pmatrix} \beta & \Gamma \\ \epsilon & \beta \\ \eta & \beta \\ \Xi & \epsilon \end{pmatrix} \begin{pmatrix} \beta \\ \gamma \end{pmatrix} = \begin{pmatrix} \beta \times \beta + \Gamma \times \gamma \\ \epsilon \times \beta + \beta \times \gamma \\ \eta \times \beta + \beta \times \gamma \\ \Xi \times \beta + \epsilon \times \gamma \end{pmatrix}$$

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)

42
38
40

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

$$\begin{pmatrix} \beta \times \beta + \Gamma \times \gamma \\ \epsilon \times \beta + \beta \times \gamma \\ \eta \times \beta + \beta \times \gamma \\ \Xi \times \beta + \epsilon \times \gamma \end{pmatrix}$$

All inputs:

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

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

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)

$$\begin{pmatrix} \beta & \Gamma \\ \epsilon & \beta \\ \eta & \beta \\ \Xi & \epsilon \end{pmatrix}$$

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 $\mathbf{f} = (80.0, 5.0, -9000.0)N$. Its mass is known as $m = 50.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(7.22, .10, -180.00)ms^{-2}$.
B. The accelaration is $(1.60, .10, -180.00)ms^{-2}$.
C. The accelaration is $(7.22, .47, -180.00)ms^{-2}$.
D. The accelaration is $(7.22, .47, -620.64)ms^{-2}$.

Auto-answer:

B. The accelaration is $(1.60, .10, -180.00)ms^{-2}$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (80.0, 5.0, -9000.0)N$ and $m = 50.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(80.0, 5.0, -9000.0)N}{50.0kg} \\ &= (1.60, .10, -180.00)ms^{-2} \end{aligned}$$

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	1.60
		2	.10
		5	−180.00

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	5.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−9000.0
INPUT 2	real	−1	50.0	
			60.1	
			2.0	50.0

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:

$$15 \times x^2 + 210 \times x - 7905 = 0$$

Answer:

17, -31

End of Answer.

Solution:

Roots to the equation

$$15 \times x^2 + 210 \times x - 7905 = 0$$

are 17 and -31 .

Let us verity 17 first: $15 \times x^2 + 210 \times x - 7905 = 4335 + (3570) + (-7905) = 7905 + (-7905) = 0$

Then verity -31: $15 \times x^2 + 210 \times x - 7905 = 14415 + (-6510) + (-7905) = 7905 + (-7905) = 0$

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		15
Calculated 2	string	1 (2 strings) :	+
Calculated 3	integer		210
Calculated 4	string	2 (2 strings) :	
Calculated 5	integer		−7905
Calculated 6	integer		4335
Calculated 7	integer		3570
Calculated 8	integer		7905
Calculated 9	integer		0
Calculated 10	integer		14415

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		−6510
Calculated 12	integer		7905
Calculated 13	integer		0

All inputs:

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

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(2) , 3(3) , 4(5) , 5(1) , 6(4) , 7(7) , 8(8) , 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 generat ed:

1(8, 23) , 2(11, 26) , 3(9, 24) , 4(13, 28) , 5(12, 27) , 6(7, 22) .

Question 29.1.1 (6, 8, 23)

An object is subjected to an external net force $\mathbf{f} = (20.0, 5.0, -9000.0)N$. Its mass is known as $m = 50.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(.40000ms^{-2}, -.20200ms^{-2}, -2.3328 \times 10^6 km/h^2)$.
B. The accelaration is $(.40000ms^{-2}, .10000ms^{-2}, -7.2147 \times 10^6 km/h^2)$.
C. The accelaration is $(.40000ms^{-2}, .10000ms^{-2}, -2.3328 \times 10^6 km/h^2)$.
D. The accelaration is $(.93127ms^{-2}, -.20200ms^{-2}, -2.3328 \times 10^6 km/h^2)$.
E. none of these.

Auto-answer:

C. The accelaration is $(.40000ms^{-2}, .10000ms^{-2}, -2.3328 \times 10^6 km/h^2)$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (20.0, 5.0, -9000.0)N$ and $m = 50.0kg$, bring them into the above equation, then we get

$$\begin{aligned}\mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(20.0, 5.0, -9000.0)N}{50.0kg} \\ &= (.40000, .10000, -180.00)ms^{-2} \\ &= (5184.0, 1296.0, -2.3328 \times 10^6)km/h^2.\end{aligned}$$

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	.40000
Calculated 2	real	5	.10000
Calculated 3	real	5	−180.00
Calculated 4	real	5	5184.0
Calculated 5	real	5	1296.0
Calculated 6	real	5	-2.3328×10^6

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	 5.0
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	 50.0

Question 29.1.2 (6, 11, 26)

In a hotel, the possiblity of smoking customer is $a = .660$, and the possiblity of equal or above 30 years old customer is $b = .4000$. Please calculate the possiblity of non-smoking and under 30 years old customer.

Solution:

Since the possiblity of smoking customer is $a = .660$, and the possiblity of equal or above 30 years old customer is $b = .4000$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - .660 = .340$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - .4000 = .6000$. So the possibility of non-smoking and under 30 years old customer is $c \times d = .204$.

End of Solution.

Answer:

The possibility of non-smoking and under 30 years old customer is $(1 - a)(1 - b) = .204$.

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	.340
Calculated 2	real	4	.6000
Calculated 3	real	3	.204

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}	 .660
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}	 .4000

Question 29.1.3 (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 $8.00 \times 10^{24} kg$. 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	$3.00000000 \times 10^{24}$	$8.000000000 \times 10^{24}$	
Venus	6.00×10^{24}	9.00×10^{24}	
Earth	7.00×10^{24}	4.00×10^{24}	
Mars	6.00×10^{24}	2.00×10^{24}	
Jupiter	9.00×10^{24}	3.00×10^{24}	
Saturn	4.00×10^{24}	8.00×10^{24}	
Uranus	4.00×10^{24}	6.00×10^{24}	
Neptune	9.00×10^{24}	3.00×10^{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	$3.00000000 \times 10^{24}$	$8.000000000 \times 10^{24}$	2.50×10^{-11}
Venus	6.00×10^{24}	9.00×10^{24}	3.95×10^{-11}
Earth	7.00×10^{24}	4.00×10^{24}	2.33×10^{-10}
Mars	6.00×10^{24}	2.00×10^{24}	8.00×10^{-10}
Jupiter	9.00×10^{24}	3.00×10^{24}	5.34×10^{-10}
Saturn	4.00×10^{24}	8.00×10^{24}	3.33×10^{-11}
Uranus	4.00×10^{24}	6.00×10^{24}	5.93×10^{-11}
Neptune	9.00×10^{24}	3.00×10^{24}	5.34×10^{-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	$3.00000000 \times 10^{24}$	$8.000000000 \times 10^{24}$	2.50×10^{-11}
Venus	6.00×10^{24}	9.00×10^{24}	3.95×10^{-11}
Earth	7.00×10^{24}	4.00×10^{24}	2.33×10^{-10}
Mars	6.00×10^{24}	2.00×10^{24}	8.00×10^{-10}
Jupiter	9.00×10^{24}	3.00×10^{24}	$5.34 \times 10^{-10}3$
Saturn	4.00×10^{24}	8.00×10^{24}	3.33×10^{-11}
Uranus	4.00×10^{24}	6.00×10^{24}	5.93×10^{-11}
Neptune	9.00×10^{24}	3.00×10^{24}	5.34×10^{-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	2.50×10^{-11}
Calculated 2	real	3	3.95×10^{-11}
Calculated 3	real	3	2.33×10^{-10}
Calculated 4	real	3	8.00×10^{-10}
Calculated 5	real	3	5.34×10^{-10}
Calculated 6	real	3	3.33×10^{-11}
Calculated 7	real	3	5.93×10^{-11}
Calculated 8	real	3	5.34×10^{-10}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	8.00×10^{24}
INPUT 2	real	16	$2.00000000 \times 10^{24}$ $1.010000000 \times 10^{25}$ $10.0000000 \times 10^{23}$	$3.00000000 \times 10^{24}$
INPUT 3	real	15	$2.000000000 \times 10^{24}$ $1.0100000000 \times 10^{25}$ $10.00000000 \times 10^{23}$	$8.000000000 \times 10^{24}$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	6.00×10^{24}
INPUT 5	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	9.00×10^{24}
INPUT 6	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	7.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 7	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	4.00×10^{24}
INPUT 8	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	6.00×10^{24}
INPUT 9	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	2.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 10	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	9.00×10^{24}
INPUT 11	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	3.00×10^{24}
INPUT 12	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	4.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 13	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	8.00×10^{24}
INPUT 14	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	4.00×10^{24}
INPUT 15	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	6.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 16	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	9.00×10^{24}
INPUT 17	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	3.00×10^{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 29.1.4 (6, 13, 28)

What is the operation between $a = 7$ and $b = 8$: $a + b =$? Please also calculate it.

Answer:

7;

8;

The operation is ADDITION and the result is 15.000.

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 (4 strings) :	ADDITION
Calculated 2	real	5	15.000

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 29.1.5 (6, 12, 27)

In a hotel, the possiblity of smoking customer is $a = .790$, and the possiblity of equal-or-above 30 years old customer is $b = .6200$. 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 $a = .790$, and the possiblity of equal-or-above 30 years old customer is $b = .6200$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - .790 = .210$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - .6200 = .3800$. Then

Customer	Possibility
smoking and equal-or-above 30 years old	$.790 \times .6200 = .490$
smoking and under 30 years old	$.790 \times .3800 = .300$
non-smoking and equal-or-above 30 years old	$.210 \times .6200 = .130$
non-smoking and under 30 years old	$.210 \times .3800 = 7.98 \times 10^{-2}$

And the total summation of all possibilities is 1.000.

End of Solution.

Answer:

Customer	Possibility
smoking and equal-or-above 30 years old	.490
smoking and under 30 years old	.300
non-smoking and equal-or-above 30 years old	.130
non-smoking and under 30 years old	7.98×10^{-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	.210
Calculated 2	real	4	.3800
Calculated 3	real	3	.790
Calculated 4	real	3	.210
Calculated 5	real	4	.6200
Calculated 6	real	4	.3800
Calculated 7	real	3	.490
Calculated 8	real	3	.300
Calculated 9	real	3	.130
Calculated 10	real	3	7.98×10^{-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}	 .790
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}	 .6200

Question 29.1.6 (6, 7, 22)

An object is subjected to an external net force $\mathbf{f} = (30.0, 3.0, -2000.0)N$.

Its mass is known as $m = 52.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration (vector) is $(7476.9, 747.69, 1.7457 \times 10^6)km/h^2$.
B. The accelaration (vector) is $(-27352., 747.69, -498462.)km/h^2$.
C. The accelaration (vector) is $(7476.9, 747.69, -498462.)km/h^2$.
D. The accelaration (vector) is $(35096., 747.69, -498462.)km/h^2$.
E. The accelaration (vector) is $(21956., 747.69, -498462.)km/h^2$.
F. The accelaration (vector) is $(-27352., 747.69, 2.1712 \times 10^6)km/h^2$.
G. The accelaration (vector) is $(-27352., 747.69, 1.7457 \times 10^6)km/h^2$.
H. The accelaration (vector) is $(35096., 747.69, 2.1712 \times 10^6)km/h^2$.
I. The accelaration (vector) is $(7476.9, 747.69, 1.0906 \times 10^6)km/h^2$.
J. The accelaration (vector) is $(-27352., 747.69, 1.0906 \times 10^6)km/h^2$.
K. The accelaration (vector) is $(21956., 747.69, 1.7457 \times 10^6)km/h^2$.
L. The accelaration (vector) is $(35096., 747.69, 1.7457 \times 10^6)km/h^2$.

Auto-answer:

C. The accelaration (vector) is $(7476.9, 747.69, -498462.)km/h^2$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (30.0, 3.0, -2000.0)N$ and $m = 52.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(30.0, 3.0, -2000.0)N}{52.0kg} \\
&= (.57692, 5.7692 \times 10^{-2}, -38.462)ms^{-2} \\
&= (7476.9, 747.69, -498462.)km/h^2.
\end{aligned}$$

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	.57692
Calculated 2	real	5	5.7692×10^{-2}
Calculated 3	real	5	-38.462
Calculated 4	real	5	7476.9
Calculated 5	real	5	747.69
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	 3.0
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

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 29.2 (2, 2, 2)

An object is subjected to an external net force $\mathbf{f} = (30.000, 3.0000, -6000.0)N$. Its mass is known as $m = 54.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(.55556ms^{-2}, -3471.8km/h^2, -532.57ms^{-2})$.
B. The accelaration is $(1.4947ms^{-2}, 720.00km/h^2, -111.11ms^{-2})$.
C. The accelaration is $(1.4947ms^{-2}, -3471.8km/h^2, -111.11ms^{-2})$.
D. The accelaration is $(1.4947ms^{-2}, 720.00km/h^2, -532.57ms^{-2})$.
E. The accelaration is $(.55556ms^{-2}, 720.00km/h^2, -111.11ms^{-2})$.
F. The accelaration is $(1.4947ms^{-2}, -3471.8km/h^2, -532.57ms^{-2})$.
G. None of these.

Auto-answer:

E. The accelaration is $(.55556ms^{-2}, 720.00km/h^2, -111.11ms^{-2})$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (30.000, 3.0000, -6000.0)N$ and $m = 54.0000kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(30.000, 3.0000, -6000.0)N}{54.0000kg} \\
&= (.55556, 5.5556 \times 10^{-2}, -111.11)ms^{-2} \\
&= (7200.0, 720.00, -1.4400 \times 10^{6})km/h^2.
\end{aligned}$$

End of Solution.

Total numbers:

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

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	.55556
Calculated 2	real	5	5.5556×10^{-2}
Calculated 3	real	5	-111.11
Calculated 4	real	5	7200.0
Calculated 5	real	5	720.00
Calculated 6	real	5	-1.4400×10^{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	 -6000.0
Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	-4	50.0000 60.1000 2.0000	 54.0000

QUESTION 29.3 (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 33 provinces and 38 territories.
D. Canada has 34 provinces and 39 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 29.4 (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. 30 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. 30 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 (2 strings) :	T
Calculated 2	string	2 (2 strings) :	F
Calculated 3	string	1 (2 strings) :	T

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 100, 1$	30
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 29.5 (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 $\mathbf{f} = (40.0, 7.0, -5000.0)N$. Its mass is known as $m = 50.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(.800, .14, 253.62)ms^{-2}$.
B. The accelaration is $(4.59, .14, 253.62)ms^{-2}$.
C. The accelaration is $(.800, .34, -100.00)ms^{-2}$.
D. The accelaration is $(4.59, .14, -100.00)ms^{-2}$.
E. The accelaration is $(.800, .14, -100.00)ms^{-2}$.
F. The accelaration is $(4.59, .34, -100.00)ms^{-2}$.
G. The accelaration is $(.800, .34, 253.62)ms^{-2}$.
H. The accelaration is $(4.59, .34, 253.62)ms^{-2}$.

Auto-answer:

E. The accelaration is $(.800, .14, -100.00)ms^{-2}$.

End of auto-answer.

Answer:

The correct answer from the choices is
E. The accelaration is $(.800, .14, -100.00)ms^{-2}$.

End of Answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (40.0, 7.0, -5000.0)N$ and $m = 50.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(40.0, 7.0, -5000.0)N}{50.0000kg} \\ &= (.800, .14, -100.00)ms^{-2} \end{aligned}$$

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	.800
		2	.14
		5	−100.00

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	7.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−5000.0
INPUT 2	real	−4	50.0000	
			60.1000	
			2.0000	50.0000

QUESTION 29.6 (4, 4, 4)

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

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

Auto-answer:

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

All inputs:

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

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

QUESTION 29.7 (7, 14, 50)

An object is subjected to an external net force $\mathbf{f} = (80.0, 10.0, -3000.0)N$. Its mass is known as $m = 52.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.54, .19, 159.85)ms^{-2}$.
B. The accelaration is $(3.15, -.61, 159.85)ms^{-2}$.
C. The accelaration is $(1.54, .19, -57.692)ms^{-2}$.
D. The accelaration is $(3.15, .19, 159.85)ms^{-2}$.

Auto-answer:

C. The accelaration is $(1.54, .19, -57.692)ms^{-2}$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (80.0, 10.0, -3000.0)N$ and $m = 52.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(80.0, 10.0, -3000.0)N}{52.0kg} \\ &= (1.54, .19, -57.692)ms^{-2} \end{aligned}$$

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	1.54
		2	.19
		5	-57.692

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	10.0
		-1	-2000.0	
			-10001.0	
			-1000.0	-3000.0
INPUT 2	real	-1	50.0	
			60.1	
			2.0	52.0

QUESTION 29.8 (8, 15, 60)

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

$$\begin{pmatrix} \Gamma & \Gamma \\ \sigma & \Xi \\ \Lambda & \delta \\ \delta & \rho \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} =?$$

Answer:

$$\begin{pmatrix} 5 & 6 & 5 & 5 \\ 5 & 5 & 7 & 4 \\ 4 & 6 & 6 & 6 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} = \begin{pmatrix} 42 \\ 42 \\ 44 \end{pmatrix}$$

$$\begin{pmatrix} \Gamma & \Gamma \\ \sigma & \Xi \\ \Lambda & \delta \\ \delta & \rho \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} = \begin{pmatrix} \Gamma \times \beta + \Gamma \times \beta \\ \sigma \times \beta + \Xi \times \beta \\ \Lambda \times \beta + \delta \times \beta \\ \delta \times \beta + \rho \times \beta \end{pmatrix}$$

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
44

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

$$\begin{pmatrix} \Gamma \times \beta + \Gamma \times \beta \\ \sigma \times \beta + \Xi \times \beta \\ \Lambda \times \beta + \delta \times \beta \\ \delta \times \beta + \rho \times \beta \end{pmatrix}$$

All inputs:

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

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

$$\begin{pmatrix} \Gamma & \Gamma \\ \sigma & \Xi \\ \Lambda & \delta \\ \delta & \rho \end{pmatrix}$$

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

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

QUESTION 29.9 (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:

$$-15 \times x^2 + 210 \times x + 2205 = 0$$

Answer:

21, -7

End of Answer.

Solution:

Roots to the equation

$$-15 \times x^2 + 210 \times x + 2205 = 0$$

are 21 and -7 .

Let us verity 21 first: $-15 \times x^2 + 210 \times x + 2205 = -6615 + (4410) + (2205) = -2205 + (2205) = 0$

Then verity -7: $-15 \times x^2 + 210 \times x + 2205 = -735 + (-1470) + (2205) = -2205 + (2205) = 0$

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		−15
Calculated 2	string	1 (2 strings) :	+
Calculated 3	integer		210
Calculated 4	string	1 (2 strings) :	+
Calculated 5	integer		2205
Calculated 6	integer		−6615
Calculated 7	integer		4410
Calculated 8	integer		−2205
Calculated 9	integer		0
Calculated 10	integer		−735

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		−1470
Calculated 12	integer		−2205
Calculated 13	integer		0

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$-11, 30, 4$	21
INPUT 2	integer		$-31, 60, 3$	-7
INPUT 3	integer		$-15, 15, 2$	-15

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(4) , 3(3) , 4(1) , 5(5) , 6(2) , 7(8) , 8(7) , 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 generat ed:

1(11, 26) , 2(6, 21) , 3(12, 27) , 4(8, 23) , 5(10, 25) , 6(13, 28) .

Question 30.1.1 (6, 11, 26)

In a hotel, the possiblity of smoking customer is $a = .150$, and the possiblity of equal or above 30 years old customer is $b = .3600$. Please calculate the possiblity of non-smoking and under 30 years old customer.

Solution:

Since the possiblity of smoking customer is $a = .150$, and the possiblity of equal or above 30 years old customer is $b = .3600$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - .150 = .850$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - .3600 = .6400$. So the possibility of non-smoking and under 30 years old customer is $c \times d = .544$.

End of Solution.

Answer:

The possibility of non-smoking and under 30 years old customer is $(1 - a)(1 - b) = .544$.

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	.850
Calculated 2	real	4	.6400
Calculated 3	real	3	.544

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}	 .150
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}	 .3600

Question 30.1.2 (6, 6, 21)

An object is subjected to an external net force $\mathbf{f} = (90.0, 4.0, -8000.0)N$. 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 $\mathbf{f} = (90.0, 4.0, -8000.0)N$ and $m = 56.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(90.0, 4.0, -8000.0)N}{56.0kg} \\
&= (1.6071, 7.1429 \times 10^{-2}, -142.86)ms^{-2} \\
&= (20829., 925.71, -1.8514 \times 10^{6})km/h^2.
\end{aligned}$$

End of Answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (90.0, 4.0, -8000.0)N$ and $m = 56.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(90.0, 4.0, -8000.0)N}{56.0kg} \\
&= (1.6071, 7.1429 \times 10^{-2}, -142.86)ms^{-2} \\
&= (20829., 925.71, -1.8514 \times 10^{6})km/h^2.
\end{aligned}$$

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	1.6071
Calculated 2	real	5	7.1429×10^{-2}
Calculated 3	real	5	-142.86
Calculated 4	real	5	20829.
Calculated 5	real	5	925.71
Calculated 6	real	5	-1.8514×10^{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	 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	 56.0

Question 30.1.3 (6, 12, 27)

In a hotel, the possiblity of smoking customer is $a = .520$, and the possiblity of equal-or-above 30 years old customer is $b = .2600$. 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 $a = .520$, and the possiblity of equal-or-above 30 years old customer is $b = .2600$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - .520 = .480$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - .2600 = .7400$. Then

Customer	Possibility
smoking and equal-or-above 30 years old	$.520 \times .2600 = .135$
smoking and under 30 years old	$.520 \times .7400 = .385$
non-smoking and equal-or-above 30 years old	$.480 \times .2600 = .125$
non-smoking and under 30 years old	$.480 \times .7400 = .355$

And the total summation of all possibilities is 1.000.

End of Solution.

Answer:

Customer	Possibility
smoking and equal-or-above 30 years old	.135
smoking and under 30 years old	.385
non-smoking and equal-or-above 30 years old	.125
non-smoking and under 30 years old	.355

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	.480
Calculated 2	real	4	.7400
Calculated 3	real	3	.520
Calculated 4	real	3	.480
Calculated 5	real	4	.2600
Calculated 6	real	4	.7400
Calculated 7	real	3	.135
Calculated 8	real	3	.385
Calculated 9	real	3	.125
Calculated 10	real	3	.355
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}	 .520
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}	 .2600

Question 30.1.4 (6, 8, 23)

An object is subjected to an external net force $\mathbf{f} = (50.0, 7.0, -5000.0)N$. Its mass is known as $m = 54.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(.92593ms^{-2}, .43858ms^{-2}, -1.2000 \times 10^6 km/h^2)$.
B. The accelaration is $(.92593ms^{-2}, .12963ms^{-2}, -1.2000 \times 10^6 km/h^2)$.
C. The accelaration is $(.92593ms^{-2}, .43858ms^{-2}, 4.0009 \times 10^6 km/h^2)$.
D. The accelaration is $(2.7280ms^{-2}, .43858ms^{-2}, -1.2000 \times 10^6 km/h^2)$.
E. none of these.

Auto-answer:

B. The accelaration is $(.92593ms^{-2}, .12963ms^{-2}, -1.2000 \times 10^6 km/h^2)$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (50.0, 7.0, -5000.0)N$ and $m = 54.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(50.0, 7.0, -5000.0)N}{54.0kg} \\ &= (.92593, .12963, -92.593)ms^{-2} \\ &= (12000., 1680.0, -1.2000 \times 10^6)km/h^2. \end{aligned}$$

End of Solution.

Total numbers:

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

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	.92593
Calculated 2	real	5	.12963
Calculated 3	real	5	−92.593
Calculated 4	real	5	12000.
Calculated 5	real	5	1680.0
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	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	54.0

Question 30.1.5 (6, 10, 25)

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

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

Auto-answer:

C. A truck
D. 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 30.1.6 (6, 13, 28)

What is the operation between $a = 5$ and $b = 2$: $a + b =$? Please also calculate it.

Answer:

5;
2;
The operation is ADDITION and the result is 7.0000.

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 (4 strings) :	ADDITION
Calculated 2	real	5	7.0000

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 10, 2$	5
INPUT 2	integer		$2, 10, 2$	2
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 30.2 (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. Er	c	
D. yjh	a= 3	
E. A= 6/ 2	eR	

Auto-answer:

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

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 30.3 (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 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:

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 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 $\mathbf{f} = (30.0, 8.0, -7000.0)N$. Its mass is known as $m = 56.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(-3.63, -.69, -125.00)ms^{-2}$.
B. The accelaration is $(-3.63, .14, -125.00)ms^{-2}$.
C. The accelaration is $(-3.63, -.69, 570.50)ms^{-2}$.
D. The accelaration is $(.536, -.69, 570.50)ms^{-2}$.
E. The accelaration is $(.536, .14, -125.00)ms^{-2}$.
F. The accelaration is $(.536, .14, 570.50)ms^{-2}$.
G. The accelaration is $(-3.63, .14, 570.50)ms^{-2}$.
H. The accelaration is $(.536, -.69, -125.00)ms^{-2}$.

Auto-answer:

E. The accelaration is $(.536, .14, -125.00)ms^{-2}$.

End of auto-answer.

Answer:

The correct answer from the choices is
E. The accelaration is $(.536, .14, -125.00)ms^{-2}$.

End of Answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (30.0, 8.0, -7000.0)N$ and $m = 56.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(30.0, 8.0, -7000.0)N}{56.0000kg} \\ &= (.536, .14, -125.00)ms^{-2} \end{aligned}$$

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	.536
		2	.14
		5	−125.00

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	vector	−1	20.0	
			101.0	
			10.0	30.0
		−1	2.0	
			10.1	
			1.0	8.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−7000.0
INPUT 2	real	−4	50.0000	
			60.1000	
			2.0000	56.0000

QUESTION 30.5 (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. 28 is an even number.

Your answer	

2. Montreal is in Quebec 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	T

2. Montreal is in Quebec 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 (2 strings) :	T
Calculated 2	string	1 (2 strings) :	T
Calculated 3	string	1 (2 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		$\mathbf{F} = m\mathbf{a}$ $\|\mathbf{F}\| = Gm_1m_2r^{-2}$	$<--$
INPUT 6	string		the Newton's Second Law Newton's Law of Universal Gravitation	$<--$

QUESTION 30.6 (2, 2, 2)

An object is subjected to an external net force $\mathbf{f} = (80.000, 5.0000, -9000.0)N$. Its mass is known as $m = 54.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(5.6440ms^{-2}, -3602.7km/h^2, -166.67ms^{-2})$.
B. The accelaration is $(1.4815ms^{-2}, 1200.0km/h^2, -166.67ms^{-2})$.
C. The accelaration is $(1.4815ms^{-2}, 1200.0km/h^2, -709.22ms^{-2})$.

D. The accelaration is $(5.6440ms^{-2}, -3602.7km/h^2, -709.22ms^{-2})$.
E. The accelaration is $(1.4815ms^{-2}, -3602.7km/h^2, -166.67ms^{-2})$.
F. The accelaration is $(1.4815ms^{-2}, -3602.7km/h^2, -709.22ms^{-2})$.
G. None of these.

Auto-answer:

B. The accelaration is $(1.4815ms^{-2}, 1200.0km/h^2, -166.67ms^{-2})$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (80.000, 5.0000, -9000.0)N$ and $m = 54.0000kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(80.000, 5.0000, -9000.0)N}{54.0000kg} \\
&= (1.4815, 9.2593 \times 10^{-2}, -166.67)ms^{-2} \\
&= (19200., 1200.0, -2.1600 \times 10^{6})km/h^2.
\end{aligned}$$

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	1.4815
Calculated 2	real	5	9.2593×10^{-2}
Calculated 3	real	5	-166.67
Calculated 4	real	5	19200.
Calculated 5	real	5	1200.0
Calculated 6	real	5	-2.1600×10^{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	 5.0000
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	 54.0000

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

QUESTION 30.7 (8, 15, 60)

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

$$\begin{pmatrix} \rho & \beta \\ \zeta & \Theta \\ \Lambda & \Psi \\ \Gamma & \Gamma \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} =?$$

Answer:

$$\begin{pmatrix} 7 & 4 & 5 & 7 \\ 4 & 5 & 6 & 4 \\ 7 & 5 & 5 & 7 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} = \begin{pmatrix} 46 \\ 38 \\ 48 \end{pmatrix}$$

$$\begin{pmatrix} \rho & \beta \\ \zeta & \Theta \\ \Lambda & \Psi \\ \Gamma & \Gamma \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} = \begin{pmatrix} \rho \times \beta + \beta \times \beta \\ \zeta \times \beta + \Theta \times \beta \\ \Lambda \times \beta + \Psi \times \beta \\ \Gamma \times \beta + \Gamma \times \beta \end{pmatrix}$$

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
38
48

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

$$\begin{pmatrix} \rho \times \beta + \beta \times \beta \\ \zeta \times \beta + \Theta \times \beta \\ \Lambda \times \beta + \Psi \times \beta \\ \Gamma \times \beta + \Gamma \times \beta \end{pmatrix}$$

All inputs:

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

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

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)

$$\begin{pmatrix} \rho & \beta \\ \zeta & \Theta \\ \Lambda & \Psi \\ \Gamma & \Gamma \end{pmatrix}$$

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

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

QUESTION 30.8 (7, 14, 50)

An object is subjected to an external net force $\mathbf{f} = (90.0, 2.0, -6000.0)N$. Its mass is known as $m = 54.0kg$. Please choose the correct accelaration

from the following choices.
A. The accelaration is $(-8.24, .17, -111.11)ms^{-2}$.
B. The accelaration is $(-8.24, 3.7 \times 10^{-2}, 351.37)ms^{-2}$.
C. The accelaration is $(1.67, 3.7 \times 10^{-2}, -111.11)ms^{-2}$.
D. The accelaration is $(-8.24, .17, 351.37)ms^{-2}$.

Auto-answer:

C. The accelaration is $(1.67, 3.7 \times 10^{-2}, -111.11)ms^{-2}$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (90.0, 2.0, -6000.0)N$ and $m = 54.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(90.0, 2.0, -6000.0)N}{54.0kg} \\ &= (1.67, 3.7 \times 10^{-2}, -111.11)ms^{-2} \end{aligned}$$

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	1.67
		2	3.7×10^{-2}
		5	-111.11

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	2.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−6000.0
INPUT 2	real	−1	50.0	
			60.1	
			2.0	54.0

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:

$$-15 \times x^2 - 30 \times x + 525 = 0$$

Answer:

5, -7

End of Answer.

Solution:

Roots to the equation

$$-15 \times x^2 - 30 \times x + 525 = 0$$

are 5 and -7 .

Let us verity 5 first: $-15 \times x^2 - 30 \times x + 525 = -375 + (-150) + (525) = -525 + (525) = 0$

Then verity -7: $-15 \times x^2 - 30 \times x + 525 = -735 + (210) + (525) = -525 + (525) = 0$

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		-15
Calculated 2	string	2 (2 strings) :	
Calculated 3	integer		-30
Calculated 4	string	1 (2 strings) :	+
Calculated 5	integer		525
Calculated 6	integer		-375
Calculated 7	integer		-150
Calculated 8	integer		-525
Calculated 9	integer		0
Calculated 10	integer		-735

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		210
Calculated 12	integer		-525
Calculated 13	integer		0

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$-11, 30, 4$	5
INPUT 2	integer		$-31, 60, 3$	-7
INPUT 3	integer		$-15, 15, 2$	-15

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(4) , 4(2) , 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 generat ed:

1(9, 24) , 2(13, 28) , 3(11, 26) , 4(7, 22) , 5(8, 23) , 6(12, 27) .

Question 31.1.1 (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	$7.00000000 \times 10^{24}$	$5.000000000 \times 10^{24}$	
Venus	2.00×10^{24}	6.00×10^{24}	
Earth	9.00×10^{24}	6.00×10^{24}	
Mars	2.00×10^{24}	5.00×10^{24}	
Jupiter	5.00×10^{24}	5.00×10^{24}	
Saturn	4.00×10^{24}	2.00×10^{24}	
Uranus	7.00×10^{24}	2.00×10^{24}	
Neptune	4.00×10^{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	$7.00000000 \times 10^{24}$	$5.000000000 \times 10^{24}$	9.34×10^{-11}
Venus	2.00×10^{24}	6.00×10^{24}	1.85×10^{-11}
Earth	9.00×10^{24}	6.00×10^{24}	8.34×10^{-11}
Mars	2.00×10^{24}	5.00×10^{24}	2.67×10^{-11}
Jupiter	5.00×10^{24}	5.00×10^{24}	6.67×10^{-11}
Saturn	4.00×10^{24}	2.00×10^{24}	3.33×10^{-10}
Uranus	7.00×10^{24}	2.00×10^{24}	5.84×10^{-10}
Neptune	4.00×10^{24}	4.00×10^{24}	8.34×10^{-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	$7.00000000 \times 10^{24}$	$5.000000000 \times 10^{24}$	9.34×10^{-11}
Venus	2.00×10^{24}	6.00×10^{24}	1.85×10^{-11}
Earth	9.00×10^{24}	6.00×10^{24}	8.34×10^{-11}
Mars	2.00×10^{24}	5.00×10^{24}	2.67×10^{-11}
Jupiter	5.00×10^{24}	5.00×10^{24}	$6.67 \times 10^{-11}3$
Saturn	4.00×10^{24}	2.00×10^{24}	3.33×10^{-10}
Uranus	7.00×10^{24}	2.00×10^{24}	5.84×10^{-10}
Neptune	4.00×10^{24}	4.00×10^{24}	8.34×10^{-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	9.34×10^{-11}
Calculated 2	real	3	1.85×10^{-11}
Calculated 3	real	3	8.34×10^{-11}
Calculated 4	real	3	2.67×10^{-11}
Calculated 5	real	3	6.67×10^{-11}
Calculated 6	real	3	3.33×10^{-10}
Calculated 7	real	3	5.84×10^{-10}
Calculated 8	real	3	8.34×10^{-11}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	5.00×10^{24}
INPUT 2	real	16	$2.00000000 \times 10^{24}$ $1.010000000 \times 10^{25}$ $10.0000000 \times 10^{23}$	$7.00000000 \times 10^{24}$
INPUT 3	real	15	$2.000000000 \times 10^{24}$ $1.0100000000 \times 10^{25}$ $10.00000000 \times 10^{23}$	$5.000000000 \times 10^{24}$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	2.00×10^{24}
INPUT 5	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	6.00×10^{24}
INPUT 6	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	9.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 7	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	6.00×10^{24}
INPUT 8	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	2.00×10^{24}
INPUT 9	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	5.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 10	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	5.00×10^{24}
INPUT 11	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	5.00×10^{24}
INPUT 12	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	4.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 13	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	2.00×10^{24}
INPUT 14	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	7.00×10^{24}
INPUT 15	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	2.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 16	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	4.00×10^{24}
INPUT 17	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	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 31.1.2 (6, 13, 28)

What is the operation between $a = 7$ and $b = 2$: $a - b =$? Please also calculate it.

Answer:

7;

2;

The operation is SUBTRACTION 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	2 (4 strings) :	SUBTRACTION
Calculated 2	real	5	5.0000

All inputs:

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

Question 31.1.3 (6, 11, 26)

In a hotel, the possiblity of smoking customer is $a = .970$, and the possiblity of equal or above 30 years old customer is $b = 6.00 \times 10^{-2}$. Please calculate the possiblity of non-smoking and under 30 years old customer.

Solution:

Since the possiblity of smoking customer is $a = .970$, and the possiblity of equal or above 30 years old customer is $b = 6.00 \times 10^{-2}$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - .970 = 3.00 \times 10^{-2}$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - 6.00 \times 10^{-2} = .9400$. So the possibility of non-smoking and under 30 years old customer is $c \times d = 2.82 \times 10^{-2}$.

End of Solution.

Answer:

The possibility of non-smoking and under 30 years old customer is $(1 - a)(1 - b) = 2.82 \times 10^{-2}$.

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	3.00×10^{-2}
Calculated 2	real	4	.9400
Calculated 3	real	3	2.82×10^{-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}	 .970
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}	 6.00×10^{-2}

Question 31.1.4 (6, 7, 22)

An object is subjected to an external net force $\mathbf{f} = (40.0, 8.0, -2000.0)N$. Its mass is known as $m = 58.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration (vector) is $(41249., 1787.6, -1.0404 \times 10^6)km/h^2$.
B. The accelaration (vector) is $(41249., 1787.6, -446897.)km/h^2$.
C. The accelaration (vector) is $(32375., 1787.6, 2.2177 \times 10^6)km/h^2$.
D. The accelaration (vector) is $(8937.9, 1787.6, -446897.)km/h^2$.
E. The accelaration (vector) is $(8937.9, 1787.6, 2.2177 \times 10^6)km/h^2$.
F. The accelaration (vector) is $(41249., 1787.6, -1.7821 \times 10^6)km/h^2$.
G. The accelaration (vector) is $(8937.9, 1787.6, -1.7821 \times 10^6)km/h^2$.
H. The accelaration (vector) is $(-41516., 1787.6, -1.0404 \times 10^6)km/h^2$.
I. The accelaration (vector) is $(32375., 1787.6, -446897.)km/h^2$.
J. The accelaration (vector) is $(8937.9, 1787.6, -1.0404 \times 10^6)km/h^2$.
K. The accelaration (vector) is $(32375., 1787.6, -1.0404 \times 10^6)km/h^2$.
L. The accelaration (vector) is $(41249., 1787.6, 2.2177 \times 10^6)km/h^2$.

Auto-answer:

D. The accelaration (vector) is $(8937.9, 1787.6, -446897.)km/h^2$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (40.0, 8.0, -2000.0)N$ and $m = 58.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(40.0, 8.0, -2000.0)N}{58.0kg} \\ &= (.68966, .13793, -34.483)ms^{-2} \\ &= (8937.9, 1787.6, -446897.)km/h^2. \end{aligned}$$

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	.68966
Calculated 2	real	5	.13793
Calculated 3	real	5	−34.483
Calculated 4	real	5	8937.9
Calculated 5	real	5	1787.6
Calculated 6	real	5	−446897.

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	 8.0
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	 58.0

Question 31.1.5 (6, 8, 23)

An object is subjected to an external net force $\mathbf{f} = (90.0, 9.0, -3000.0)N$. Its mass is known as $m = 52.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.7308ms^{-2}, .17308ms^{-2}, -747692.km/h^2)$.
B. The accelaration is $(5.8592ms^{-2}, .17308ms^{-2}, -747692.km/h^2)$.
C. The accelaration is $(5.8592ms^{-2}, .74216ms^{-2}, -747692.km/h^2)$.
D. The accelaration is $(5.8592ms^{-2}, .74216ms^{-2}, 3.4579 \times 10^6 km/h^2)$.
E. none of these.

Auto-answer:

A. The accelaration is $(1.7308ms^{-2}, .17308ms^{-2}, -747692.km/h^2)$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (90.0, 9.0, -3000.0)N$ and $m = 52.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(90.0, 9.0, -3000.0)N}{52.0kg} \\ &= (1.7308, .17308, -57.692)ms^{-2} \\ &= (22431., 2243.1, -747692.)km/h^2. \end{aligned}$$

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	1.7308
Calculated 2	real	5	.17308
Calculated 3	real	5	−57.692
Calculated 4	real	5	22431.
Calculated 5	real	5	2243.1
Calculated 6	real	5	−747692.

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	9.0
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 31.1.6 (6, 12, 27)

In a hotel, the possiblity of smoking customer is $a = .470$, and the possiblity of equal-or-above 30 years old customer is $b = .1600$. 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 $a = .470$, and the possiblity of equal-or-above 30 years old customer is $b = .1600$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - .470 = .530$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - .1600 = .8400$. Then

Customer	Possibility
smoking and equal-or-above 30 years old	$.470 \times .1600 = 7.52 \times 10^{-2}$
smoking and under 30 years old	$.470 \times .8400 = .395$
non-smoking and equal-or-above 30 years old	$.530 \times .1600 = 8.48 \times 10^{-2}$
non-smoking and under 30 years old	$.530 \times .8400 = .445$

And the total summation of all possibilities is 1.000.

End of Solution.

Answer:

Customer	Possibility
smoking and equal-or-above 30 years old	7.52×10^{-2}
smoking and under 30 years old	.395
non-smoking and equal-or-above 30 years old	8.48×10^{-2}
non-smoking and under 30 years old	.445

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	.530
Calculated 2	real	4	.8400
Calculated 3	real	3	.470
Calculated 4	real	3	.530
Calculated 5	real	4	.1600
Calculated 6	real	4	.8400
Calculated 7	real	3	7.52×10^{-2}
Calculated 8	real	3	.395
Calculated 9	real	3	8.48×10^{-2}
Calculated 10	real	3	.445

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}	 .470
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}	 .1600

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 33 provinces and 38 territories.
B. Canada has 37 provinces and 37 territories.
C. Canada has 34 provinces and 39 territories.
D. Canada has 10 provinces and 3 territories.
E. Canada has 36 provinces and 35 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 31.3 (4, 4, 4)

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

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

Auto-answer:

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

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 31.4 (2, 2, 2)

An object is subjected to an external net force $\mathbf{f} = (60.000, 5.0000, -6000.0)N$. Its mass is known as $m = 50.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.2000ms^{-2}, 5760.2km/h^2, -120.00ms^{-2})$.
B. The accelaration is $(1.2000ms^{-2}, 1296.0km/h^2, -120.00ms^{-2})$.
C. The accelaration is $(-3.1540ms^{-2}, 1296.0km/h^2, -120.00ms^{-2})$.
D. The accelaration is $(-3.1540ms^{-2}, 5760.2km/h^2, 478.93ms^{-2})$.
E. The accelaration is $(1.2000ms^{-2}, 5760.2km/h^2, 478.93ms^{-2})$.
F. The accelaration is $(-3.1540ms^{-2}, 5760.2km/h^2, -120.00ms^{-2})$.
G. None of these.

Auto-answer:

B. The accelaration is $(1.2000ms^{-2}, 1296.0km/h^2, -120.00ms^{-2})$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (60.000, 5.0000, -6000.0)N$ and $m = 50.0000kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(60.000, 5.0000, -6000.0)N}{50.0000kg} \\
&= (1.2000, .10000, -120.00)ms^{-2} \\
&= (15552., 1296.0, -1.5552 \times 10^6)km/h^2.
\end{aligned}$$

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	1.2000
Calculated 2	real	5	.10000
Calculated 3	real	5	−120.00
Calculated 4	real	5	15552.
Calculated 5	real	5	1296.0
Calculated 6	real	5	-1.5552×10^6

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	 5.0000
INPUT 3	real	−1	−2000.0 −10001.0 −1000.0	 −6000.0
Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−4	50.0000 60.1000 2.0000	 50.0000

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. 37 is an even number.
Your answer		2. Hull is in Ontario province.
Your answer		3. $\mathbf{F} = m\mathbf{a}$ is a mathmatical form of Newton's Law of Uni-

versal Gravitation.

Answer:

The correct answer	F

1. 37 is an even number.

The correct answer	F

2. Hull is in Ontario province.

The correct answer	F

3. $\mathbf{F} = m\mathbf{a}$ 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	2 (2 strings) :	F
Calculated 2	string	2 (2 strings) :	F
Calculated 3	string	2 (2 strings) :	F

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 100, 1$	37
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 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 $\mathbf{f} = (50.0, 5.0, -9000.0)N$. Its mass is known as $m = 56.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(.893, -.27, -456.38)ms^{-2}$.
B. The accelaration is $(4.31, -.27, -160.71)ms^{-2}$.
C. The accelaration is $(.893, 8.9 \times 10^{-2}, -456.38)ms^{-2}$.
D. The accelaration is $(4.31, 8.9 \times 10^{-2}, -160.71)ms^{-2}$.
E. The accelaration is $(.893, 8.9 \times 10^{-2}, -160.71)ms^{-2}$.
F. The accelaration is $(4.31, 8.9 \times 10^{-2}, -456.38)ms^{-2}$.
G. The accelaration is $(4.31, -.27, -456.38)ms^{-2}$.
H. The accelaration is $(.893, -.27, -160.71)ms^{-2}$.

Auto-answer:

E. The accelaration is $(.893, 8.9 \times 10^{-2}, -160.71)ms^{-2}$.

End of auto-answer.

Answer:

The correct answer from the choices is
E. The accelaration is $(.893, 8.9 \times 10^{-2}, -160.71)ms^{-2}$.

End of Answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (50.0, 5.0, -9000.0)N$ and $m = 56.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(50.0, 5.0, -9000.0)N}{56.0000kg} \\ &= (.893, 8.9 \times 10^{-2}, -160.71)ms^{-2} \end{aligned}$$

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	.893
		2	8.9×10^{-2}
		5	-160.71

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	5.0
		-1	-2000.0	
			-10001.0	
			-1000.0	-9000.0
INPUT 2	real	-4	50.0000	
			60.1000	
			2.0000	56.0000

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

QUESTION 31.7 (8, 15, 60)

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

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

Answer:

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

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

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
40
42

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

$$\begin{pmatrix} \Phi \times \gamma + \gamma \times \beta \\ \Upsilon \times \gamma + \Upsilon \times \beta \\ \beta \times \gamma + \zeta \times \beta \\ \Lambda \times \gamma + \Delta \times \beta \end{pmatrix}$$

All inputs:

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

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

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)

$$\begin{pmatrix} \Phi & \gamma \\ \Upsilon & \Upsilon \\ \beta & \zeta \\ \Lambda & \Delta \end{pmatrix}$$

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 $\mathbf{f} = (50.0, 5.0, -3000.0)N$. Its mass is known as $m = 58.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(-3.63, 8.6 \times 10^{-2}, -51.724)ms^{-2}$.
B. The accelaration is $(-3.63, 8.6 \times 10^{-2}, -256.91)ms^{-2}$.
C. The accelaration is $(.862, 8.6 \times 10^{-2}, -51.724)ms^{-2}$.
D. The accelaration is $(-3.63, .41, -256.91)ms^{-2}$.

Auto-answer:

C. The accelaration is $(.862, 8.6 \times 10^{-2}, -51.724)ms^{-2}$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (50.0, 5.0, -3000.0)N$ and $m = 58.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(50.0, 5.0, -3000.0)N}{58.0kg} \\ &= (.862, 8.6 \times 10^{-2}, -51.724)ms^{-2} \end{aligned}$$

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	.862
		2	8.6×10^{-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	5.0
		-1	-2000.0	
			-10001.0	
			-1000.0	-3000.0
INPUT 2	real	-1	50.0	
			60.1	
			2.0	58.0

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:

$$9 \times x^2 + 72 \times x + 63 = 0$$

Answer:

-7, -1

End of Answer.

Solution:

Roots to the equation

$$9 \times x^2 + 72 \times x + 63 = 0$$

are -7 and -1 .

Let us verity -7 first: $9 \times x^2 + 72 \times x + 63 = 441 + (-504) + (63) = -63 + (63) = 0$

Then verity -1: $9 \times x^2 + 72 \times x + 63 = 9 + (-72) + (63) = -63 + (63) = 0$

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 (2 strings) :	+
Calculated 3	integer		72
Calculated 4	string	1 (2 strings) :	+
Calculated 5	integer		63
Calculated 6	integer		441
Calculated 7	integer		−504
Calculated 8	integer		−63
Calculated 9	integer		0
Calculated 10	integer		9

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		−72
Calculated 12	integer		−63
Calculated 13	integer		0

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$-11, 30, 4$	−7
INPUT 2	integer		$-31, 60, 3$	−1
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 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(4) , 4(2) , 5(3) , 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 generat ed:

1(12, 27) , 2(8, 23) , 3(9, 24) , 4(7, 22) , 5(10, 25) , 6(6, 21) .

Question 32.1.1 (6, 12, 27)

In a hotel, the possiblity of non-smoking customer is $a = .460$, and the possiblity of equal-or-above 30 years old customer is $b = .7000$. 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 $a = .460$, and the possiblity of equal-or-above 30 years old customer is $b = .7000$, the possiblity of smoking customer is $c = 1.0 - a = 1.0 - .460 = .540$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - .7000 = .3000$. Then

Customer	Possibility
smoking and equal-or-above 30 years old	$.540 \times .7000 = .378$
smoking and under 30 years old	$.540 \times .3000 = .162$
non-smoking and equal-or-above 30 years old	$.460 \times .7000 = .322$
non-smoking and under 30 years old	$.460 \times .3000 = .138$

And the total summation of all possibilities is 1.000.

End of Solution.

Answer:

Customer	Possibility
smoking and equal-or-above 30 years old	.378
smoking and under 30 years old	.162
non-smoking and equal-or-above 30 years old	.322
non-smoking and under 30 years old	.138

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	.540
Calculated 2	real	4	.3000
Calculated 3	real	3	.540
Calculated 4	real	3	.460
Calculated 5	real	4	.7000
Calculated 6	real	4	.3000
Calculated 7	real	3	.378
Calculated 8	real	3	.162
Calculated 9	real	3	.322
Calculated 10	real	3	.138
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}	 .460
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}	 .7000

Question 32.1.2 (6, 8, 23)

An object is subjected to an external net force $\mathbf{f} = (90.0, 5.0, -5000.0)N$. Its mass is known as $m = 54.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(5.4286ms^{-2}, .41036ms^{-2}, -1.2000 \times 10^6 km/h^2)$.
B. The accelaration is $(5.4286ms^{-2}, .41036ms^{-2}, 2.5023 \times 10^6 km/h^2)$.
C. The accelaration is $(1.6667ms^{-2}, 9.2593 \times 10^{-2} ms^{-2}, -1.2000 \times 10^6 km/h^2)$.
D. The accelaration is $(5.4286ms^{-2}, 9.2593 \times 10^{-2} ms^{-2}, 2.5023 \times 10^6 km/h^2)$.
E. none of these.

Auto-answer:

C. The accelaration is $(1.6667ms^{-2}, 9.2593 \times 10^{-2} ms^{-2}, -1.2000 \times 10^6 km/h^2)$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (90.0, 5.0, -5000.0)N$ and $m = 54.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(90.0, 5.0, -5000.0)N}{54.0kg} \\ &= (1.6667, 9.2593 \times 10^{-2}, -92.593)ms^{-2} \\ &= (21600., 1200.0, -1.2000 \times 10^6)km/h^2. \end{aligned}$$

End of Solution.

Total numbers:

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

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.6667
Calculated 2	real	5	9.2593×10^{-2}
Calculated 3	real	5	-92.593
Calculated 4	real	5	21600.
Calculated 5	real	5	1200.0
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	90.0
INPUT 2	real	-1	2.0 10.1 1.0	5.0
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 32.1.3 (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	$2.00000000 \times 10^{24}$	$6.000000000 \times 10^{24}$	
Venus	6.00×10^{24}	3.00×10^{24}	
Earth	8.00×10^{24}	5.00×10^{24}	
Mars	5.00×10^{24}	2.00×10^{24}	
Jupiter	3.00×10^{24}	9.00×10^{24}	
Saturn	8.00×10^{24}	9.00×10^{24}	
Uranus	5.00×10^{24}	4.00×10^{24}	
Neptune	3.00×10^{24}	8.00×10^{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	$2.00000000 \times 10^{24}$	$6.000000000 \times 10^{24}$	2.59×10^{-11}
Venus	6.00×10^{24}	3.00×10^{24}	3.11×10^{-10}
Earth	8.00×10^{24}	5.00×10^{24}	1.49×10^{-10}
Mars	5.00×10^{24}	2.00×10^{24}	5.84×10^{-10}
Jupiter	3.00×10^{24}	9.00×10^{24}	1.73×10^{-11}
Saturn	8.00×10^{24}	9.00×10^{24}	4.61×10^{-11}
Uranus	5.00×10^{24}	4.00×10^{24}	1.46×10^{-10}
Neptune	3.00×10^{24}	8.00×10^{24}	2.19×10^{-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	$2.00000000 \times 10^{24}$	$6.000000000 \times 10^{24}$	2.59×10^{-11}
Venus	6.00×10^{24}	3.00×10^{24}	3.11×10^{-10}
Earth	8.00×10^{24}	5.00×10^{24}	1.49×10^{-10}
Mars	5.00×10^{24}	2.00×10^{24}	5.84×10^{-10}
Jupiter	3.00×10^{24}	9.00×10^{24}	$1.73 \times 10^{-11}3$
Saturn	8.00×10^{24}	9.00×10^{24}	4.61×10^{-11}
Uranus	5.00×10^{24}	4.00×10^{24}	1.46×10^{-10}
Neptune	3.00×10^{24}	8.00×10^{24}	2.19×10^{-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	2.59×10^{-11}
Calculated 2	real	3	3.11×10^{-10}
Calculated 3	real	3	1.49×10^{-10}
Calculated 4	real	3	5.84×10^{-10}
Calculated 5	real	3	1.73×10^{-11}
Calculated 6	real	3	4.61×10^{-11}
Calculated 7	real	3	1.46×10^{-10}
Calculated 8	real	3	2.19×10^{-11}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	7.00×10^{24}
INPUT 2	real	16	$2.00000000 \times 10^{24}$ $1.010000000 \times 10^{25}$ $10.0000000 \times 10^{23}$	$2.00000000 \times 10^{24}$
INPUT 3	real	15	$2.000000000 \times 10^{24}$ $1.0100000000 \times 10^{25}$ $10.00000000 \times 10^{23}$	$6.000000000 \times 10^{24}$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	6.00×10^{24}
INPUT 5	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	3.00×10^{24}
INPUT 6	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	8.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 7	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	5.00×10^{24}
INPUT 8	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	5.00×10^{24}
INPUT 9	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	2.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 10	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	3.00×10^{24}
INPUT 11	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	9.00×10^{24}
INPUT 12	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	8.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 13	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	9.00×10^{24}
INPUT 14	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	5.00×10^{24}
INPUT 15	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	4.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 16	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	3.00×10^{24}
INPUT 17	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	8.00×10^{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 32.1.4 (6, 7, 22)

An object is subjected to an external net force $\mathbf{f} = (50.0, 7.0, -6000.0)N$. Its mass is known as $m = 50.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration (vector) is $(35103., 1814.4, 7.7574 \times 10^6)km/h^2$.
B. The accelaration (vector) is $(12960., 1814.4, 7.3457 \times 10^6)km/h^2$.
C. The accelaration (vector) is $(35103., 1814.4, 6.3830 \times 10^6)km/h^2$.
D. The accelaration (vector) is $(35103., 1814.4, -1.5552 \times 10^6)km/h^2$.
E. The accelaration (vector) is $(12960., 1814.4, -1.5552 \times 10^6)km/h^2$.
F. The accelaration (vector) is $(12960., 1814.4, 7.7574 \times 10^6)km/h^2$.
G. The accelaration (vector) is $(29636., 1814.4, 7.3457 \times 10^6)km/h^2$.
H. The accelaration (vector) is $(35103., 1814.4, 7.3457 \times 10^6)km/h^2$.

I. The accelaration (vector) is $(62776., 1814.4, -1.5552 \times 10^6) km/h^2$.
J. The accelaration (vector) is $(29636., 1814.4, 7.7574 \times 10^6) km/h^2$.
K. The accelaration (vector) is $(29636., 1814.4, 6.3830 \times 10^6) km/h^2$.
L. The accelaration (vector) is $(29636., 1814.4, -1.5552 \times 10^6) km/h^2$.

Auto-answer:

E. The accelaration (vector) is $(12960., 1814.4, -1.5552 \times 10^6) km/h^2$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (50.0, 7.0, -6000.0)N$ and $m = 50.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(50.0, 7.0, -6000.0)N}{50.0kg} \\ &= (1.0000, .14000, -120.00) ms^{-2} \\ &= (12960., 1814.4, -1.5552 \times 10^6) km/h^2. \end{aligned}$$

End of Solution.

Total numbers:

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

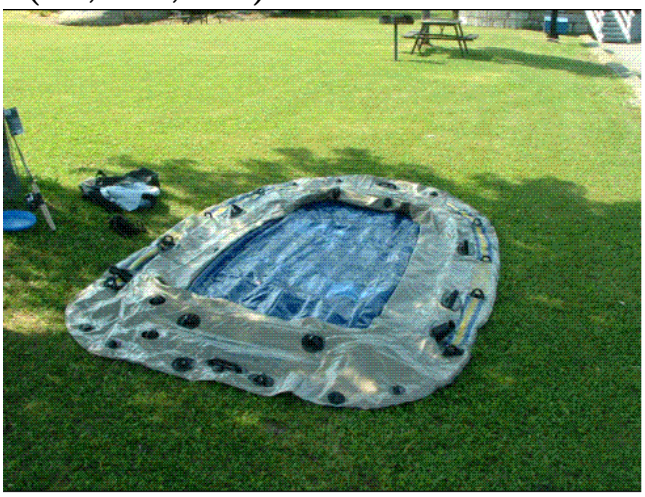
Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.0000
Calculated 2	real	5	.14000
Calculated 3	real	5	-120.00
Calculated 4	real	5	12960.
Calculated 5	real	5	1814.4
Calculated 6	real	5	-1.5552×10^6

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	 −6000.0
Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	−1	50.0 60.1 2.0	 50.0

Question 32.1.5 (6, 10, 25)



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

A. A truck
B. An air-boat
C. An airplane
D. A frisbee
E. A table

F. Not any of aboves.

Auto-answer:

A. A truck
C. 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 32.1.6 (6, 6, 21)

An object is subjected to an external net force $\mathbf{f} = (50.0, 5.0, -3000.0)N$. 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 $\mathbf{f} = (50.0, 5.0, -3000.0)N$ and $m = 54.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(50.0, 5.0, -3000.0)N}{54.0kg} \\
&= (.92593, 9.2593 \times 10^{-2}, -55.556)ms^{-2} \\
&= (12000., 1200.0, -720000.)km/h^2.
\end{aligned}$$

End of Answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (50.0, 5.0, -3000.0)N$ and $m = 54.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(50.0, 5.0, -3000.0)N}{54.0kg} \\
&= (.92593, 9.2593 \times 10^{-2}, -55.556)ms^{-2} \\
&= (12000., 1200.0, -720000.)km/h^2.
\end{aligned}$$

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	.92593
Calculated 2	real	5	9.2593×10^{-2}
Calculated 3	real	5	-55.556
Calculated 4	real	5	12000.
Calculated 5	real	5	1200.0
Calculated 6	real	5	$-720000.$

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	 5.0
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

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. 5 is an odd number.

Your answer	

2. Kingston 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. 5 is an odd number.

The correct answer	T

2. Kingston 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 (2 strings) :	T
Calculated 2	string	1 (2 strings) :	T
Calculated 3	string	1 (2 strings) :	T

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 100, 1$	5
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 32.3 (4, 4, 4)

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

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

Auto-answer:

Column Left	Column Right	Answers
A. yjh	eR	**C.** , **D.**
B. C	b	**E.**
C. er	YJH	**A.**
D. Er	ER	**C.** , **D.**
E. B	c	**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		3

All inputs:

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

QUESTION 32.4 (2, 2, 2)

An object is subjected to an external net force $\mathbf{f} = (20.000, 10.0000, -9000.0)N$. Its mass is known as $m = 58.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(.99840ms^{-2}, 2234.5km/h^2, -155.17ms^{-2})$.
B. The accelaration is $(.34483ms^{-2}, 2234.5km/h^2, -405.11ms^{-2})$.
C. The accelaration is $(.34483ms^{-2}, -10755.km/h^2, -155.17ms^{-2})$.
D. The accelaration is $(.99840ms^{-2}, 2234.5km/h^2, -405.11ms^{-2})$.
E. The accelaration is $(.34483ms^{-2}, 2234.5km/h^2, -155.17ms^{-2})$.
F. The accelaration is $(.99840ms^{-2}, -10755.km/h^2, -155.17ms^{-2})$.
G. None of these.

Auto-answer:

E. The accelaration is $(.34483ms^{-2}, 2234.5km/h^2, -155.17ms^{-2})$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (20.000, 10.0000, -9000.0)N$ and $m = 58.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(20.000, 10.0000, -9000.0)N}{58.0000kg} \\ &= (.34483, .17241, -155.17)ms^{-2} \\ &= (4469.0, 2234.5, -2.0110 \times 10^6)km/h^2. \end{aligned}$$

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	.34483
Calculated 2	real	5	.17241
Calculated 3	real	5	-155.17
Calculated 4	real	5	4469.0
Calculated 5	real	5	2234.5
Calculated 6	real	5	-2.0110×10^6

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	 10.0000
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	 58.0000

QUESTION 32.5 (3, 3, 3)

Please choose the correct one from the following statements:

A. Canada has 10 provinces and 3 territories.
B. Canada has 37 provinces and 37 territories.
C. Canada has 34 provinces and 39 territories.
D. Canada has 36 provinces and 35 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 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 $\mathbf{f} = (40.0, 8.0, -6000.0)N$. Its mass is known as $m = 50.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(2.65, .16, -120.00)ms^{-2}$.
B. The accelaration is $(.800, -.64, -120.00)ms^{-2}$.
C. The accelaration is $(2.65, -.64, -120.00)ms^{-2}$.
D. The accelaration is $(2.65, .16, -347.33)ms^{-2}$.
E. The accelaration is $(2.65, -.64, -347.33)ms^{-2}$.

F. The accelaration is $(.800, .16, -120.00)ms^{-2}$.
G. The accelaration is $(.800, -.64, -347.33)ms^{-2}$.
H. The accelaration is $(.800, .16, -347.33)ms^{-2}$.

Auto-answer:

F. The accelaration is $(.800, .16, -120.00)ms^{-2}$.

End of auto-answer.

Answer:

The correct answer from the choices is
F. The accelaration is $(.800, .16, -120.00)ms^{-2}$.

End of Answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (40.0, 8.0, -6000.0)N$ and $m = 50.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(40.0, 8.0, -6000.0)N}{50.0000kg} \\ &= (.800, .16, -120.00)ms^{-2} \end{aligned}$$

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	.800
		2	.16
		5	-120.00

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	-6000.0
INPUT 2	real	-4	50.0000	
			60.1000	
			2.0000	50.0000

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

QUESTION 32.7 (8, 15, 60)

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

$$\begin{pmatrix} \Xi & \eta \\ \Upsilon & \Lambda \\ \delta & \delta \\ \rho & \sigma \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} =?$$

Answer:

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

$$\begin{pmatrix} \Xi & \eta \\ \Upsilon & \Lambda \\ \delta & \delta \\ \rho & \sigma \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} = \begin{pmatrix} \Xi \times \beta + \eta \times \beta \\ \Upsilon \times \beta + \Lambda \times \beta \\ \delta \times \beta + \delta \times \beta \\ \rho \times \beta + \sigma \times \beta \end{pmatrix}$$

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)

44
44
44

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

$$\begin{pmatrix} \Xi \times \beta + \eta \times \beta \\ \Upsilon \times \beta + \Lambda \times \beta \\ \delta \times \beta + \delta \times \beta \\ \rho \times \beta + \sigma \times \beta \end{pmatrix}$$

All inputs:

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

7 4 4 7
6 4 5 7
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)

$$\begin{pmatrix} \Xi & \eta \\ \Upsilon & \Lambda \\ \delta & \delta \\ \rho & \sigma \end{pmatrix}$$

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

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

QUESTION 32.8 (7, 14, 50)

An object is subjected to an external net force $\mathbf{f} = (70.0, 6.0, -5000.0)N$. Its mass is known as $m = 58.0kg$. Please choose the correct accelaration

from the following choices.
A. The accelaration is $(1.21, .10, 329.96)ms^{-2}$.
B. The accelaration is $(2.53, .10, 329.96)ms^{-2}$.
C. The accelaration is $(2.53, .49, 329.96)ms^{-2}$.
D. The accelaration is $(1.21, .10, -86.207)ms^{-2}$.

Auto-answer:

D. The accelaration is $(1.21, .10, -86.207)ms^{-2}$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (70.0, 6.0, -5000.0)N$ and $m = 58.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(70.0, 6.0, -5000.0)N}{58.0kg} \\ &= (1.21, .10, -86.207)ms^{-2} \end{aligned}$$

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	.10
		5	−86.207

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	−5000.0
INPUT 2	real	−1	50.0	
			60.1	
			2.0	58.0

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:

$$1 \times x^2 - 2 \times x - 15 = 0$$

Answer:

-3, 5

End of Answer.

Solution:

Roots to the equation

$$1 \times x^2 - 2 \times x - 15 = 0$$

are -3 and 5 .

Let us verity -3 first: $1 \times x^2 - 2 \times x - 15 = 9 + (6) + (-15) = 15 + (-15) = 0$

Then verity 5: $1 \times x^2 - 2 \times x - 15 = 25 + (-10) + (-15) = 15 + (-15) = 0$

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		1
Calculated 2	string	2 (2 strings) :	
Calculated 3	integer		-2
Calculated 4	string	2 (2 strings) :	
Calculated 5	integer		-15
Calculated 6	integer		9
Calculated 7	integer		6
Calculated 8	integer		15
Calculated 9	integer		0
Calculated 10	integer		25

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		-10
Calculated 12	integer		15
Calculated 13	integer		0

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$-11, 30, 4$	-3
INPUT 2	integer		$-31, 60, 3$	5
INPUT 3	integer		$-15, 15, 2$	1

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(3) , 3(5) , 4(1) , 5(2) , 6(4) , 7(8) , 8(7) , 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 generat ed:

1(12, 27) , 2(11, 26) , 3(13, 28) , 4(9, 24) , 5(8, 23) , 6(10, 25) .

Question 33.1.1 (6, 12, 27)

In a hotel, the possiblity of smoking customer is $a = .440$, and the possiblity of under 30 years old customer is $b = 2.00 \times 10^{-2}$. 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 $a = .440$, and the possiblity of under 30 years old customer is $b = 2.00 \times 10^{-2}$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - .440 = .560$ and the possiblity of equal-or-above 30 years old customer is $d = 1.0 - b = 1.0 - 2.00 \times 10^{-2} = .9800$. Then

Customer	Possibility
smoking and equal-or-above 30 years old	$.440 \times .9800 = .431$
smoking and under 30 years old	$.440 \times 2.000 \times 10^{-2} = 8.80 \times 10^{-3}$
non-smoking and equal-or-above 30 years old	$.560 \times .9800 = .549$
non-smoking and under 30 years old	$.560 \times 2.000 \times 10^{-2} = 1.12 \times 10^{-2}$

And the total summation of all possibilities is 1.0000.

End of Solution.

Answer:

Customer	Possibility
smoking and equal-or-above 30 years old	.431
smoking and under 30 years old	8.80×10^{-3}
non-smoking and equal-or-above 30 years old	.549
non-smoking and under 30 years old	1.12×10^{-2}

And the total summation of all possibilities is 1.0000.

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	.560
Calculated 2	real	4	.9800
Calculated 3	real	3	.440
Calculated 4	real	3	.560
Calculated 5	real	4	.9800
Calculated 6	real	4	2.000×10^{-2}
Calculated 7	real	3	.431
Calculated 8	real	3	8.80×10^{-3}
Calculated 9	real	3	.549
Calculated 10	real	3	1.12×10^{-2}
Sequential	Type	Accuracy	Calculated
Calculated 11	real	4	1.0000

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}	 .440
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 33.1.2 (6, 11, 26)

In a hotel, the possiblity of smoking customer is $a = .810$, and the possiblity of equal or above 30 years old customer is $b = .5200$. Please calculate the possiblity of non-smoking and under 30 years old customer.

Solution:

Since the possiblity of smoking customer is $a = .810$, and the possiblity of equal or above 30 years old customer is $b = .5200$, the possiblity of non-smoking customer is $c = 1.0-a = 1.0-.810 = .190$ and the possiblity of under 30 years old customer is $d = 1.0 - b = 1.0 - .5200 = .4800$. So the possibility of non-smoking and under 30 years old customer is $c \times d = 9.12 \times 10^{-2}$.

End of Solution.

Answer:

The possibility of non-smoking and under 30 years old customer is $(1 - a)(1 - b) = 9.12 \times 10^{-2}$.

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	.190
Calculated 2	real	4	.4800
Calculated 3	real	3	9.12×10^{-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}	 .810
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}	 .5200

Question 33.1.3 (6, 13, 28)

What is the operation between $a = 5$ and $b = 2$: $a \times b =$? Please also calculate it.

Answer:

5;
2;
The operation is MULTIPLICATION and the result is 10.000.

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	3 (4 strings) :	MULTIPLICATION
Calculated 2	real	5	10.000

All inputs:

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

Question 33.1.4 (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 $2.00 \times 10^{24} kg$. 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	$3.00000000 \times 10^{24}$	$2.000000000 \times 10^{24}$	
Venus	7.00×10^{24}	5.00×10^{24}	
Earth	7.00×10^{24}	9.00×10^{24}	
Mars	6.00×10^{24}	5.00×10^{24}	
Jupiter	6.00×10^{24}	4.00×10^{24}	
Saturn	7.00×10^{24}	7.00×10^{24}	
Uranus	8.00×10^{24}	5.00×10^{24}	
Neptune	5.00×10^{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	$3.00000000 \times 10^{24}$	$2.000000000 \times 10^{24}$	1.00×10^{-10}
Venus	7.00×10^{24}	5.00×10^{24}	3.74×10^{-11}
Earth	7.00×10^{24}	9.00×10^{24}	1.15×10^{-11}
Mars	6.00×10^{24}	5.00×10^{24}	3.20×10^{-11}
Jupiter	6.00×10^{24}	4.00×10^{24}	5.00×10^{-11}
Saturn	7.00×10^{24}	7.00×10^{24}	1.91×10^{-11}
Uranus	8.00×10^{24}	5.00×10^{24}	4.27×10^{-11}
Neptune	5.00×10^{24}	5.00×10^{24}	2.67×10^{-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	$3.00000000 \times 10^{24}$	$2.000000000 \times 10^{24}$	1.00×10^{-10}
Venus	7.00×10^{24}	5.00×10^{24}	3.74×10^{-11}
Earth	7.00×10^{24}	9.00×10^{24}	1.15×10^{-11}
Mars	6.00×10^{24}	5.00×10^{24}	3.20×10^{-11}
Jupiter	6.00×10^{24}	4.00×10^{24}	$5.00 \times 10^{-11}3$
Saturn	7.00×10^{24}	7.00×10^{24}	1.91×10^{-11}
Uranus	8.00×10^{24}	5.00×10^{24}	4.27×10^{-11}
Neptune	5.00×10^{24}	5.00×10^{24}	2.67×10^{-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	1.00×10^{-10}
Calculated 2	real	3	3.74×10^{-11}
Calculated 3	real	3	1.15×10^{-11}
Calculated 4	real	3	3.20×10^{-11}
Calculated 5	real	3	5.00×10^{-11}
Calculated 6	real	3	1.91×10^{-11}
Calculated 7	real	3	4.27×10^{-11}
Calculated 8	real	3	2.67×10^{-11}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	2.00×10^{24}
INPUT 2	real	16	$2.00000000 \times 10^{24}$ $1.010000000 \times 10^{25}$ $10.0000000 \times 10^{23}$	$3.00000000 \times 10^{24}$
INPUT 3	real	15	$2.000000000 \times 10^{24}$ $1.0100000000 \times 10^{25}$ $10.00000000 \times 10^{23}$	$2.000000000 \times 10^{24}$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	7.00×10^{24}
INPUT 5	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	5.00×10^{24}
INPUT 6	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	7.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 7	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	9.00×10^{24}
INPUT 8	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	6.00×10^{24}
INPUT 9	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	5.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 10	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	6.00×10^{24}
INPUT 11	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	4.00×10^{24}
INPUT 12	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	7.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 13	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	7.00×10^{24}
INPUT 14	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	8.00×10^{24}
INPUT 15	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	5.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 16	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	5.00×10^{24}
INPUT 17	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	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 33.1.5 (6, 8, 23)

An object is subjected to an external net force $\mathbf{f} = (70.0, 9.0, -8000.0)N$. Its mass is known as $m = 50.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.4000ms^{-2}, .18000ms^{-2}, -5.6351 \times 10^6 km/h^2)$.
B. The accelaration is $(1.4000ms^{-2}, .18000ms^{-2}, -2.0736 \times 10^6 km/h^2)$.
C. The accelaration is $(3.6739ms^{-2}, -.45089ms^{-2}, -5.6351 \times 10^6 km/h^2)$.
D. The accelaration is $(1.4000ms^{-2}, -.45089ms^{-2}, -2.0736 \times 10^6 km/h^2)$.
E. none of these.

Auto-answer:

B. The accelaration is $(1.4000ms^{-2}, .18000ms^{-2}, -2.0736 \times 10^6 km/h^2)$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (70.0, 9.0, -8000.0)N$ and $m = 50.0kg$, bring them into the above equation, then we get

$$\begin{aligned}\mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(70.0, 9.0, -8000.0)N}{50.0kg} \\ &= (1.4000, .18000, -160.00)ms^{-2} \\ &= (18144., 2332.8, -2.0736 \times 10^6)km/h^2.\end{aligned}$$

End of Solution.

Total numbers:

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

Calculated values:

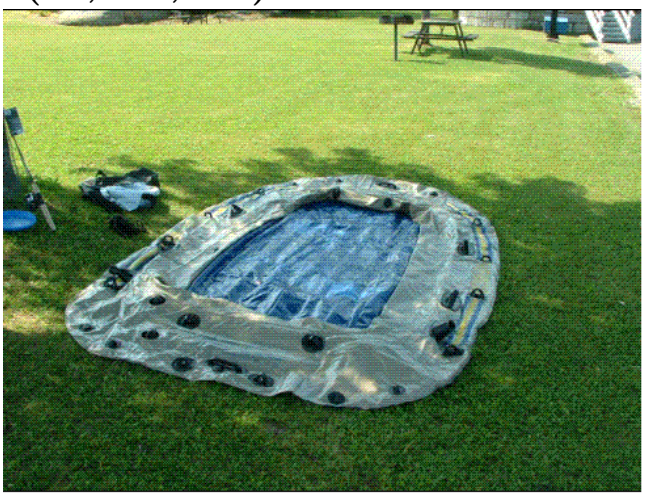
Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	1.4000
Calculated 2	real	5	.18000
Calculated 3	real	5	−160.00
Calculated 4	real	5	18144.
Calculated 5	real	5	2332.8
Calculated 6	real	5	-2.0736×10^6

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	 9.0
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	 50.0

Question 33.1.6 (6, 10, 25)



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

A. An airplane
B. A frisbee
C. Lawn
D. A table
E. An air-boat
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:

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 (3, 3, 3)

Please choose the correct one from the following statements:

A. Canada has 10 provinces and 3 territories.
B. Canada has 34 provinces and 39 territories.
C. Canada has 33 provinces and 38 territories.
D. Canada has 35 provinces and 34 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 33.3 (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. 60 is an even number.

Your answer	

2. Kingston 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. 60 is an even number.

The correct answer	T

2. Kingston 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 (2 strings) :	T
Calculated 2	string	1 (2 strings) :	T
Calculated 3	string	1 (2 strings) :	T

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 100, 1$	60
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 33.4 (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 $\mathbf{f} = (20.0, 9.0, -4000.0)N$. Its mass is known as $m = 52.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(.385, .17, -364.54)ms^{-2}$.
B. The accelaration is $(.385, .60, -76.923)ms^{-2}$.
C. The accelaration is $(2.64, .60, -364.54)ms^{-2}$.
D. The accelaration is $(2.64, .60, -76.923)ms^{-2}$.
E. The accelaration is $(2.64, .17, -76.923)ms^{-2}$.
F. The accelaration is $(2.64, .17, -364.54)ms^{-2}$.
G. The accelaration is $(.385, .17, -76.923)ms^{-2}$.

H. The accelaration is $(.385, .60, -364.54)ms^{-2}$.

Auto-answer:

G. The accelaration is $(.385, .17, -76.923)ms^{-2}$.

End of auto-answer.

Answer:

The correct answer from the choices is
G. The accelaration is $(.385, .17, -76.923)ms^{-2}$.

End of 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 $m = 52.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(20.0, 9.0, -4000.0)N}{52.0000kg} \\ &= (.385, .17, -76.923)ms^{-2} \end{aligned}$$

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	.385
		2	.17
		5	−76.923

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	9.0
		-1	-2000.0	
			-10001.0	
			-1000.0	-4000.0
INPUT 2	real	-4	50.0000	
			60.1000	
			2.0000	52.0000

QUESTION 33.5 (2, 2, 2)

An object is subjected to an external net force $\mathbf{f} = (100.000, 2.0000, -9000.0)N$. Its mass is known as $m = 50.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(7.8567ms^{-2}, 518.40km/h^2, 720.09ms^{-2})$.
B. The accelaration is $(7.8567ms^{-2}, 518.40km/h^2, -180.00ms^{-2})$.
C. The accelaration is $(2.0000ms^{-2}, 518.40km/h^2, 720.09ms^{-2})$.
D. The accelaration is $(2.0000ms^{-2}, 1545.6km/h^2, 720.09ms^{-2})$.
E. The accelaration is $(2.0000ms^{-2}, 1545.6km/h^2, -180.00ms^{-2})$.
F. The accelaration is $(7.8567ms^{-2}, 1545.6km/h^2, -180.00ms^{-2})$.
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 $\mathbf{f} = (100.000, 2.0000, -9000.0)N$ and $m = 50.0000kg$, bring them into the above equation, then we get

$$\begin{aligned}\mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(100.000, 2.0000, -9000.0)N}{50.0000kg} \\ &= (2.0000, 4.0000 \times 10^{-2}, -180.00)ms^{-2} \\ &= (25920., 518.40, -2.3328 \times 10^{6})km/h^{2}.\end{aligned}$$

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	2.0000
Calculated 2	real	5	4.0000×10^{-2}
Calculated 3	real	5	-180.00
Calculated 4	real	5	25920.
Calculated 5	real	5	518.40
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	 100.000
INPUT 2	real	-4	2.0000 10.1000 1.0000	 2.0000
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

QUESTION 33.6 (4, 4, 4)

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

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

Auto-answer:

Column Left	Column Right	Answers
A. B	ER	**C.**
B. asdf(:)	a= 2	**E.**
C. er	YJH	**D.**
D. yjh	b	**A.**
E. A= 4/ 2	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		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 33.7 (8, 15, 60)

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

$$\begin{pmatrix} \Theta & \eta \\ \rho & \Gamma \\ \zeta & \Delta \\ \alpha & \Theta \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} =?$$

Answer:

$$\begin{pmatrix} 6 & 6 & 6 & 4 \\ 5 & 4 & 5 & 6 \\ 4 & 4 & 5 & 4 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} = \begin{pmatrix} 44 \\ 40 \\ 34 \end{pmatrix}$$

$$\begin{pmatrix} \Theta & \eta \\ \rho & \Gamma \\ \zeta & \Delta \\ \alpha & \Theta \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} = \begin{pmatrix} \Theta \times \beta + \eta \times \beta \\ \rho \times \beta + \Gamma \times \beta \\ \zeta \times \beta + \Delta \times \beta \\ \alpha \times \beta + \Theta \times \beta \end{pmatrix}$$

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
34

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

$$\begin{pmatrix} \Theta \times \beta + \eta \times \beta \\ \rho \times \beta + \Gamma \times \beta \\ \zeta \times \beta + \Delta \times \beta \\ \alpha \times \beta + \Theta \times \beta \end{pmatrix}$$

All inputs:

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

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

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)

$$\begin{pmatrix} \Theta & \eta \\ \rho & \Gamma \\ \zeta & \Delta \\ \alpha & \Theta \end{pmatrix}$$

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

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

QUESTION 33.8 (7, 14, 50)

An object is subjected to an external net force $\mathbf{f} = (20.0, 4.0, -3000.0)N$. Its mass is known as $m = 54.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(.370, .16, 187.26)ms^{-2}$.

B. The accelaration is $(.370, 7.4 \times 10^{-2}, -55.556)ms^{-2}$.

C. The accelaration is $(1.82, .16, 187.26)ms^{-2}$.

D. The accelaration is $(1.82, 7.4 \times 10^{-2}, 187.26)ms^{-2}$.

Auto-answer:

B. The accelaration is $(.370, 7.4 \times 10^{-2}, -55.556)ms^{-2}$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (20.0, 4.0, -3000.0)N$ and $m = 54.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(20.0, 4.0, -3000.0)N}{54.0kg} \\ &= (.370, 7.4 \times 10^{-2}, -55.556)ms^{-2} \end{aligned}$$

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	.370
		2	7.4×10^{-2}
		5	-55.556

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	−3000.0
INPUT 2	real	−1	50.0	
			60.1	
			2.0	54.0

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:

$$3 \times x^2 + 30 \times x - 513 = 0$$

Answer:

9, -19

End of Answer.

Solution:

Roots to the equation

$$3 \times x^2 + 30 \times x - 513 = 0$$

are 9 and -19 .

Let us verity 9 first: $3 \times x^2 + 30 \times x - 513 = 243 + (270) + (-513) = 513 + (-513) = 0$

Then verity -19: $3 \times x^2 + 30 \times x - 513 = 1083 + (-570) + (-513) = 513 + (-513) = 0$

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 (2 strings) :	+
Calculated 3	integer		30
Calculated 4	string	2 (2 strings) :	
Calculated 5	integer		−513
Calculated 6	integer		243
Calculated 7	integer		270
Calculated 8	integer		513
Calculated 9	integer		0
Calculated 10	integer		1083

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		−570
Calculated 12	integer		513
Calculated 13	integer		0

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$-11, 30, 4$	9
INPUT 2	integer		$-31, 60, 3$	−19
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 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(2) , 3(1) , 4(3) , 5(5) , 6(4) , 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 generat ed:

1(8, 23) , 2(9, 24) , 3(7, 22) , 4(11, 26) , 5(6, 21) , 6(10, 25) .

Question 34.1.1 (6, 8, 23)

An object is subjected to an external net force $\mathbf{f} = (70.0, 2.0, -2000.0)N$. Its mass is known as $m = 52.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(6.5126ms^{-2}, 3.8462 \times 10^{-2}ms^{-2}, -498462.km/h^2)$.
B. The accelaration is $(6.5126ms^{-2}, .10556ms^{-2}, 1.7228 \times 10^{6}km/h^2)$.
C. The accelaration is $(1.3462ms^{-2}, 3.8462 \times 10^{-2}ms^{-2}, -498462.km/h^2)$.
D. The accelaration is $(6.5126ms^{-2}, 3.8462 \times 10^{-2}ms^{-2}, 1.7228 \times 10^{6}km/h^2)$.
E. none of these.

Auto-answer:

C. The accelaration is $(1.3462ms^{-2}, 3.8462 \times 10^{-2}ms^{-2}, -498462.km/h^2)$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (70.0, 2.0, -2000.0)N$ and $m = 52.0kg$, bring them into the above equation, then we get

$$\begin{aligned}\mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(70.0, 2.0, -2000.0)N}{52.0kg} \\ &= (1.3462, 3.8462 \times 10^{-2}, -38.462)ms^{-2} \\ &= (17446., 498.46, -498462.)km/h^2.\end{aligned}$$

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	1.3462
Calculated 2	real	5	3.8462×10^{-2}
Calculated 3	real	5	-38.462
Calculated 4	real	5	17446.
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	 70.0
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 34.1.2 (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 $6.00 \times 10^{24} kg$. 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	$7.00000000 \times 10^{24}$	$8.000000000 \times 10^{24}$	
Venus	4.00×10^{24}	6.00×10^{24}	
Earth	5.00×10^{24}	7.00×10^{24}	
Mars	6.00×10^{24}	7.00×10^{24}	
Jupiter	4.00×10^{24}	4.00×10^{24}	
Saturn	4.00×10^{24}	7.00×10^{24}	
Uranus	3.00×10^{24}	3.00×10^{24}	
Neptune	7.00×10^{24}	3.00×10^{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	$7.00000000 \times 10^{24}$	$8.000000000 \times 10^{24}$	4.38×10^{-11}
Venus	4.00×10^{24}	6.00×10^{24}	4.45×10^{-11}
Earth	5.00×10^{24}	7.00×10^{24}	4.08×10^{-11}
Mars	6.00×10^{24}	7.00×10^{24}	4.90×10^{-11}
Jupiter	4.00×10^{24}	4.00×10^{24}	1.00×10^{-10}
Saturn	4.00×10^{24}	7.00×10^{24}	3.27×10^{-11}
Uranus	3.00×10^{24}	3.00×10^{24}	1.33×10^{-10}
Neptune	7.00×10^{24}	3.00×10^{24}	3.11×10^{-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	$7.00000000 \times 10^{24}$	$8.000000000 \times 10^{24}$	4.38×10^{-11}
Venus	4.00×10^{24}	6.00×10^{24}	4.45×10^{-11}
Earth	5.00×10^{24}	7.00×10^{24}	4.08×10^{-11}
Mars	6.00×10^{24}	7.00×10^{24}	4.90×10^{-11}
Jupiter	4.00×10^{24}	4.00×10^{24}	$1.00 \times 10^{-10}3$
Saturn	4.00×10^{24}	7.00×10^{24}	3.27×10^{-11}
Uranus	3.00×10^{24}	3.00×10^{24}	1.33×10^{-10}
Neptune	7.00×10^{24}	3.00×10^{24}	3.11×10^{-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	4.38×10^{-11}
Calculated 2	real	3	4.45×10^{-11}
Calculated 3	real	3	4.08×10^{-11}
Calculated 4	real	3	4.90×10^{-11}
Calculated 5	real	3	1.00×10^{-10}
Calculated 6	real	3	3.27×10^{-11}
Calculated 7	real	3	1.33×10^{-10}
Calculated 8	real	3	3.11×10^{-10}

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	6.00×10^{24}
INPUT 2	real	16	$2.00000000 \times 10^{24}$ $1.010000000 \times 10^{25}$ $10.0000000 \times 10^{23}$	$7.00000000 \times 10^{24}$
INPUT 3	real	15	$2.000000000 \times 10^{24}$ $1.0100000000 \times 10^{25}$ $10.00000000 \times 10^{23}$	$8.000000000 \times 10^{24}$

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 4	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	4.00×10^{24}
INPUT 5	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	6.00×10^{24}
INPUT 6	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	5.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 7	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	7.00×10^{24}
INPUT 8	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	6.00×10^{24}
INPUT 9	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	7.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 10	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	4.00×10^{24}
INPUT 11	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	4.00×10^{24}
INPUT 12	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	4.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 13	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	7.00×10^{24}
INPUT 14	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	3.00×10^{24}
INPUT 15	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	3.00×10^{24}

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 16	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	7.00×10^{24}
INPUT 17	real	22	2.00×10^{24} 1.010×10^{25} 10.0×10^{23}	3.00×10^{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 34.1.3 (6, 7, 22)

An object is subjected to an external net force $\mathbf{f} = (30.0, 8.0, -8000.0)N$.

Its mass is known as $m = 54.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration (vector) is $(7200.0, 1920.0, -1.9200 \times 10^6)km/h^2$.
B. The accelaration (vector) is $(19056., 1920.0, -8.8002 \times 10^6)km/h^2$.
C. The accelaration (vector) is $(35393., 1920.0, -7.4286 \times 10^6)km/h^2$.
D. The accelaration (vector) is $(33646., 1920.0, -7.4286 \times 10^6)km/h^2$.
E. The accelaration (vector) is $(19056., 1920.0, -7.4286 \times 10^6)km/h^2$.
F. The accelaration (vector) is $(33646., 1920.0, 6.5973 \times 10^6)km/h^2$.
G. The accelaration (vector) is $(7200.0, 1920.0, -8.8002 \times 10^6)km/h^2$.
H. The accelaration (vector) is $(19056., 1920.0, 6.5973 \times 10^6)km/h^2$.
I. The accelaration (vector) is $(33646., 1920.0, -1.9200 \times 10^6)km/h^2$.
J. The accelaration (vector) is $(33646., 1920.0, -8.8002 \times 10^6)km/h^2$.
K. The accelaration (vector) is $(7200.0, 1920.0, -7.4286 \times 10^6)km/h^2$.
L. The accelaration (vector) is $(19056., 1920.0, -1.9200 \times 10^6)km/h^2$.

Auto-answer:

A. The accelaration (vector) is $(7200.0, 1920.0, -1.9200 \times 10^6)km/h^2$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (30.0, 8.0, -8000.0)N$ and $m = 54.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(30.0, 8.0, -8000.0)N}{54.0kg} \\
&= (.55556, .14815, -148.15)ms^{-2} \\
&= (7200.0, 1920.0, -1.9200 \times 10^6)km/h^2.
\end{aligned}$$

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	.55556
Calculated 2	real	5	.14815
Calculated 3	real	5	−148.15
Calculated 4	real	5	7200.0
Calculated 5	real	5	1920.0
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	30.0
INPUT 2	real	−1	2.0 10.1 1.0	8.0
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 34.1.4 (6, 11, 26)

In a hotel, the possiblity of smoking customer is $a = .130$, and the possiblity of under 30 years old customer is $b = .9200$. Please calculate the possiblity of non-smoking and equal or above 30 years old customer.

Solution:

Since the possiblity of smoking customer is $a = .130$, and the possiblity of under 30 years old customer is $b = .9200$, the possiblity of non-smoking customer is $c = 1.0 - a = 1.0 - .130 = .870$ and the possiblity of equal or above 30 years old customer is $d = 1.0 - b = 1.0 - .9200 = 8.000 \times 10^{-2}$. So

the possibility of non-smoking and equal or above 30 years old customer is $c \times d = 6.96 \times 10^{-2}$.

End of Solution.

Answer:

The possibility of non-smoking and equal or above 30 years old customer is $(1 - a)(1 - b) = 6.96 \times 10^{-2}$.

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	.870
Calculated 2	real	4	8.000×10^{-2}
Calculated 3	real	3	6.96×10^{-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}	 .130
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}	 .9200

Question 34.1.5 (6, 6, 21)

An object is subjected to an external net force $\mathbf{f} = (20.0, 3.0, -6000.0)N$. 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 $\mathbf{f} = (20.0, 3.0, -6000.0)N$ and $m = 54.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(20.0, 3.0, -6000.0)N}{54.0kg} \\
&= (.37037, 5.5556 \times 10^{-2}, -111.11)ms^{-2} \\
&= (4800.0, 720.00, -1.4400 \times 10^{6})km/h^2.
\end{aligned}$$

End of Answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (20.0, 3.0, -6000.0)N$ and $m = 54.0kg$, bring them into the above equation, then we get

$$\begin{aligned}
\mathbf{a} &= \frac{\mathbf{f}}{m} \\
&= \frac{(20.0, 3.0, -6000.0)N}{54.0kg} \\
&= (.37037, 5.5556 \times 10^{-2}, -111.11)ms^{-2} \\
&= (4800.0, 720.00, -1.4400 \times 10^{6})km/h^2.
\end{aligned}$$

End of Solution.

Total numbers:

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

Calculated values:

Sequential	Type	Accuracy	Calculated
Calculated 1	real	5	.37037
Calculated 2	real	5	5.5556×10^{-2}
Calculated 3	real	5	-111.11
Calculated 4	real	5	4800.0
Calculated 5	real	5	720.00
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	 20.0
INPUT 2	real	-1	2.0 10.1 1.0	 3.0
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

Question 34.1.6 (6, 10, 25)

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

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

Auto-answer:

C. A truck
D. 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:

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 34.2 (2, 2, 2)

An object is subjected to an external net force $\mathbf{f} = (50.000, 6.0000, -5000.0)N$. Its mass is known as $m = 50.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.0000ms^{-2}, 1555.2km/h^2, 443.97ms^{-2})$.
B. The accelaration is $(2.8752ms^{-2}, 7233.3km/h^2, -100.00ms^{-2})$.
C. The accelaration is $(1.0000ms^{-2}, 1555.2km/h^2, -100.00ms^{-2})$.
D. The accelaration is $(2.8752ms^{-2}, 1555.2km/h^2, 443.97ms^{-2})$.
E. The accelaration is $(1.0000ms^{-2}, 7233.3km/h^2, -100.00ms^{-2})$.
F. The accelaration is $(2.8752ms^{-2}, 1555.2km/h^2, -100.00ms^{-2})$.
G. None of these.

Auto-answer:

C. The accelaration is $(1.0000ms^{-2}, 1555.2km/h^2, -100.00ms^{-2})$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (50.000, 6.0000, -5000.0)N$ and $m = 50.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(50.000, 6.0000, -5000.0)N}{50.0000kg} \\ &= (1.0000, .12000, -100.00)ms^{-2} \\ &= (12960., 1555.2, -1.2960 \times 10^6)km/h^2. \end{aligned}$$

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	1.0000
Calculated 2	real	5	.12000
Calculated 3	real	5	−100.00
Calculated 4	real	5	12960.
Calculated 5	real	5	1555.2
Calculated 6	real	5	-1.2960×10^6

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	6.0000
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	50.0000

QUESTION 34.3 (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 $\mathbf{f} = (40.0, 10.0, -8000.0)N$. Its mass is known as $m = 56.0000kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(-2.32, .18, -545.73)ms^{-2}$.
B. The accelaration is $(.714, .18, -545.73)ms^{-2}$.
C. The accelaration is $(.714, -.68, -545.73)ms^{-2}$.

D. The accelaration is $(-2.32, .18, -142.86)ms^{-2}$.
E. The accelaration is $(-2.32, -.68, -545.73)ms^{-2}$.
F. The accelaration is $(-2.32, -.68, -142.86)ms^{-2}$.
G. The accelaration is $(.714, .18, -142.86)ms^{-2}$.
H. The accelaration is $(.714, -.68, -142.86)ms^{-2}$.

Auto-answer:

G. The accelaration is $(.714, .18, -142.86)ms^{-2}$.

End of auto-answer.

Answer:

The correct answer from the choices is
G. The accelaration is $(.714, .18, -142.86)ms^{-2}$.

End of Answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (40.0, 10.0, -8000.0)N$ and $m = 56.0000kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(40.0, 10.0, -8000.0)N}{56.0000kg} \\ &= (.714, .18, -142.86)ms^{-2} \end{aligned}$$

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	.714
		2	.18
		5	−142.86

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	10.0
		−1	−2000.0	
			−10001.0	
			−1000.0	−8000.0
INPUT 2	real	−4	50.0000	
			60.1000	
			2.0000	56.0000

QUESTION 34.4 (3, 3, 3)

Please choose the correct one from the following statements:

A. Canada has 36 provinces and 35 territories.
B. Canada has 34 provinces and 39 territories.
C. Canada has 37 provinces and 37 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 34.5 (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. 97 is an odd number.

Your answer	

2. Kingston 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. 97 is an odd number.

The correct answer	T

2. Kingston 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 (2 strings) :	T
Calculated 2	string	1 (2 strings) :	T
Calculated 3	string	1 (2 strings) :	T

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$1, 100, 1$	97
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 34.6 (4, 4, 4)

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

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

Auto-answer:

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

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

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

QUESTION 34.7 (8, 15, 60)

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

$$\begin{pmatrix} \zeta & \varepsilon \\ \gamma & \Gamma \\ \Theta & \varepsilon \\ \gamma & \zeta \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} =?$$

Answer:

$$\begin{pmatrix} 5 & 5 & 4 & 6 \\ 6 & 4 & 7 & 5 \\ 7 & 7 & 7 & 7 \end{pmatrix} \times \begin{pmatrix} 2 \\ 2 \\ 2 \\ 2 \end{pmatrix} = \begin{pmatrix} 40 \\ 44 \\ 56 \end{pmatrix}$$

$$\begin{pmatrix} \zeta & \varepsilon \\ \gamma & \Gamma \\ \Theta & \varepsilon \\ \gamma & \zeta \end{pmatrix} \begin{pmatrix} \beta \\ \beta \end{pmatrix} = \begin{pmatrix} \zeta \times \beta + \varepsilon \times \beta \\ \gamma \times \beta + \Gamma \times \beta \\ \Theta \times \beta + \varepsilon \times \beta \\ \gamma \times \beta + \zeta \times \beta \end{pmatrix}$$

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)

40
44
56

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

$$\begin{pmatrix} \zeta \times \beta + \varepsilon \times \beta \\ \gamma \times \beta + \Gamma \times \beta \\ \Theta \times \beta + \varepsilon \times \beta \\ \gamma \times \beta + \zeta \times \beta \end{pmatrix}$$

All inputs:

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

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

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)

$$\begin{pmatrix} \zeta & \varepsilon \\ \gamma & \Gamma \\ \Theta & \varepsilon \\ \gamma & \zeta \end{pmatrix}$$

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 $\mathbf{f} = (90.0, 9.0, -4000.0)N$. Its mass is known as $m = 54.0kg$. Please choose the correct accelaration from the following choices.

A. The accelaration is $(1.67, .17, 264.68)ms^{-2}$.
B. The accelaration is $(1.67, -.50, -74.074)ms^{-2}$.
C. The accelaration is $(1.67, .17, -74.074)ms^{-2}$.
D. The accelaration is $(7.96, .17, 264.68)ms^{-2}$.

Auto-answer:

C. The accelaration is $(1.67, .17, -74.074)ms^{-2}$.

End of auto-answer.

Solution:

We will use the Newton's Second Law:

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

Since $\mathbf{f} = (90.0, 9.0, -4000.0)N$ and $m = 54.0kg$, bring them into the above equation, then we get

$$\begin{aligned} \mathbf{a} &= \frac{\mathbf{f}}{m} \\ &= \frac{(90.0, 9.0, -4000.0)N}{54.0kg} \\ &= (1.67, .17, -74.074)ms^{-2} \end{aligned}$$

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	.17
		5	−74.074

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	−4000.0
INPUT 2	real	−1	50.0	
			60.1	
			2.0	54.0

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:

$$-5 \times x^2 + 205 \times x - 2100 = 0$$

Answer:

21, 20

End of Answer.

Solution:

Roots to the equation

$$-5 \times x^2 + 205 \times x - 2100 = 0$$

are 21 and 20 .

Let us verity 21 first: $-5 \times x^2 + 205 \times x - 2100 = -2205 + (4305) + (-2100) = 2100 + (-2100) = 0$

Then verity 20: $-5 \times x^2 + 205 \times x - 2100 = -2000 + (4100) + (-2100) = 2100 + (-2100) = 0$

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 (2 strings) :	+
Calculated 3	integer		205
Calculated 4	string	2 (2 strings) :	
Calculated 5	integer		-2100
Calculated 6	integer		-2205
Calculated 7	integer		4305
Calculated 8	integer		2100
Calculated 9	integer		0
Calculated 10	integer		-2000

Sequential	Type	Accuracy	Calculated
Calculated 11	integer		4100
Calculated 12	integer		2100
Calculated 13	integer		0

All inputs:

Sequential	Type	Accuracy	Three inputs	Generated
INPUT 1	integer		$-11, 30, 4$	21
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(4,3.13)	No	1(1, 1)	1(1 ,3.13 ,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(4,3.13)	No	1(1, 1)	4(0 ,3.13 ,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