

SECTION-I

Q NO: 02

Ans:-

INTRODUCTION:

The universe is not only stranger
than we think, it is stranger
- than we can think.
- Albert Einstein.

The integration of Artificial Intelligence (AI) in Healthcare, the understanding of the universe's origin through the Big Bang theory, the pressing issue of global warming, and the importance of disaster management are all crucial aspects that shape our world. ~~It is~~

(a) Potential benefits and challenges of AI in Healthcare

BENEFITS:

i- **Early Diagnosis:** AI can analyze complex medical data to detect disease early, improving treatment success rates and reducing mortality.

For Example: A study published in the Journal Nature medicine found that

AI-powered algorithms can detect breast cancer from mammography images with a high degree of accuracy.

ii) Improved workflow efficiency.

AI automates administrative tasks, saving clinicians time and reducing burnout. According to a survey by the American Medical Association, 71% of physicians reported feeling burned out and AI can help alleviate this burden.

iii) Cost reduction

AI can avoid unnecessary procedures and readmissions, lowering healthcare costs. A study by McKinsey estimated that AI can save the US healthcare system up to \$1 trillion annually.

CHALLENGES:

i) ~~Impact of~~ Data privacy security.

AI requires access to sensitive patient data, raising concerns about data breaches and cybersecurity. The US Department of Health and Human Services reported over 41 million

healthcare data breaches between 2009 and 2020.

ii) Algorithm Bias

Biased training data can lead to unequal care, perpetuating health disparities. A study published in Science found that AI-powered algorithms can perpetuate racial biases in healthcare.

IMPACTS OF AI ON PATIENT CARE AND MEDICAL DIAGNOSIS.

- i- AI transforming patient care and medical diagnosis by:
- ii- Enhancing diagnostic accuracy and speed.
- iii- Streamlining clinical workflows.
- iv- Providing personalized treatment plans.
- v- Enabling remote patient monitoring and management.
- vi- Supporting public health initiatives and epidemic response.

According to report by Accenture, AI powered healthcare can improve patient outcomes by 30-40% while reducing costs by 20-30%.

(b) BIG BANG THEORY.

The big bang theory suggests that the universe's ~~residual heat~~ ^{beginning} began as a single point and expanded rapidly around 13.8 billion years ago. Key evidences supporting this theory includes:

i. Cosmic Microwave Background Radiation:

The universe's residual heat, detected in the form of microwave radiation.

The Cosmic Background Explorer (COBE) satellite provided strong evidence for the big bang theory.

ii. Abundance of Light elements

The universe's light elements, such as hydrogen and helium match predictions based on the big bang theory.

According to NASA, the abundance of light elements in the universe is consistent with the Big Bang theory.

(c) Global Warming

CAUSES:

- Human Activities

- i- Burning fossil fuels.
- ii- Deforestation
- iii- Driving global warming.

According to intergovernmental Panel on climate change (ipcc), human activities are responsible for approximately 65% of green house gas emission.

- Green House Gases Emission

- i- Carbon dioxide
- ii- Methane

EFFECTS:

- Rising Sea Levels:

- i- Melting glaciers and ice sheets
- ii- Sea level rise
- iii- Threatening ^{eco} coastal system and communities-

According to ipcc, sea levels are projected to rise 26 cm to 82 cm by 2050

- Extreme Weather Events:

- i- Increased frequency and severity of heat waves, droughts and storm.

STRATEGIES FOR MITIGATION

- i- Transition to renewable energy.
- ii- Energy efficiency.
- iii- Sustainable land Use.

■ (d) DISASTER MANAGEMENT PLAN

Key Components

- i- Preparedness
- ii- Response
- iii- Recovery.

Importance

- i- mitigating impacts (Preparedness, Response and Recovery)
- ii- Saving lives (Reduce injuries, prevent displacement)

Successful Strategies

- i- Early Warning System
- ii- Community engagement
- iii- Infrastructure resilience.

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CONCLUSION

The future is not something we have to wait for, it's something we can design.
- Joi Ito.

As we navigate the complexities of AI in healthcare, the universe's origin, global warming, and disaster management, it is essential to prioritize innovation, sustainability and resilience. By working together, we can create a brighter future for generations to come.

SECTION=II (Ability Portion)

Q6:-

(a) If the selling price is doubled, the profit triples. Find the profit in percent.

Let's assume the cost price (CP) is $= x$
the selling price (SP) is $= y$.

Given that if selling price is doubled, the profit triples, we can set up the equation:

$$3(y - x) = 2y - x$$

Simplifying the equation

$$3y - 3x = 2y - x$$

$$3y - 2y = 3x - x$$

$$y = 2x$$

Now let's find the profit percentage.

$$\text{Profit} = \text{SP} - \text{CP} = 2x - x = x$$

$$\begin{aligned} \text{Profit Percentage} &= (\text{Profit} \div \text{CP}) \times 100 \\ &= (x \div x) \times 100 = 100\% \end{aligned}$$

The final answer is $= 100$

(b) Two servants X and Y are paid a total of Rs. 550 per week by their master. If X is paid 120 percent of the sum paid to Y. How much is Y paid per week?

Let's assume Y's payment is y .

Given that X is paid 120% of Y's payment, X's payment = $1.2y$

The total payment is Rs. 550, So we can set up the equation-

$$y + 1.2y = 550$$

Combine like terms.

$$2.2y = 550$$

Divide both sides by 2.2

$$\cancel{2.2} \div 2.2 y = 2.2 \div 550$$
$$\boxed{y = 250.}$$

(c) The ratio ^{of} perimeter and the breadth of a rectangle is 5:1. If the area of rectangle is 216 sq. ~~km~~ cm, what is the length of the rectangle.

Let's assume the breadth is b and the length is l .

Given the ratio of perimeter to breadth is 5:1, we can set up the equation:

$$2(l+b) \div b = 5/1$$

Simplifying the equation

$$2l + 2b = 5b$$

$$2l = 5b - 2b$$

$$2l = 3b$$

$$l = (3/2)b \quad \left(\text{Given the area of the rectangle is 216 sq. cm} \right)$$

$$l \times b = 216$$

$$\text{Substitute } l = (3/2)b$$

continue from here

$$(3/2)b \times b = 216$$

$$(3/2)b^2 = 216$$

$$1.5b^2 = 216$$

$$b^2 = \frac{216}{1.5} = 144$$

$$\sqrt{b} = \sqrt{144}$$

$$\boxed{b = 12}$$

Now find the length

$$l = (3/2)b$$

$$l = (3/2) \times 12$$

$$l = 1.5 \times 12$$

$$\boxed{l = 18}$$

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(d) Tickets numbered 1 to 20 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn has a number which is multiple of 3 or 5?

Multiples of 3: 3, 6, 9, 12, 15, 18.

Multiples of 5: 5, 10, 15, 20.

Notice that 15 is a multiple of both 3 and 5, so we should avoid counting it twice.

Total multiples of 3 or 5: $6 + 4 - 1$
 $= 9$

Probability = $\frac{\text{No. of favorable Outcomes.}}{\text{Total no. of Outcomes.}}$

$$\text{Probability} = \frac{9}{20}$$

QNo: 07:-

(a) Two numbers A and B such that the sum of 5% of A and 4% of B is two-third of the sum of 6% of A and 8% of B. Find the ratio of A:B.

Given the equation:

$$0.05A + 0.04B = \left(\frac{2}{3}\right) (0.06A + 0.08B)$$

Multiply both sides by 100 to eliminate decimals.

$$5A + 4B = \left(\frac{2}{3}\right) (6A + 8B)$$

Expanding right side.

$$(5A + 4B) \times 3 = 2(6A + 8B)$$

$$15A + 4B = 12A + 16B$$

Subtracting 12A from both sides:

$$3A + 4B = 16B$$

Subtract 4B from both sides.

$$3A = 12B$$

Divide both sides by B and then by 3:

$$A/B = 4$$

$$\boxed{A:B = 4:3}$$

(6) In a two-digit, if it is known that its ~~unit~~ units digit exceeds its tens digit by 2 and that the product of the given no. and the sum of its digits is equal to 144, and the no. is?

Let's assume the ten's digit is x and the units digit is $x+2$.

The no. is $10x + (x+2) = 11x+2$.

The sum of its digits is $x + (x+2) = 2x+2$.

Given the product of the no. and the sum of its digits is 144:

$$(11x+2)(2x+2) = 144$$

Simplifying:

$$22x^2 + 26x + 4 = 144$$

$$22x^2 + 26x = 144 - 4$$

$$22x^2 + 26x = 140$$

$$22x^2 + 26x - 140 = 0$$

Dividing both sides by 2:

$$11x^2 + 13x - 70 = 0$$

Factor the quadratic equation:

$$(11x+35)(x-2) = 0$$

$$x = -35/11 \text{ (not possible) or } x = 2$$

The ten's digit is 2, and the unit's digit is 4.

The no. is 24.

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(c) A sum of the money is to be distributed among A, B, C, D in the proportion of 5:2:4:3. If C gets Rs 1000 more than D. What is B's share?

Let's assume the shares are $5x, 2x, 4x, 3x$

Given C gets Rs. 1000 more than D.

$$4x - 3x = 1000$$

$$x = 1000$$

$$B's \text{ share} = 2x = 2 \times 1000 = 2000$$

$$B's \text{ share} = 2000.$$

(d) A father said to his son, "I was as old as you are at present time of your birth." If the father's age is 38 years now, the son's age five years back was?

Let's assume the son's current age is x .

The father's current age is 38.

At the time of the son's birth, the father's age was $38 - x$.

Given the father's age at the son's birth was equal to the son's current age:

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$$38 - x = x$$

$$2x = 38$$

$$x = \frac{38}{2}$$

$$x = 19.$$

The son's current age is 19.

The son's age five years back = $19 - 5 = 14$

The son's age was = 14 years.