

General Science and AbilityDay: MTWTFSSDate: 30/07/2025

Part - II

Section - 1

Q. NO. 2

- a. What are the potential benefits and challenges of implementing Artificial Intelligence (AI) in Healthcare.

Artificial Intelligence (AI): According to Oxford dictionary artificial intelligence is "the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision making, and translation between languages."

⇒ Potential Benefits of AI in Healthcare

- ⇒ Enhanced Diagnostic Accuracy
- ⇒ Predictive Analytics
- ⇒ Personalized Treatment plans
- ⇒ Virtual health Assistants
- ⇒ Remote Monitoring and Telemedicine

⇒ Enhanced Diagnostic Accuracy:

AI algorithms can analyze medical images (like X-rays, MRIs and CT scans)

with high precision. Tools like IBM Watson and Google Deepmind assist doctors by identifying diseases such as cancer, pneumonia, and diabetic retinopathy early and accurately.

⇒ Predictive Analytics:

AI can use patient data to predict disease risk like heart disease or stroke using electronic health records (EHRs).

⇒ Personalized Treatment Plans:

i- AI systems analyze genetic information, lifestyle, and medical history to tailor individualized treatments.

ii- Pharmacogenomics powered by AI allows better matching of drugs to patients, reducing side effects and increasing effectiveness.

⇒ Virtual Health Assistants:

Chatbots and AI-powered apps provide 24/7 health assistance, medication reminders, and basic medical advice, reducing pressure on healthcare providers.

⇒ Remote Monitoring and Telemedicine:

AI integrates with wearable devices to continuously monitor patient vitals enabling real time alerts and early intervention.

Challenges of Implementing AI in Healthcare

⇒ Data Privacy and Security:

Handling sensitive health data raise concerns about data breaches, un-authorized access, and ethical use.

⇒ High Cost and Infrastructure Needs:

AI implementation demands advanced hardware, software, and trained personnel, which may be unaffordable for smaller or rural healthcare settings.

⇒ Risk of Diagnostic Errors

AI systems may misinterpret data or overlook complex human nuances, leading to incorrect diagnoses if not properly supervised.

⇒ Ethical and Legal Issues:

If AI systems makes a wrong diagnosis
no one takes responsibility.

Impact of AI on Patient care and Medical Diagnosis

⇒ Positive Impact

- i- AI helps to make accurate diagnosis with high speeds especially in radiology, dermatology and pathology.
- ii- Early detection of diseases is possible with AI.
- iii- Improved Access to healthcare in remote areas is possible.

Concerns

- i- Over reliance on AI reduces critical Thinking and diagnostic skills.
- ii- Equity Issues: If AI tools are developed using biased databases, they may provide unequal care across different population.

Q. No. 2. b

Big Bang Theory

According to this theory, the universe began approximately 13.8 billion years ago from an extremely hot, dense, and singular state and has been expanding ever since.

Significance in Understanding the Universe

1. Big Bang Explains the origin of space and time as it marks the beginning of the universe, space and time itself.
2. It Describes cosmic expansion and gives a frame work to understand why galaxies are moving apart.
3. It forms the basis for Foundation of modern cosmology by providing concept about cosmic structure, formation of elements, and galactic evolution.
4. It Informs About Theories of Dark Matter

and Dark Energy and helps in explaining the unseen forces affecting the universe's structure and expansion.

5. It Bridges Astronomy and Particle Physics and explains early universe conditions under extreme temperatures and densities.

⇒ Key Evidence Supporting the Big Bang Theory

1. Cosmic Microwave Background Radiation (CMB)

It was discovered in 1965 by Arno Penzias and Robert Wilson. It is faint radiation left over from the hot, dense state of early universe.

2. Redshift and Expansion of universe show that the universe is expanding and if traced backward leads to a single point of origin the big bang.

3. Abundance of Light Elements (like hydrogen, helium and Lithium) formed during the first few minutes after the explosion (Big Bang nucleosynthesis).

4- The distribution of galaxies and clusters across vast distance supports the idea of expansion and evolution from a single origin point.

5- Observations of Type Ia supernovae show that time dilation (a prediction of expanding space) affects their light, further supporting Big Bang expansion.

Q.NO. 2

Global Warming

Global warming refers to the long term rise in Earth's average surface temperature due to accumulation of greenhouse gases in the atmosphere.

Primary Causes of Global Warming:

1- Greenhouse Gas Emissions

- * Carbon dioxide (CO_2) from fossil fuels.
- * Methane (CH_4) from rice paddies etc.
- * Nitrous Oxide (N_2O) from fertilizers etc.
- * Fluorinated gases from refrigerants.

- ii. Deforestation $\rightarrow$ reducing carbon sinks
- iii. Industrialization and Urbanization
- iv. Agriculture and Livestock

Role of Human Activities

According to IPCC human activities cause 1.1°C of global warming above pre-industrial levels.

Key Human Contributions

- $\rightarrow$ Burning of fossil fuels
- $\rightarrow$ Unsustainable agriculture
- $\rightarrow$ Overconsumption and waste
- $\rightarrow$ Land use changes (e.g; deforestation).

Effects of Global Warming

1- Environmental Effects

- $\rightarrow$ Melting glaciers $\rightarrow$ Rising sea levels
- $\rightarrow$ Ocean Acidification $\rightarrow$ Extreme weather

2- Economic Consequences

- $\rightarrow$ Damage to infrastructure
- $\rightarrow$ Reduced Agricultural yields
- $\rightarrow$ Increased Health costs

3. Social and Health Impacts

- water scarcity
- Food scarcity
- climate migration
- spread of diseases

⇒ Strategies to Mitigate Global Warming

- i- Transition to Renewable Energy (solar, wind, hydro and geothermal energy to replace fossil fuels).
- ii- Carbon Pricing and Regulation
- iii- Afforestation and Reforestation
- iv- Energy Efficiency
- v- Sustainable Agriculture
- vi- Public Awareness and Education
- vii- International Agreements

Q. No. 2 d

Disaster Management Plan

According to UNDRR, Disaster Management involves the organization, planning and application of measures preparing for responding to and recovering from disasters.

Key components of Disaster Management Plan:

- ⇒ Risk Assessment and Hazard Mapping
- ⇒ Preparedness
- ⇒ Response Mechanism
- ⇒ Recovery
- ⇒ Mitigation and prevention
- ⇒ Institutional Framework
- ⇒ Community Participation

Importance of Preparedness, Response and Recovery

1- Preparedness:

- saves lives by ensuring quick evacuation and safety protocols.
- Reduces panic

Example : Japan's school level earthquake drills and tsunami warning systems significantly reduce casualties.

2. Response

- Immediate action minimizes damage.

→ Effective coordination accelerates relief.

3. Recovery

→ Ensures long term community resilience
→ prevents secondary disasters like disease outbreaks and food shortage.

Examples of Successful Disaster Management Strategies:

i- Bangladesh's Cyclone Preparedness Programme: (CPP):

It reduced cyclone deaths from 300,000 (1970) to a few thousand in recent cyclones.

ii- Japan's Earthquake Management:

It uses strict building codes and earthquake resistant infrastructure.

~~2011~~ 2011 Tohoku Earthquake and Tsunami although a huge disaster, loss was mitigated due to preparedness.

iii. NDMA Pakistan:

Prepared national Disaster Risk reduction policy and coordinates with PDMA, and armed forces to reduce disaster loss.

Section - II

Q. NO. 6

IIa

Let;

$$\text{Cost Price} = C$$

$$\text{Original Price of selling} = S$$

$$\text{Then, Profit} = S - C$$

According to question;

$$\text{New Selling Price} = 2S$$

$$\text{New Profit} = 3(S - C)$$

$$\begin{aligned}\text{But new profit} &= \text{New selling price} - \text{Cost price} \\ &= 2S - C\end{aligned}$$

So,

$$2S - C = 3(S - C)$$

$$\text{Soln: } 2S - C = 3S - 3C \Rightarrow 2S - C - 3S + 3C = 0$$

$$\Rightarrow -S + 2C = 0 \Rightarrow S = 2C$$

So, - Selling Price = $2 \times$ Cost price
 - Profit = $S - C = 2C - C = C$

$$\text{Profit \% age} = \frac{\text{Profit}}{\text{cost price}} \times 100 = \frac{C}{C} \times 100 = 100\%$$

Q.No. 6 b

Let,

- Y's salary = Rs y

- Then X's salary = 120% of y = $1.2y$

According to given data

$$y + 1.2y = 550 \Rightarrow 2.2y = 550$$

$$y = \frac{550}{2.2} = 250$$

So,

Y is paid Rs. 250 per week.

Q.No. 6 c

Suppose: Breadth = b , Perimeter = $5b$

As we know

$$\text{Perimeter} = 2(l + b) = 5b \Rightarrow l + b = \frac{5b}{2}$$

$$l = \frac{5b}{2} - b = \frac{3b}{2}$$

$$\text{Area} = \text{length} \times \text{Breadth} = l \times b$$

$$\frac{3b}{2} \times b = 216 \Rightarrow \frac{3b^2}{2} = 216$$

$$b^2 = \frac{216 \times 2}{3} = 144 \Rightarrow b = \sqrt{144} = 12$$

$$\text{So, } l = \frac{3 \times 12}{2} = 18$$

$$\text{Length} = 18 \text{ cm}$$

Q. No. 6 d

Total Outcomes = 20

Favourable Outcomes = Number from 1 to 20 that are multiple of 3 or 5

→ Multiples of 3 = 3, 6, 9, 12, 15, 18 in 6 numbers

→ Multiples of 5 = 5, 10, 15, 20 in 4 numbers

→ Common Multiples (Both 3 and 5) = 15 in and it is counted twice, so subtract once
So,

$$\text{Favourable Outcomes} = 6 + 4 - 1 = 9$$

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

Q.No. 7 a

Given Data :

$$\text{Sol}^{\circ} \text{ of - } A + 4 \cdot 1^{\circ} \text{ of } B = \frac{2}{3} \times [6 \cdot 1^{\circ} \text{ of } A + 8 \cdot 1^{\circ} \text{ of } B]$$

If written in Equation Form

$$\rightarrow 0.05A + 0.04B = \frac{2}{3} (0.06A + 0.08B) \quad \text{--- (1)}$$

Multiply Both sides of eq by 100

$$\rightarrow 5A + 4B = \frac{2}{3} (6A + 8B) \quad \text{--- (2)}$$

Multiply Both sides of eq, 2 by 3

$$3(5A + 4B) = 2(6A + 8B) \Rightarrow 15A + 12B = 12A + 16B$$

By simplifying ;

$$15A - 12A = 16B - 12B$$

$$\Rightarrow 3A = 4B \Rightarrow \frac{A}{B} = \frac{4}{3}$$

$$[A:B = 4:3]$$

Q.No. 7 bLet the two digit number be $10x + y$ where x = tens digit, y = units digit

Given data

$$\rightarrow y = x + 2$$

$$\rightarrow \text{The number } \times (\text{sum of digits}) = 144$$

So,

$$(10x + y)(x + y) = 144$$

$$\text{and } y = x + 2$$

$$(10x + x + 2)(x + x + 2) = 144$$

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

Now multiply

$$(11x + 2)(2x + 2) = 144 \Rightarrow 22x^2 + 4x + 4 = 144$$

$$\Rightarrow 22x^2 + 22x + 4x + 4 = 144$$

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

$$= 22x^2 + 26x - 140 = 0 \quad \text{--- ①}$$

Divide eq ① by 2

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

Through quadratic formula

$$x = \frac{-13 \pm \sqrt{13^2 + 4 \times 11 \times 70}}{2 \times 11}$$

$$= \frac{-13 \pm \sqrt{169 + 3080}}{22} = \frac{-13 \pm \sqrt{3249}}{22} \Rightarrow \#$$

$$= \frac{-13 \pm 57}{22}$$

$$x = \frac{44}{22} = 2 \quad \text{or} \quad x = \frac{-70}{22} = -3.18$$

$$\text{If } x = 2, \text{ then } y = x + 2 = 4$$

$$\boxed{\text{Number} = 10x + y = 10 \times 2 + 4 = 24}$$

Q. No. 7 c

$$\text{Ratio } A : B : C : D = 5 : 2 : 4 : 3$$

Let each part = x

$$\text{So, } C = 4x, \quad D = 3x$$

Given: C gets Rs. 1000 more than D

$$4x - 3x = x = 1000$$

So,

$$B = 2x = 2 \times 1000 = \text{Rs. } 2000$$

$$\text{So, } [B's \text{ share} = \text{Rs. } 2000]$$

Q. No. 7 d

Let son's current age = x

Father's current age = 38

Given Data;

$$\Rightarrow \text{Age Difference} = \text{Father's age} - \text{son's age} = x$$

$$\text{So, } 38 - x = x \Rightarrow 38 = 2x \Rightarrow x = 19$$

$$\text{Son's age five years ago} = 19 - 5 = 14$$

So

$$[\text{Son's Age 5 years ago was} = 14 \text{ years}]$$