Odisha B.ed Practice Set Paper-1

Q.1 What did the Right to Education Act focus on?

A passage is given with 5 questions following it. Read the passage carefully and choose the best answer to each question out of the four alternatives.

News from schools regularly reminds us that the momentum generated by the Right to Education (RTE) Act that was enacted over a decade ago has subsided. The RTE had laid down indicators of quality, and for a while, an attempt was made in a few States to use RTE-compliance criteria for both government and private schools. COVID-19 was not the only factor responsible for the loss of momentum in taking the RTE seriously. Parallel spheres of neglect surfaced in the crucial sector of teacher training.

Since the 1990s, teacher training has become a beehive of small-time entrepreneurs. The regulatory structure of the National Council for Teacher Education (NCTE) has not been able to enforce its meticulously worked out norms. In 2008, the Supreme Court of India appointed a commission under the late Justice J.S. Verma to examine the various ailments of teacher training. His magnificent report, submitted in 2012, offered some hope that the training of teachers would gain status and attention, but that hope proved short-lived. Improvement of quality by the inspection raj proved an illusion. Last month, the Supreme Court passed its verdict in a case concerned with teacher training at the primary level. The Court said that the NCTE has not applied its mind while allowing Bachelor of Education (BEd) degree holders to teach at the primary level — BEd is traditionally associated with secondary education).

The Muzaffarnagar (Uttar Pradesh) story — where the teacher asked her students to slap another student — gains further poignancy because the child who was victimised by his teacher is a Muslim.

According to reports, rural leaders, some well known as farmer leaders, have advised the boy's parents to avoid pursuing the case. Otherwise, these leaders feel, the episode will vitiate communal relations (the district saw riots a few years ago). The teacher herself reportedly saw no reason to be contrite as she considers it her job to control children in order to tackle them. She thought the episode was being blown out of proportion. What are these proportions, one might ask.

A. Encouraging small-time entrepreneurs to engage in teacher training
B. Establishing norms for the proper training of teachers in India
C. Setting indicators of quality for both private and government schools
D. Providing guidelines for how teachers should handle disciplinary issues in schools

Answer: C

Sol: Refer to the lines from the passage: "The RTE had laid down indicators of quality, and for a while, an attempt was made in a few States to use RTE-compliance criteria for both government and private schools."

Q.2 How did the Supreme Court of India approach the issue of teacher training?

A passage is given with 5 questions following it. Read the passage carefully and choose the best answer to each question out of the four alternatives.

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A. It directed the NCTE to strictly enforce its norms for teacher training.
B. It established a commission under Justice J.S. Verma to investigate the issues.
C. It created new training modules to improve the quality of teacher training.
D. It took a hands-off approach, allowing the NCTE to handle the issue autonomously.

Answer: B

Sol: Refer to the lines from the passage: "In 2008, the Supreme Court of India appointed a commission under the late Justice J.S. Verma to examine the various ailments of teacher training."

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Q.3 What was a recent judgment passed by the Supreme Court regarding teacher training?

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A. That the NCTE failed to properly consider the decision to allow B.Ed degree holders to teach at the primary level
B. That Justice J.S. Verma's report was not properly implemented
C. That teacher training has improved significantly since the 1990s
D. That all teacher training institutes need to follow a new set of guidelines issued by the Supreme Court

Answer: A

Sol: Refer to the lines from the passage: "Last month, the Supreme Court passed its verdict in a case concerned with teacher training at the primary level. The Court said that the NCTE has not applied its mind while allowing Bachelor of Education (B.Ed) degree holders to teach at the primary level — B.Ed is traditionally associated with secondary education."

Q.4 In the Muzaffarnagar incident, what was the reaction of the teacher involved?

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A. She was remorseful and understood the gravity of her actions
B. She did not express regret, believing she needed to maintain control over her students
C. She promised to improve her methods of controlling the class
D. She resigned from her position in light of the incident

Answer: B

Sol: Refer to the lines from the passage: "The teacher herself reportedly saw no reason to be contrite as she considers it her job to control children in order to tackle them. She thought the episode was being blown out of proportion."

Q.5 Select the most appropriate synonym of the given word.
Trail

A. Guide
B. Lead
C. Follow
D. Pioneer

Answer: C

Sol: The correct synonym of the given word is "Follow."
Trail: To follow behind someone or something. (पीछा करना)
Example: The detective trailed the suspect throughout the city.
Follow: Go or come after a person or thing proceeding ahead. (अनुसरण करना)
Example: The little ducklings follow their mother everywhere.
Synonyms: track, chase, tail.
Antonyms: lead, guide, precede.
Meanings of other options:
• (a) **Guide**: Show or indicate the way to others.
• (b) **Lead**: Be in charge or command of.
• (d) **Pioneer**: Develop or be the first to use or apply.

Q.6 **Select the most appropriate synonym for the given word."**
Forfeiture

A. Confiscation
B. Compensation
C. Donation
D. Acquisition

Answer: A

Sol: The correct synonym of the word "forfeiture" is *(a) Confiscation*.
· **Forfeiture** means losing something, especially as a consequence of breaking a rule or law. (Hindi: ज़ब्ती)
· *Example*: The company faced the forfeiture of its assets after violating regulations.
· **Confiscation** means the action of taking someone's property with authority, typically as a penalty. (Hindi: जब्ती)
· *Example*: The government ordered the confiscation of illegal goods.
Explanation of Incorrect Options:
· *(b)* **Compensation**: Refers to something given in return for loss, not losing something. (Hindi: मुआवज़ा)
· *(c)* **Donation**: Refers to voluntarily giving something away, not losing it involuntarily. (Hindi: दान)
· *(d)* **Acquisition**: Refers to gaining or obtaining something, the opposite of forfeiture. (Hindi: अधिग्रहण)

Q.7 **Select the option that can be used as a one-word substitute for the given group of words.**
A person who is skeptical about the existence of God

A. Theist
B. Agnostic
C. Devotee
D. Cleric

Answer: B

Sol: The correct one-word substitute for "a person who is skeptical about the existence of God" is **agnostic**.
An **agnostic** is someone who believes that the existence of a higher power, such as God, is unknown or unknowable. (अज्ञेयवादी)
Example: His agnostic views often put him at odds with the more devout members of his community.
Meanings of the other given options:
· **Theist**: A person who believes in the existence of a god or gods.
· **Devotee**: A person who is very enthusiastic about or devoted to a religion or to religious feelings and duties.
· **Cleric**: A member of the clergy, someone who is a priest or religious leader.

Q.8 **Select the grammatically correct sentence.**

A. The introduction of an new smartphone in the market has created a lot of buzz.
B. A introduction of the new smartphone in the market has created a lot of buzz.
C. The introduction of the new smartphone in the market has created a lot of buzz.
D. An introduction of the new smartphone in a market has created a lot of buzz.

Answer: C

Sol: Option c is grammatically correct.
The correct answer is (c) "The introduction of the new smartphone in the market has created a lot of buzz."
The phrase "the introduction of the new smartphone in the market" is grammatically correct, with correct use of the definite article "the" and the correct preposition "in."
Let's look at the other options:
· "The introduction of an new smartphone in the market has created a lot of buzz." is incorrect because "an" should be used before a word that starts with a vowel sound, not "new."
· "A introduction of the new smartphone in the market has created a lot of buzz." is incorrect because "a" should be "an" before "introduction," which starts with a vowel sound.
· "An introduction of the new smartphone in a market has created a lot of buzz." is incorrect because "an" before "introduction" is unnecessary and "a" before "market" is less specific than the correct option (c) "the market."

Q.9 **Select the sentence that is grammatically correct.**

A. Anyone has their reasons in making decisions.
B. Anyone have their reasons for making decisions.
C. Anyone has his or her reasons for making decisions.
D. Anyone have his or her reasons for making decisions.

Answer: C

Sol: Option (c) "Anyone has his or her reasons for making decisions" is the grammatically correct sentence.
· **"Anyone"** is a singular indefinite pronoun, so it requires a singular verb. The correct verb is "has," not "have." Additionally, "his or her" is used to match the singular nature of "anyone," ensuring proper agreement in gender-neutral terms.
Grammatical Rule Involved:
· **Subject-Verb Agreement**:
· **"Anyone"** is a singular indefinite pronoun, so it takes a singular verb. The correct form is "has" instead of "have."
· Rule: Singular subjects require singular verbs, and plural subjects require plural verbs.
· **Pronoun Agreement**:
· When using indefinite pronouns like "anyone," "everyone," or "someone," the pronouns that refer back to them should be singular. Therefore, "his or her" is used instead of "their" to ensure agreement in number and gender.
· Rule: Pronouns must agree in number and gender with the nouns or pronouns they refer to.
Example:
· Correct: "Anyone has his or her own way of solving problems."
· Incorrect: "Anyone have their way of solving problems."

Q.10 **Choose the sentence which is grammatically correct.**

A. The library rules are strict and must followed.
B. They are going to make an exception this time.
C. Many believe that cheating is a offence.
D. Accommodation for all guests are guaranteed.

Answer: B

Sol: The grammatically correct sentence is: "They are going to make an exception this time."
This sentence is structurally sound and does not contain grammatical errors, unlike the others which either have missing verbs or agreement issues.
Errors in other sentences:
· (a) " **The library rules are strict and must followed."** The error here is the missing auxiliary verb "be" after "must." The corrected sentence should be "The library rules are strict and must be followed."
· (c) " **Many believe that cheating is a offence."** The error is in the use of the indefinite article "a" before a word beginning with a vowel sound. It should be "an offence."
· (d) **"Accommodation for all guests are guaranteed."** The subject "accommodation" is singular, so the verb should also be singular to match in number. The correct sentence should be "Accommodation for all guests is guaranteed."

Q.11 **Which vitamin is necessary for blood clotting?**

A. Vitamin A
B. Vitamin C
C. Vitamin D
D. Vitamin K

Answer: D

Sol: Vitamin K is necessary for blood clotting.
 It plays a crucial role in the coagulation process, helping to form blood clots to prevent excessive bleeding. Vitamin K is involved in the activation of certain proteins involved in clotting, specifically the production of prothrombin and other clotting factors. Without sufficient Vitamin K, blood clotting may be impaired, leading to an increased risk of bleeding disorders. Good dietary sources of Vitamin K include green leafy vegetables, cruciferous vegetables, herbs, fermented foods, and animal-based sources like liver and eggs.

Q.12 **Which of the following is renewable source of energy ?**

A. Coal
B. Petroleum
C. Natural gas
D. Sunlight

Answer: D

Sol: The correct answer is (d) Sunlight.

- Sunlight is a**renewable energy source**because it is naturally replenished and abundant.
- Solar energy can be harnessed through technologies like photovoltaic cells to generate electricity.
- Utilizing sunlight for energy reduces reliance on fossil fuels and decreases greenhouse gas emissions.

Additional Information:

- **Coal, Petroleum, and Natural Gas:**
  - These are **nonrenewable energy sources**, collectively known as fossil fuels.
  - They formed over millions of years from the remains of ancient plants and animals.
  - Their finite availability and environmental impact make them unsustainable in the long term.

Q.13 **The portfolios among the members of the Council of Ministers are allocated by**

A. The Prime Minister
B. The President in his discretion
C. The President on the recommendations of the Prime Minister
D. The Speaker in consultation with the Prime Minister

Answer: C

Sol: The answer is (c), the President on the recommendations of the Prime Minister. The portfolios among the members of the Council of Ministers are allocated by the President on the recommendations of the Prime Minister. The Prime Minister has the final say in the allocation of portfolios, but he is required to consult with the President before making any decisions.
Therefore, the only option that is correct is (c), the President on the recommendations of the Prime Minister.
Here are some additional details about the allocation of portfolios:
• The Prime Minister takes into account the experience and expertise of the ministers when allocating portfolios.
• The Prime Minister may also consider the political interests of the ministers when allocating portfolios.
• The allocation of portfolios is a sensitive issue and the Prime Minister must be careful not to offend any of the ministers.
The allocation of portfolios is an important part of the formation of the Council of Ministers. The portfolios that are allocated to the ministers will determine their responsibilities and the role that they will play in the government.

Q.14 **Who among the following has the power to prorogue the Lok Sabha sessions?**

A. Speaker of the Rajya Sabha
B. Speaker of the Lok Sabha
C. President of India
D. Prime Minister

Answer: C

Sol: The President of India has the power to prorogue the Lok Sabha sessions. Prorogation ends a session of the Parliament, which is usually followed by a new session after a period.

Important Key Points:

1. **Prorogation**: The act of formally ending a parliamentary session.
2. **President's power**: The President of India has the authority to prorogue sessions.
3. **Effect**: Ends all pending business and prepares for the next session.
4. **Session interval**: Usually followed by a new session.
5. **Parliamentary procedure**: Part of the legislative process.
6. **Constitutional provision**: Specified under Article 85 of the Indian Constitution.

Knowledge Booster:

 Speaker of the Rajya Sabha (a): Presides over the Rajya Sabha, not responsible for prorogation.
 Speaker of the Lok Sabha (b): Conducts Lok Sabha proceedings but does not prorogue sessions.
 Prime Minister (d): Heads the government but does not have the power to prorogue Parliament.

Q.15 **Which of the following countries is not a member of SAARC ?**

A. Nepal
B. Bangladesh
C. Afghanistan
D. Myanmar

Answer: D

Sol: Myanmar is not a member of the South Asian Association for Regional Cooperation (SAARC). SAARC is an organization of South Asian nations established to promote regional cooperation and development.

Important Key Points:

1. SAARC was established in 1985 and consists of eight member countries.
2. The member countries are Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka.
3. SAARC aims to promote economic growth, social progress, and cultural development in the region.
4. Myanmar is a member of the Association of Southeast Asian Nations (ASEAN), not SAARC.

Information Booster:

 Nepal: Founding member of SAARC.
 Bangladesh: Founding member of SAARC.
 Afghanistan: Joined SAARC in 2007.

Q.16 **Which organization was responsible for the formulation of the NCF 2005 in India?**

A. Ministry of Education
B. National Council of Educational Research and Training (NCERT)
C. University Grants Commission (UGC)
D. National Testing Agency (NTA)

Answer: B

Sol: The National Council of Educational Research and Training (NCERT) was responsible for the formulation of the National Curriculum Framework (NCF) 2005 in India. The NCERT is an autonomous organization under the Ministry of Education and plays a key role in curriculum development and educational research in the country.

Information Booster

 The Ministry of Education in India is the government body responsible for formulating and implementing educational policies and programs at the national level. It plays a crucial role in shaping the education system and overseeing various aspects of education, including curriculum development.
 The University Grants Commission (UGC) in India is a statutory body responsible for the coordination, determination, and maintenance of standards in higher education. While it does not directly formulate national curriculum frameworks, it provides guidelines and regulations for universities and colleges across the country.
 The National Testing Agency (NTA) in India is an autonomous organization responsible for conducting various national-level entrance examinations for admission to higher education institutions. It is primarily focused on conducting fair and transparent examinations and does not have a direct role in formulating curriculum frameworks.

Q.17 **"The Idea of Residual Powers" provision in India is adopted from which Country's constitution?**

A. British Constitution
B. United States Constitution
C. French Constitution
D. Canadian Constitution

Answer: D

Sol:

The Indian Constitution incorporates several features from the constitutions of various countries.

The concept of Residual Powers in India is specifically adopted from the Canadian Constitution. Other features borrowed from Canada's constitutional framework include:

· Centrifugal federalism (a strong center with weaker states),
· The provision where the Centre appoints the Governor, and
· The Advisory jurisdiction of the Supreme Court.

Information Booster:

Features adopted from the British Constitution:

· Parliamentary form of government,
· The Rule of Law,
· Legislative procedures,
· Single citizenship,
· The Cabinet system,
· Provisions for Writs, and
· Bicameralism.

Features borrowed from the United States Constitution:

· The process for the Impeachment of the President,
· The roles and functions of the President and Vice-President,
· The procedure for the removal of Supreme Court and High Court judges,
· The principle of Judicial Review,
· The Independence of the Judiciary, and
· The incorporation of Fundamental Rights.

Features derived from the French Constitution:

· The Concept of a Republic, and
· The ideals of Liberty, Equality, and Fraternity.

Q.18 The Supreme Commander of the Armed Forces in India is

A. Chief of Defence Staff
B. The President
C. The Prime Minister
D. The Defence Minister

Answer: B

Sol: The answer is (b), the President of India. The President is the Supreme Commander of the Armed Forces in India, as per Article 53 of the Constitution of India. The President can declare war or conclude peace, on the advice of the Union Council of Ministers headed by the Prime Minister. The President also has the power to appoint the Chiefs of Staff of the Army, Navy, and Air Force.

Explanation:

 The Chief of Defence Staff is the highest-ranking military officer in India, but he is not the Supreme Commander of the Armed Forces. The Chief of Defence Staff is responsible for coordinating the activities of the three armed forces, but he does not have the power to declare war or conclude peace.

 The Prime Minister is the head of the government in India, but he is not the Supreme Commander of the Armed Forces. The Prime Minister can advise the President on matters related to the armed forces, but the final decision on these matters rests with the President.

 The Defence Minister is the minister in charge of the Ministry of Defence in India. The Defence Minister is responsible for the day-to-day administration of the armed forces, but he does not have the power to declare war or conclude peace.

Therefore, the only option that is the Supreme Commander of the Armed Forces in India is (b), the President.

Q.19 By which constitutional amendment the 'Right to Education' was added in the Constitution of India?

A. 86^{th} Amendment
B. 74^{th} Amendment
C. 89^{th} Amendment
D. 91^{st} Amendment

Answer: A

Sol: The **86th Constitutional Amendment Act, 2002**, inserted **Article 21A** in the Indian Constitution, making the **Right to Education (RTE)** a **fundamental right**. This amendment mandates that **free and compulsory education** must be provided to all children **between the ages of 6 and 14 years** by the state. The **Right to Education Act (RTE), 2009**, was later enacted to implement this constitutional provision effectively.

Information Booster:

- **Article 21A**: Ensures free and compulsory education for children aged **6 to 14 years**.
- **RTE Act, 2009**: Lays down the framework for the implementation of **universal elementary education**.
- **Fundamental Right**: Right to Education is included under **Part III of the Constitution** as a fundamental right.
- **Directive Principles of State Policy (DPSP)**: The amendment modified **Article 45**, which initially directed the state to provide free education to children up to 14 years but was **not legally enforceable** before the amendment.
- **Article 51A(k)**: Imposes a **fundamental duty** on parents/guardians to ensure their children receive education.
- **Impact on Education System**: Helped increase **school enrollment rates, reduce dropout rates, and improve literacy levels** in India.
- **Significance**: Considered a landmark reform in India's education policy, promoting **inclusive and equitable education**.

Q.20 **Which of the following recommended the establishment of the first modern universities in India?**

A. Macaulay's Minute, 1835
B. Wood's Despatch, 1854
C. Indian Universities Commission, 1902
D. Indian Universities Act, 1904

Answer: B

Sol:

The Correct Answer is Wood's Despatch, 1854
Wood's Despatch of 1854, sent by Sir Charles Wood, the then President of the Board of Control of the British East India Company, is considered a landmark in the history of modern Indian education. It laid the foundation for a structured education system in India and recommended the establishment of universities in major presidencies like Calcutta, Bombay, and Madras, modeled on the University of London.
· The importance of education for administration and governance.
· Promotion of western knowledge and English education.
· Development of primary, secondary, and higher education.
· Establishment of a Department of Public Instruction in each province.
Information Booster:
As a result of the Wood's Despatch, the first three modern universities in India were established in 1857:
· University of Calcutta
· University of Bombay
· University of Madras
These were affiliated universities with the authority to conduct examinations and grant degrees but not necessarily to teach.
Additional Knowledge:
· Macaulay's Minute, 1835: Focused on promoting English education in India but did not recommend setting up universities.
· Indian Universities Commission, 1902: Reviewed the functioning of universities but came long after the first universities were established.
· Indian Universities Act, 1904: Was based on the recommendations of the 1902 Commission and aimed at improving the administration of universities, not establishing them.

Q.21 **Arrange the words in alphabetical order and which word comes second.**

A. Eager
B. Emergency
C. Explosion
D. Ecstasy

Answer: D

Sol: Eager, Ecstasy, Emergency, Explosion

Q.22 **Which two signs should be interchanged in the following equation to make it correct?**
18 + 6 – 6 ÷ 3 × 3 = 6

A. + and –
B. + and ÷
C. – and ÷
D. + and ×

Answer: B

Sol: 18 + 6 – 6 ÷ 3 × 3 = 6
on interchanging + and ÷
18 ÷ 6 – 6 + 3 × 3
3 – 6 + 9 = 6 = RHS

Q.23 Select the combination of letters that when sequentially placed in the gaps of the given letter series will complete the series.-
a b c _ d _ b c _ d _ b _ c d a

A. bacde
B. cdabe
C. decdb
D. dacac

Answer: D

Sol: **Given** - a b c _ d _ b c _ d _ b _ c d a
bacde
a b c b d a b c c d d b e b d a
cdabe
a b c c d d b c a d b b e b d a
decdb
a b c d d e b c c d d b b b d a
dacac
a b c d d/ a b c c d/ a b c c d /a
fourth place - d, c, b.... a pattern follow

Q.24 Select the terms that will replace the ? in the following series.
Z, X, V, ?, R, P, ?

A. S, N
B. S, O
C. T, O
D. T, N

Answer: D

Sol: Given: Z, X, V, ?, R, P, ?
We can see the letters are decreasing in alphabetical order:
Z → X → V → ? → R → P → ?
If we examine the differences between consecutive letters:
Z to X = -2
X to V = -2
V to ? = -2
? to R = -2
R to P = -2
Continuing the pattern of subtracting 2 from each letter, the missing letters should be:
V - 2 = T
P - 2 = N
Conclusion:
The letters that replace the question marks are T and N.

Q.25 Select the option that is related to the third word in the same way as the second word is related to the first word.
BRAZIL: REAL :: JAPAN: ?

A. PESO

B. YUAN
C. RIAL
D. YEN

Answer: D

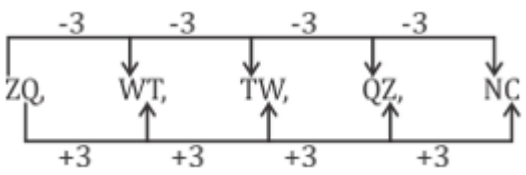
Sol: Country – Currency relationship is used.

Q.26 **Which of the following letter-clusters will replace the question mark (?) in the given series?**
ZQ, WT, TW, QZ, ?

A. WQ
B. NC
C. UL
D. MU

Answer: B

Sol:

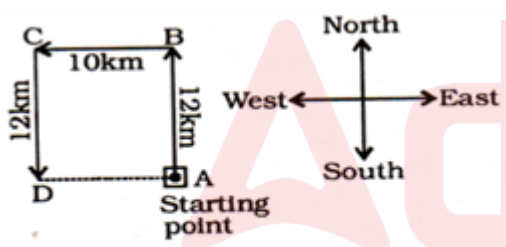


Q.27 **Ram walks 12 kms to the North, then 10 kms to West, 12 kms to South. How far is Ram from the starting points?**

A. 9 kms
B. 13 kms
C. 8 kms
D. 10 kms

Answer: D

Sol:



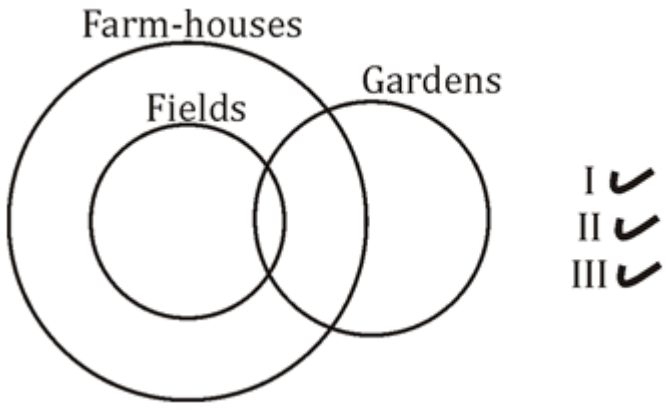
Required distance = AD = 10 km

Q.28 **Two statements are given, followed by three conclusions numbered I, II and III. Assuming the statements to be true, even if they seem to be at variance with commonly known facts, decide which of the conclusions logically follow (s) from the statements.**
Statements:
All fields are farm-houses.
Some fields are gardens.
Conclusions:
I. Some farm-houses are fields.
II. Some gardens are fields.
III. Some farm-houses are gardens.

A. All the conclusions, I, II and III, follow
B. Either conslusion I or III follows.
C. Only conclusions I and II follow.
D. Only conclusions I and III follow.

Answer: A

Sol:



I ✓
II ✓
III ✓

Q.29 Select the Venn diagram that best illustrates the relationship between the following classes.
Nurses, Doctors, Pharmacists

A. 

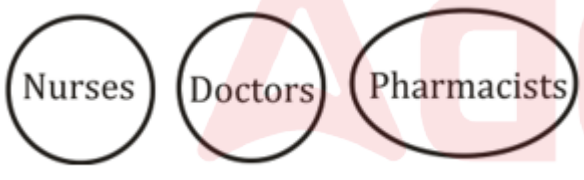
B. 

C. 

D. 

Answer: B

Sol:



Q.30 In a code language, LOGIC is written as GOCIL. How will WORDS be written as in that language?

A. DORSW
B. RSWOD
C. SDROW
D. ROSDW

Answer: D

Sol: L O G I C ⇒ G O C I L
1 2 3 4 5 ⇒ 3 2 5 4 1

W O R D S ⇒ R O S D W
1 2 3 4 5 ⇒ 3 2 5 4 1

Q.31 As per NEP-2020, children of age 3–8 will come under:

A. Pre Primary stage
B. Preparatory stage
C. Foundational stage
D. Lower Primary stage

Answer: C

Sol: According to the National Education Policy (NEP) 2020, children aged 3–8 years are categorized under the **Foundational Stage**. This stage covers early childhood care and education (ECCE) and aims to ensure that children develop essential cognitive, social, emotional, and physical skills. The Foundational Stage is crucial for laying the groundwork for future learning, as it includes both pre-school education and the early years of formal schooling, which are fundamental to a child's overall development.

The Foundational Stage includes:

- **Pre-primary education** (ages 3–6) which focuses on play-based learning and holistic development.
- **Grades 1 and 2** (ages 6–8) which emphasize learning through discovery, exploration, and activities, with an emphasis on literacy and numeracy skills.

The stage highlights the importance of a play-based, activity-driven curriculum, especially during the first five years of a child's life. It is designed to foster creativity, curiosity, and critical thinking skills from the very beginning of formal education.

Information Booster:

1. **Age group**: The Foundational Stage targets children aged 3–8, which includes the pre-school years (ages 3–6) and the early formal education years (Grades 1 and 2).
2. **Holistic development**: It focuses not only on academic learning but also on physical, emotional, and social development, creating a balanced approach to child growth.
3. **Play-based learning**: The emphasis on play-based education ensures that learning is joyful, engaging, and child-centric, helping develop creativity, problem-solving, and social skills.
4. **Transition**: The Foundational Stage prepares children for the next stage of education by ensuring they have developed a strong foundation in language, numeracy, and basic life skills.
5. **Integration of ECCE**: Early Childhood Care and Education (ECCE) is integrated into the Foundational Stage, recognizing its importance in shaping the cognitive and social skills of children.

Additional Information:

- **(a) Pre Primary stage**: This stage refers to the early childhood years (ages 3–6), which typically cover nursery, kindergarten, and other pre-school programs. However, it doesn't fully account for the formal education years (Grades 1 and 2), which are also part of the Foundational Stage under NEP 2020.
- **(b) Preparatory stage**: This stage refers to children aged 8–11, which corresponds to the early part of primary school (Grades 3–5). Thus, it is irrelevant to the age group 3–8 as per NEP 2020.
- **(d) Lower Primary stage**: The Lower Primary stage refers to children aged 6–10 (Grades 1–5). While it overlaps slightly with the Foundational Stage in terms of the first two years of formal schooling, it is not the correct category for children aged 3–8.

Q.32 According to NEP 2020, the structure/pattern of school education modified as:

A. 5 + 3 + 3 + 4
B. 10 + 2 + 3
C. 5 + 5 + 2 + 3
D. 8 + 2 + 2 + 3

Answer: A

Sol: According to the **National Education Policy (NEP) 2020**, the structure of school education has been redefined as **5 + 3 + 3 + 4**, which breaks down the schooling years into distinct stages:

1. **Foundational Stage (5 years)**: Covers preschool education (3 years of pre-primary and 2 years of primary education).
2. **Preparatory Stage (3 years)**: Includes classes 3 to 5, focusing on building basic literacy and numeracy skills.
3. **Middle Stage (3 years)**: Covers classes 6 to 8, focusing on more abstract thinking and subjects like mathematics and science.
4. **Secondary Stage (4 years)**: Covers classes 9 to 12, with an emphasis on subject-specific learning, higher-order thinking, and preparation for further education or vocational training.

This structure aims to provide a more holistic and flexible education system, ensuring that children develop essential skills at every stage of their learning journey.

Q.33 Thinking Process' is associated with:

A. Affective domain
B. Cognitivism
C. Psychomotor domain
D. Emotional domain

Answer: B

Sol: The **thinking process** is primarily associated with **Cognitivism**, which focuses on **how the mind processes, stores, and retrieves information**. This theory emphasizes **learning through understanding, problem-solving, reasoning, memory, and perception**. Cognitivism suggests that knowledge is constructed **actively** rather than just passively absorbed, making it central to **critical thinking and intellectual development**.

Information Booster:

- **Cognitivism** deals with **mental functions** such as **perception, attention, problem-solving, and memory recall**.
- **Thinking involves higher-order cognitive skills**, including **analysis, synthesis, and evaluation**, which are essential for **decision-making and creativity**.
- **Jean Piaget** and **Jerome Bruner** were key theorists who contributed to the understanding of cognitive learning.
- **Cognitive learning strategies** involve **organizing knowledge, linking concepts, and applying critical thinking**.
- **Educational approaches based on Cognitivism** include **concept mapping, discovery learning, and metacognition (thinking about thinking)**.
- **It plays a crucial role in intellectual growth**, enabling individuals to **process and apply knowledge effectively in real-life scenarios**.

Additional Information:

- **Affective domain** relates to **emotions, attitudes, and values**, rather than cognitive processing.
- **Psychomotor domain** involves **physical skills and movement-based learning**, such as sports or hand-eye coordination.
- **Emotional domain** focuses on **feelings, empathy, and emotional intelligence**, which are separate from the cognitive thinking process.

Q.34 'Learning by doing' falls under:

A. Assessment learning
B. Constructive learning
C. Experiential learning
D. Behaviouristic learning

Answer: C

Sol: **"Learning by doing"** is the core principle of **experiential learning**, where students gain knowledge through **direct experience, hands-on activities, and real-world applications**. This approach emphasizes **active engagement, problem-solving, and reflection**, allowing learners to develop **critical thinking, creativity, and practical skills**. **John Dewey**, a key proponent of experiential learning, believed that education should be based on **practical experiences rather than passive instruction**.

Information Booster:

- **Experiential learning promotes active engagement**, enhancing **understanding and retention**.
- **Encourages problem-solving and critical thinking** by applying concepts in **real-world scenarios**.
- **Includes project-based learning, field trips, lab experiments, and role-playing**.

- **Enhances collaboration and teamwork**, as students work on practical tasks together.
- **Develops decision-making and leadership skills**, preparing students for real-life challenges.
- **Fosters creativity and innovation**, as students explore concepts through hands-on activities.

Additional Information:

- **Assessment learning** focuses on evaluating student progress rather than engaging in hands-on experiences.
- **Constructive learning** is based on **building knowledge through interaction and exploration**, but experiential learning specifically emphasizes **hands-on practice**.
- **Behavioristic learning** relies on **stimulus-response conditioning** rather than practical application and reflection.

Q.35 What is the primary role of teachers in education?

A. To create assignments
B. To facilitate learning and development
C. To grade students' work
D. To manage the classroom

Answer: B

Sol:

The primary role of teachers in education is to facilitate learning and development. While teachers do create assignments, grade students' work, and manage the classroom, their main responsibility is to guide and support students in their educational journey. This includes helping them develop critical thinking, problem-solving abilities, and a deeper understanding of subjects, as well as promoting their overall personal and intellectual growth.

Information Booster

1. Teachers create an engaging and inclusive learning environment that supports the academic and social development of students.
2. Facilitating learning involves using various teaching methods and resources to engage students and help them grasp complex concepts.
3. Teachers are mentors and role models, offering emotional and moral support alongside academic instruction.
4. Effective teaching goes beyond imparting knowledge to fostering skills that are vital for students' futures, such as communication, teamwork, and creativity.
5. Classroom management, grading, and assignment creation are important tasks, but they are part of the broader role of facilitating learning.

Additional Knowledge

· To create assignments: Assignments are tools that teachers use to reinforce learning, but they are not the primary role of the teacher.
· To grade students' work: Grading is an essential task, but it is a part of the overall responsibility to evaluate and guide students.
· To manage the classroom: While managing behavior and ensuring an orderly environment is crucial, it is only a component of the broader role of teaching and learning facilitation.
· Facilitate learning and development: This is the core responsibility of teachers, focusing on enabling students to develop academically, socially, and emotionally.

Q.36 Lev Vygotsky's sociocultural theory highlights the significance of:

A. Unconscious desires and instincts
B. Genetic factors
C. Social interactions and cultural influences
D. Stages of moral development

Answer: C

Sol: Lev Vygotsky's sociocultural theory emphasizes the role of social interactions and cultural influences in cognitive development. According to Vygotsky, individuals acquire knowledge and develop cognitive abilities through social interactions with others, particularly more knowledgeable individuals or more capable peers. He believed that learning is a social and collaborative process, where individuals engage in joint activities, receive guidance and support, and internalize cultural tools and resources. Cultural factors, such as language, customs, and societal norms, play a crucial role in shaping cognitive development according to Vygotsky's theory.

Information Booster

 Vygotsky's sociocultural theory does not focus on unconscious desires and instincts, as it takes a more sociocultural perspective on cognitive development, emphasizing the role of external social interactions and cultural influences.

 While genetic factors can contribute to individual differences and potential in cognitive development, Vygotsky's sociocultural theory places greater emphasis on the sociocultural context and the impact of social interactions and cultural influences on cognitive growth, rather than genetic factors alone.

 Vygotsky's sociocultural theory does not specifically address stages of moral development. Moral development is more closely associated with theories such as Lawrence Kohlberg's stages of moral development or the social learning theory of morality, whereas Vygotsky's theory focuses on broader cognitive development influenced by social interactions and cultural factors.

Q.37 "According to Lev Vygotsky, private speech :

A. helps the students to regulate their thinking,
B. does not impact students thinking.
C. hinders the students thinking,
D. increases student's egocentricism.

Answer: A

Sol: Lev Vygotsky proposed that private speech, or self-directed speech, plays a crucial role in cognitive development. He viewed private speech as a tool for self-regulation and problem-solving. It enables children to guide themselves, plan actions, and monitor their progress. This form of speech is particularly evident in challenging tasks, where children verbalize their thoughts to organize and control their behavior. Over time, private speech becomes internalized as inner thought.

Information Booster:

1. **Private Speech and Development:** Common in children aged 3–7, private speech evolves from social interaction and later becomes internal thought.
2. **Problem-Solving Tool:** Children use private speech to work through difficulties, plan steps, and regulate emotions.
3. **Zone of Proximal Development (ZPD):** Private speech helps bridge the gap between what a child can do independently and with assistance.
4. **Gradual Internalization:** As children grow, private speech decreases externally but continues internally as a cognitive tool.
5. **Research Support:** Studies show a positive correlation between private speech and task performance in young children.

Additional Knowledge:

(b) Does not impact thinking: This is contrary to Vygotsky's theory. Private speech is not passive; it is a dynamic tool influencing cognitive and emotional processes.

(c) Hinders students' thinking: Critics from Piaget's perspective might view early self-talk as egocentric, but Vygotsky clarified that private speech is developmentally constructive.

(d) Increases egocentricism: Unlike Piaget's interpretation, Vygotsky believed private speech reflects social learning and aids cognitive growth, rather than promoting egocentric behavior.

Q.38 The psychological basis of teaching – learning depends on

A. Teaching style
B. Course content
C. Language
D. Socio – economic status

Answer: A

Sol: The psychological basis of teaching-learning primarily depends on teaching style. Teaching style refers to the methods and approaches that a teacher uses to convey information and engage students in the learning process. The way a teacher interacts with students, adapts to their needs, and employs various instructional techniques can significantly impact students' psychological development and learning outcomes. A supportive and flexible teaching style, which takes into account students' cognitive, emotional, and developmental needs, helps in creating an optimal learning environment. This influences motivation, retention of information, and the overall learning experience.

Information Booster:

1. Teaching style involves strategies such as active learning, problem-solving, and personalized instruction that cater to students' individual learning needs.
2. A positive teaching style encourages students to feel engaged, valued, and motivated to learn.
3. Effective teaching methods include providing clear explanations, using visual aids, and fostering interactive learning environments.
4. The psychological aspect of teaching also includes understanding students' emotional responses and how these influence their ability to learn.
5. Adapting teaching style to the learning preferences of students helps improve their confidence and academic success.

Additional Knowledge:

- **Course content**: While course content is essential for providing the knowledge base, it is not solely responsible for the psychological effectiveness of teaching and learning. The way the content is presented—via the teacher's style—determines how well students can understand and relate to it.
- **Language**: Language can impact the teaching-learning process, particularly in multilingual or multicultural settings. However, it is more of a tool for communication rather than the fundamental psychological basis. The teaching style dictates how language is utilized to bridge learning gaps.
- **Socio-economic status**: Socio-economic status can influence access to educational resources, but it is not the psychological basis of teaching and learning. Psychological factors such as self-esteem, motivation, and cognitive development are more directly impacted by teaching style, which adapts to the learner's needs.

Q.39 **Who is the centre of the teaching learning process?**

A. Text book
B. Teacher
C. Learner
D. Syllabus

Answer: C

Sol: The correct answer is c, Learner.
Learner is the centre of the teaching learning process. Learners are given an opportunity to construct knowledge and teacher is a guide in the learning process.
 The learner centred approach of teaching puts learners in the centre and gives primacy to children's experiences and needs.
 It strongly belives that when children are given the freedom to work at their own pace, they develop the ability to assimilate the concepts efficiently.

Q.40 **Which of the following is not an essential quality of an effective teacher?**

A. Empathy
B. Subject expertise
C. Strict authoritarianism
D. Communication skills

Answer: C

Sol: **Strict authoritarianism** often leads to a rigid and unapproachable classroom environment, which is not conducive to effective teaching. Empathy, subject expertise, and communication skills are essential qualities of an effective teacher.
Information Booster:
· Empathy helps teachers understand students' needs and challenges.
· Subject expertise ensures accurate and comprehensive content delivery.
· Communication skills are vital for conveying information clearly.
· Strict authoritarianism can hinder student-teacher relationships.
Additional Information:
· **(a) Empathy** allows for a supportive and understanding classroom environment.
· **(b) Subject expertise** is necessary for credibility and effective teaching.
· **(d) Communication skills** are critical for effective instruction and feedback.

Q.41 **An object is placed in front of a concave mirror of focal length 18cm, at a distance of 12 cm. The magnification produced by the mirror is____.**

A. – 0.6
B. + 0.6
C. –3
D. +3

Answer: D

Sol: **The correct answer is: (d) + 3**
Explanation:
The magnification (M) produced by a mirror is given by the formula:

$$M = -\frac{v}{u}$$

where v is the image distance and uuu is the object distance.
We can also use the mirror equation to relate the focal length f, object distance uuu, and image distance v:

$$\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$$

Substituting the given values:

- Focal length f=−18cm (since it's a concave mirror, the focal length is negative).
- Object distance u=−12cm (object is in front of the mirror).

Now, using the mirror equation:

$$\frac{1}{-18} = \frac{1}{v} + \frac{1}{-12}$$

Solving for v:

$$\frac{1}{v} = \frac{1}{-18} + \frac{1}{12} = \frac{-2+3}{36} = \frac{1}{36}$$

Thus, v=36 cm (the image is real and formed on the same side as the object).

Now, calculate magnification:

$$M = -\frac{v}{u} = -\frac{36}{-12} = +3$$

Information Booster:

• The focal length of a concave mirror is negative.
• The magnification for a concave mirror can be positive or negative depending on the nature of the image (real or virtual).
• A positive magnification indicates an upright image, while a negative magnification indicates an inverted image.
• The image is real if the object is placed outside the focal length.
• For concave mirrors, when the object is between the focal point and the mirror, a virtual and upright image is formed.

Q.42 **What is the full form of LASER?**

A. Lower Application of System Emission of Radioactivity
B. Learning to Amplify and Stimulate Emission of Radiation
C. Light Addition to Systematic Electromagnetic Radiation
D. Light and Sound Emission for Radiation
E. Light Amplification by Stimulated Emission of Radiation.

Answer: E

Sol: The correct answer is **(e) Light Amplification by Stimulated Emission of Radiation.**
Explanation:
LASER stands for **Light Amplification by Stimulated Emission of Radiation**, referring to the process of **stimulating the emission of light** and **amplifying it through a specific medium** to produce a **coherent beam**.

Information Booster:

- **First Developed**: In **1960 by Theodore Maiman**.
- **Applications**: Used in **medicine, communication, entertainment, manufacturing, military, and space technology**.
- **Principle**: Based on **stimulated emission of radiation**.
- **Types of LASERs**: Gas lasers, Solid-state lasers, Fiber lasers, and Semiconductor lasers.
- **Medical Uses**: Eye surgeries (LASIK), skin treatments, and cancer therapy.
- **Industrial Uses**: Cutting, welding, and engraving materials.
- **Military Uses**: Missile guidance, laser weapons, and target designation.
- **Communication**: Used in **fiber-optic technology** for high-speed data transmission.

Q.43 **A girl of mass 40 kg jumps with horizontal velocity of 6 m/s onto a stationary cart with frictionless wheels. If the mass of cart is 4 kg, then the final velocity of system will be (No external force is working in horizontal direction)-**

A. 6 m/s
B. 4 m/s
C. 5.25 m/s
D. 5.45 m/s

Answer: D

Sol:

The problem follows the **principle of conservation of linear momentum**, which states that:
Initial momentum = Final momentum
Let:
· **Mass of the girl** = 40 kg
· **Velocity of the girl** = 6 m/s
· **Mass of the cart** = 4 kg
· **Velocity of the cart** = 0 m/s (stationary)
Applying the conservation of momentum equation:
$(m1v1+m2v2)=(m1+m2)vf$
$(40\times6+4\times0)=(40+4)vf$
$240=44vf$
$vf = 240/44$
Thus, the final velocity of the system is **5.45 m/s**.

Q.44 **The sum of all potential changes in a closed circuit is zero. This is called _____.**

A. Kirchhoff's first rule
B. Kirchhoff's fourth rule
C. Kirchhoff's third rule
D. Kirchhoff's second rule

Answer: D

Sol: **The correct answer is (D) Kirchhoff's second rule**
Explanation:

Kirchhoff's Second Rule, also known as the **Loop Rule or Voltage Law (KVL)**, states that the **algebraic sum of potential differences (voltages) around any closed loop or mesh is zero**. This is based on the law of conservation of energy: as a charge completes a loop in a circuit, it loses and gains energy in such a way that the total change is zero.

Information Booster:

- It applies to **closed loops**in electrical circuits.
- Ensures energy conservation within the circuit.
- All voltage drops and gains are added algebraically.
- Used in **analyzing complex circuits**involving multiple loops.
- Often written as: **ΣV = 0**around a closed loop.
- Commonly used in **mesh analysis**.
- Helps calculate unknown voltages and resistances.

Additional Information:

- **Kirchhoff's first rule** is the**Junction Rule**, which deals with current at a node.
- **Kirchhoff's third rule** is not officially defined in standard circuit theory.
- **Kirchhoff's fourth rule** is not part of the original two fundamental laws proposed by Gustav Kirchhoff.

Q.45 **If a magnetic field is applied perpendicular to the velocity of a charge moving in a straight line, the trajectory of the charge will be:**

A. Circular
B. Elliptical
C. Linear
D. Spiral

Answer: A

Sol: **The correct answer is (A) Circular**
Explanation:

When a charged particle enters a magnetic field perpendicular to its velocity, it experiences a centripetal force (Lorentz force) that causes it to move in a circular path. This happens due to the magnetic force being always perpendicular to the direction of motion.

Information Booster:

• The force acting is given by F = qvB.
• The direction of force is determined by the right-hand rule.
• The motion is uniform circular if speed remains constant.
• No work is done by the magnetic field as the force is perpendicular.
• This principle is used in cyclotrons and mass spectrometers.
• Radius of the path is r = mv/qB.

Additional Information:

• Elliptical – Occurs when both electric and magnetic forces act in a complex manner.
• Linear – Happens when no force acts or magnetic field is parallel to motion.
• Spiral – Forms when there is a velocity component parallel to the magnetic field.

Q.46 **Identify the correct match.**

A. Microwave Oven - Percy Spencer
B. Transformer - Pierre Vernier
C. Battery - William Stanley
D. Vernier Caliper - Alessandro Volta

Answer: A

Sol: **The correct answer is (a) Microwave Oven - Percy Spencer**

Explanation:

The **microwave oven** was invented by **Percy Spencer**, an American engineer, in 1945. He discovered microwave cooking while working with radar technology. Spencer noticed that a candy bar in his pocket melted while he was near radar equipment, leading to the development of the microwave oven.

Information Booster:

1. **Percy Spencer** was an engineer working for Raytheon when he discovered microwave cooking.
2. The first microwave oven was introduced as the "Radarange" in 1947.
3. Spencer's discovery led to the development of modern microwave ovens.
4. The microwave oven works by using electromagnetic radiation to heat and cook food quickly.
5. The invention revolutionized cooking by providing a faster, more efficient way of heating food.
6. Spencer's invention is widely used in households and commercial kitchens today.

Additional Information:

- **Pierre Vernier** is credited with the invention of the **Vernier caliper**, an instrument used for precise measurement, not the transformer.
- **William Stanley** is known for his work on the **transformer** and for developing the first practical transformer in 1885.
- **Alessandro Volta** is famous for inventing the **battery** and for his pioneering work with electricity, but he is not associated with the Vernier caliper.

Q.47 **Food is cooked in a pressure cooker quickly because**

A. Boiling point of water decreases
B. Boiling point of water increases
C. It absorbs heat quickly
D. It retains heat for a longer duration

Answer: B

Sol: **The correct answer is (b)The boiling point of water increases**

Explanation:

- Food cooks faster in a pressure cooker because the pressure inside the cooker is higher than atmospheric pressure.
- This increased pressure raises the boiling point of water. As a result, water can reach higher temperatures before it boils, allowing the food to cook faster. The higher temperature speeds up the cooking process.

Information Booster:

- A **pressure cooker** is a sealed vessel that traps steam inside, creating high pressure.
- As the pressure increases, the boiling point of water rises from the usual 100°C to a higher temperature (usually around 120°C to 130°C).
- This increase in temperature allows the food to cook faster, as the heat can penetrate the food more efficiently.

Q.48 **The correct formula for electric power is:**

A. P=V.I.T
B. P=V.T
C. P=V.I
D. $P = \frac{V}{I}$

Answer: C

Sol: **The Correct Answer is:** (c)
Explanation:

Electric power is the rate at which electrical energy is consumed or converted into other forms of energy. The correct formula for electric power is given by:

$$P=V\times I$$

Where:

- P is the electric power in watts (W)
- V is the potential difference or voltage in volts (V)

I is the current in amperes (A)
This formula is derived from the basic relationship where power is the product of voltage and current.

Information Booster:

- The unit of power is the watt (W), where W = 1 joule per second.

- Power in an electric circuit depends on both the voltage (V) and the current (I) flowing through the conductor.
- The formula is derived from the work-energy principle, where the rate of energy transfer equals voltage multiplied by current.
- Power is a **scalar quantity** and represents the rate at which energy is consumed or transformed.

Q.49 **The smallest value that can be measured by a measuring instrument is called:**

A. Parallax
B. Least count
C. Precise value
D. Accurate value

Answer: B

Sol: **The correct answer is (B) Least count**
Explanation:

The **least count** of a measuring instrument is the smallest value that it can measure accurately. It refers to the smallest division or increment on the scale of the instrument that can be reliably read or measured. For example, on a vernier caliper, the least count would be the smallest length that can be measured, typically in millimeters or centimeters.

Information Booster:

- The least count is a measure of the precision of an instrument.
- It is calculated as the difference between one main scale reading and one sliding scale reading.

- A smaller least count indicates a higher precision of the instrument.

- The least count is crucial in determining the accuracy of measurements in scientific experiments.

- Instruments like micrometers and vernier calipers have very small least counts for precise measurements.

Additional Information:

- **Parallax**: An apparent shift in the position of an object when viewed from different angles. It is related to the measurement error due to misreading the instrument.

- **Precise value**: Refers to the closeness of repeated measurements, not the smallest measurable value.

- **Accurate value**: Refers to how close a measured value is to the true value or standard.

Q.50 A body of mass 'm' moves in a horizontal circle of radius 'r' at constant speed 'v' for one complete revolution. Which of the following statements is INCORRECT?

A. The total energy of the body is constant.
B. The work done by the centripetal force is 2mv2
C. The angular velocity of body is directly perpendicular to the plane of circular motion
D. The change in linear momentum of the body is zero.

Answer: B

Sol: **The correct answer is (B) The work done by the centripetal force is $2mv^2$**

Explanation:

In uniform circular motion, the **centripetal force** acts towards the center of the circle, keeping the body moving in its circular path. The work done by the centripetal force is always **zero** because the force is always perpendicular to the direction of motion of the body. Since work is the product of force and displacement in the direction of the force, and centripetal force is perpendicular to the displacement, no work is done by it.

- **Statement A**: The total energy of the body is constant because there is no net force acting on the body to change its speed (only the direction of velocity changes).
- **Statement C**: The angular velocity is directed along the axis of rotation, which is perpendicular to the plane of circular motion.
- **Statement D**: Since the motion is uniform (constant speed), the change in linear momentum is zero because the magnitude of velocity does not change, only its direction does.

Information Booster:

- **Centripetal force** does not do work because it is always perpendicular to the displacement of the body.
- The **total mechanical energy** in uniform circular motion remains constant as the kinetic energy is not changing.
- **Angular velocity** is defined as the rate of change of angular displacement and points along the axis of rotation (perpendicular to the plane).
- **Linear momentum** changes direction during circular motion, but its magnitude remains constant, so the net change in momentum is zero.

Q.51 The maximum number of electrons that can be accommodated in the N-shell according to Bohr's formula is:

A. 8
B. 18
C. 32
D. 2

Answer: C

Sol: Ans. (c)
The Correct Answer is: (c) 32 Explanation: The maximum number of electrons in a shell is given by Bohr's formula: $2n^2$, where 'n' is the orbit number. For the N-shell (n=4), $2 \times 4^2 = 32$ electrons.
Information Booster: • The formula $2n^2$ gives the maximum electron capacity of a shell. • K-shell (n=1) holds 2 electrons, L-shell (n=2) holds 8, M-shell (n=3) holds 18, and N-shell (n=4) holds 32. • This rule helped build electronic configurations. • Only 8 electrons can occupy the outermost shell (octet rule). • Electrons fill shells in increasing energy order (Aufbau principle).
Additional Information: • (a) 8 – Maximum in L-shell (n=2), not N-shell. • (b) 18 – Maximum in M-shell (n=3). • (c) 32 – Correct, based on $2n^2$ for n = 4. • (d) 2 – Maximum in K-shell (n=1).

Q.52 Which of the following elements has a completely filled second energy level (L-shell) as per Bohr's model?

A. Oxygen
B. Nitrogen
C. Neon
D. Fluorine

Answer: C

Sol: Ans. (c)

The Correct Answer is: (c) Neon Explanation: The second shell (L-shell) can hold a maximum of 8 electrons. Neon (atomic number 10) has an electron configuration of 2,8. Therefore, its L-shell is completely filled, making it chemically inert.

Information Booster: • Electron configuration of Neon: 2 in K-shell + 8 in L-shell. • Filled outermost shell leads to zero valency. • Noble gases have completely filled valence shells. • Neon is a monoatomic gas and chemically inactive. • It is used in advertising signs (neon lights).

Additional Information: • (a) Oxygen – Atomic number 8 → config 2,6 → L-shell not full. • (b) Nitrogen – Atomic number 7 → config 2,5. • (c) Neon – Correct, 2,8 electron configuration. • (d) Fluorine – Atomic number 9 → config 2,7 → needs 1 electron to complete octet.

Q.53 **Which of the following compounds of carbon has the maximum melting point?**

A. Methane
B. Chloroform
C. Ethanol
D. Acetic acid

Answer: D

Sol:

The Correct Answer: (d) Acetic acid

Acetic acid has the highest melting point among the given carbon compounds. This is due to the strong intermolecular hydrogen bonding present in acetic acid molecules. Acetic acid forms a dimer through hydrogen bonding, which significantly increases its melting point compared to the other compounds listed.

· Methane is a non-polar gas with weak Van der Waals forces, so its melting point is very low (about −182.5°C).
· Chloroform has dipole-dipole interactions but no hydrogen bonding, so its melting point is also low (−63.5°C).
· Ethanol exhibits hydrogen bonding, but not as strongly as acetic acid (melting point: −114.1°C).
· Acetic acid has a melting point of around 16.6°C, which is highest among the options due to dimer formation via
· hydrogen bonding.

Information Booster:

· Acetic acid (CH_3COOH) is a carboxylic acid known for its sharp smell and sour taste.
· Its ability to form stable hydrogen bonded dimers in the solid state significantly raises its melting point.
· This phenomenon is not as significant in ethanol or chloroform.

Additional Knowledge:

· Methane (CH_4): Simple alkane, very low melting and boiling point due to weak London forces.
· Chloroform ($CHCl_3$): Used as a solvent and anesthetic; does not form hydrogen bonds.
· Ethanol (C_2H_5OH): Has hydrogen bonding but less effective dimerization than acetic acid.
· Acetic acid (CH_3COOH): Strong hydrogen bonding and dimer formation lead to higher melting point.

Q.54 **_____ is used by doctors to set fractured bones.**

A. $ZnSO_4 \cdot 10H_2O$
B. $ZnSO_4 \cdot 7H_2O$
C. $CaSO_4 \cdot 1/2\ H_2O$
D. $CuSO_4 \cdot 5H_2O$

Answer: C

Sol: **The correct answer is (C) $CaSO_4 \cdot 1/2\ H_2O$**

Explanation:

The compound used by doctors to set fractured bones is **Calcium Sulfate Hemihydrate ($CaSO_4 \cdot 1/2\ H_2O$)**, commonly known as Plaster of Paris. It is used in the form of a paste, which hardens upon setting, making it ideal for immobilizing fractures during healing.

Information Booster:

- Plaster of Paris ($CaSO_4 \cdot 1/2\ H_2O$) is created by heating gypsum ($CaSO_4 \cdot 2H_2O$) to a high temperature.
- When mixed with water, it forms a paste that hardens and sets, making it useful in orthopedics.
- It has a quick-setting property, making it perfect for use in medical applications like setting fractures.
- It is commonly used in the form of casts for broken bones.
- Plaster of Paris is used for creating molds in the medical field, as well as in the construction and art industries.

Additional Information:

- **$ZnSO_4 \cdot 10H_2O$ and $ZnSO_4 \cdot 7H_2O$:** Zinc sulfate is not used for setting bones, although it has applications in medicine and as a supplement.
- **$CuSO_4 \cdot 5H_2O$:** Copper sulfate is mainly used as a fungicide and for other industrial applications but is not used in setting fractures.

Q.55 **Which substance is commonly added to tap water to make it safe for drinking by killing harmful microorganisms?**

A. Iron
B. Fluoride
C. Calcium
D. Chlorine

Answer: D

Sol: **Correct Answer:(d) Chlorine**

Explanation:

Chlorine is the most commonly used substance added to **tap water** for **disinfection purposes**. It is effective in **killing harmful microorganisms** such as **bacteria, viruses, and protozoa** that may be present in untreated water. Chlorination ensures that the water is **safe for human consumption** and helps prevent **waterborne diseases** like **cholera, typhoid, and dysentery**.

Information Booster:

- Chlorine is added in the form of **chlorine gas**, **sodium hypochlorite**, or **calcium hypochlorite**.
- The process is known as **chlorination**.
- Recommended residual chlorine in drinking water: **0.2–0.5 mg/L**.
- Excessive chlorine can affect **taste and smell** but is controlled within safe limits.
- It's widely used in **municipal water treatment plants** across the world.

Additional Information:

- **Iron** –Not used for disinfection; its presence in high amounts is considered a contaminant.
- **Fluoride** – Added to prevent **dental cavities**, not for killing microbes.
- **Calcium** – Important for bone health, but not a disinfectant.

Q.56 **Iron is mixed with _____ to make stainless steel.**

A. Copper and Silver
B. Copper and Zinc
C. Copper and Tin
D. Nickel and Chromium

Answer: D

Sol: **The Correct Answer is: (d) Nickel and Chromium**

Explanation:

Stainless steel is made by mixing **iron with nickel and chromium**. Chromium (about 10.5% or more) makes the steel **corrosion-resistant**, and nickel improves its **strength and luster**. This alloy is widely used in cookware, construction, and surgical instruments.

Information Booster:

• Stainless steel resists rust and staining due to chromium.
• Nickel increases ductility and enhances appearance.

• It is recyclable and durable, making it eco-friendly.
• It is used in household items, railways, and medical tools.
• Common types include austenitic, ferritic, and martensitic stainless steels.

Additional Information:
• **Copper and Silver** – Used in making coins and jewelry; not for stainless steel.
• **Copper and Zinc** – These make **brass**, not stainless steel.
• **Copper and Tin** – These form **bronze**, a historical alloy.

Q.57 **Which alkyne will produce aldehyde by hydration in presence of HgSO4 and H2SO4?**

A. Hex-2-yne
B. Ethyne
C. But-2-yne
D. Propyne

Answer: B

Sol: **The correct answer is (B) Ethyne**
Explanation:

Ethyne (acetylene) undergoes hydration in the presence of mercury(II) sulfate ($HgSO_4$) and sulfuric acid (H_2SO_4) to produce acetaldehyde (CH_3CHO). This reaction involves a Markovnikov addition, where the water adds to the alkyne, resulting in the formation of an aldehyde.

Information Booster:
1. The reaction is known as **hydroboration-oxidation** of alkynes.
2. In the presence of $HgSO_4$ and H_2SO_4, **Ethyne** undergoes **Markovnikov's rule** for the addition of water.
3. The product formed is **acetaldehyde**, a simple aldehyde.
4. This reaction is commonly used in industrial processes for producing aldehydes.
5. Ethyne (acetylene) is a simple alkyne that readily reacts with water under acidic conditions.

The reaction occurs through an intermediate enol, which tautomerizes to form the aldehyde.

Additional Information:
- **Hex-2-yne**: Under the same conditions, it produces a **ketone** rather than an aldehyde.
- **But-2-yne**: Similarly, this alkyne produces a **ketone** and does not yield an aldehyde.
- **Propyne**: Like other alkynes, it also produces a **ketone** rather than an aldehyde under these conditions.

Q.58 **Which non-essential amino acid is synthesised by the hydroxylation of phenylalanine in a reaction catalysed by phenylalanine hydroxylase?**

A. Glutamine
B. Tyrosine
C. Cysteine
D. Glycine

Answer: B

Sol: The correct answer is **(B) Tyrosine**.
Explanation:
Tyrosine is a non-essential amino acid that is synthesized by the hydroxylation of **phenylalanine** in a reaction catalyzed by the enzyme **phenylalanine hydroxylase**. This reaction involves the addition of a hydroxyl group to the phenylalanine molecule, converting it into tyrosine.

Information Booster:

- **Phenylalanine hydroxylase** requires **tetrahydrobiopterin** as a cofactor to catalyze the conversion of phenylalanine to tyrosine.

- **Tyrosine** is important for the synthesis of neurotransmitters like **dopamine**, **norepinephrine**, and **epinephrine**.
- Tyrosine also contributes to the production of **melanin**, the pigment responsible for skin and hair color, and is involved in the synthesis of thyroid hormones.

Additional Knowledge:
Glutamine:

- **Glutamine** is a non-essential amino acid, synthesized from **glutamate** by **glutamine synthetase**.

Cysteine:

- **Cysteine** is synthesized from the essential amino acid **methionine**, not from phenylalanine.

Glycine:

- **Glycine** is synthesized from **serine**, not from phenylalanine.

Q.59 What is the IUPAC name of the compound CH_3NH_2?

A. Propan-1-amine
B. Methanamine
C. 2-Methyl propan-l-amine
D. Ethanamine

Answer: B

Sol: **Correct Answer:B. Methanamine**
Explanation:
The **IUPAC name** of **CH_3NH_2** is **Methanamine**. It is derived from **methane (CH_4)** by replacing one **hydrogen atom with an amine ($-NH_2$) functional group**. This makes it the **simplest primary amine**.

Information Booster:

- **Methanamine (Methylamine)** is a **colorless gas** with a **strong ammonia-like odor**.
- It is used in **pharmaceuticals, dyes, pesticides, and solvents**.
- The **general formula** of amines is **R-NH_2** for **primary amines**.
- It is **highly soluble in water and ethanol**.
- Industrially produced by **reaction of methanol with ammonia**.

Additional Information:

- **(A) Propan-1-amine** – Incorrect; it has **three carbon atoms ($C_3H_7NH_2$)**.
- **(C) 2-Methyl propan-1-amine** – Incorrect; it refers to **a branched-chain amine ($C_4H_{11}N$)**.
- **(D) Ethanamine** – Incorrect; it refers to **$C_2H_5NH_2$ (ethylamine)**.

Q.60 **Which chemical is used for whitening (or removal of colours) of cloth in cloth industries?**

A. Calcium oxychloride
B. Sodium hydrogencarbonate
C. Calcium chloride
D. Sodium carbonate

Answer: A

Sol: The correct answer is **(A) Calcium oxychloride**.
Explanation:
Calcium oxychloride, also known as **bleaching powder**, is used in the textile industry for whitening or removing colors from fabrics. It acts as a bleaching agent that helps to remove stains and effectively whiten cloth.

Information Booster:

- **Calcium Oxychloride**: Commonly known as **bleaching powder**, it is used for whitening and bleaching in textile industries.
- **Manufacturing Process**: **Bleaching powder** is created by reacting **chlorine gas** with **slaked lime** (calcium hydroxide).
- **Other Applications**: Besides whitening cloth, it is also widely used in disinfecting water, bleaching paper, and in various industrial chemical processes.

Additional Knowledge:

- **Sodium Hydrogencarbonate**: **Baking soda** is used in various applications such as cooking and cleaning. It helps in deodorizing and can assist with fabric softening in laundry but is not used as a bleaching agent.
- **Calcium Chloride**: This chemical is used in de-icing roads, as a desiccant, and for dust control, but not for bleaching cloth.
- **Sodium Carbonate**: Known as **washing soda**, it is a strong cleaner and water softener and is used in detergents but does not have bleaching properties.

Q.61 **What is the least value of x so that the number 234x27528 becomes divisible by 11?**

A. 1
B. 2
C. 5
D. 9

Answer: D

Sol: Divisibility rule of 11 : The given number can only be completely divided by 11 if the difference of the sum of digits at odd position and sum of digits at even position in a number is 0 or 11.
2 + 4 + 2 + 5 + 8 = 3 + x + 7 + 2
21 = 12 + x
x = 21 – 12 = 9

Q.62 **The least common multiple of a and b is 17. Find the LCM of 7a and 11b is :**

A. 1462
B. 1620
C. 1309
D. 1886

Answer: C

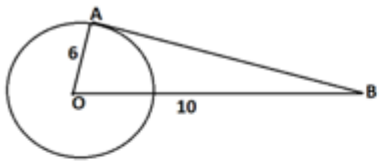
Sol: LCM = 7a × 11b
= 7 × 11 × LCM of ab
= 7 × 11 × 17
= 1309

Q.63 **A tangent AB at point A of a circle of radius 6 cm meets a line through the centre O at point B. If OB = 10 cm, then the length of AB (in cm) is equal to:**

A. 5
B. 6
C. 4
D. 8

Answer: D

Sol:



The tangent to the circle is perpendicular to the radius of the circle at the point of contact.

In triangle OAB, By using pythagoras theorem

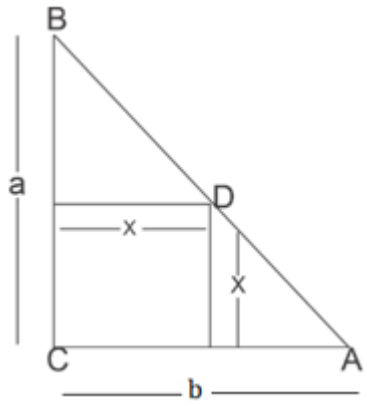
$OB^2 = AO^2 + AB^2$

$OB^2 - AO^2 = AB^2$

$10^2 - 6^2 = AB^2$

$AB = \sqrt{64} = 8\ cm$

Q.64 In a right-angle triangle, a Square is inscribed in the triangle as shown in the fig. Find the side of square



A. $\frac{1}{x}=a+\frac{1}{b}$

B. $x=a^2+b^2$

C. $\frac{1}{x}=\frac{1}{a}-\frac{1}{b}$

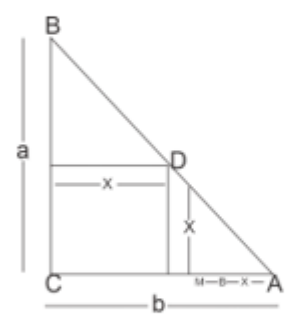
D. $\frac{1}{x}=\frac{1}{a}+\frac{1}{b}$

Answer: D

Sol: This is a standard result

$$\frac{1}{x}=\frac{1}{a}+\frac{1}{b}$$

Prof-
AMD & ACB
Similar Triangle



Cot Q= $\frac{b-x}{x}=\frac{b}{a}$

$\frac{b}{x}=\frac{b}{a}+1$

$\frac{1}{x}=\frac{1}{a}+\frac{1}{b}$ $(Dividng\ by\ 6)$

Q.65 A circular park with a radius of 14 meters has a path 2 meters wide running around it on the inside. What is the area of the path?

A. $17\pi m^2$

B. $88\pi\ m^2$

C. $52\pi\ m^2$

D. 30π m^2

Answer: C

Sol: Outer radius(R) = 14 metres
So, inner radius (r) = 14-2 = 12 metres
Area of the path = $\pi(R^2 - r^2) = \pi(196 - 144) = 52\pi$

Q.66 **Calculate the area of a rhombus if the perimeter of the rhombus is 100 cm and one of its diagonals is 14 cm long.**

A. 336 cm^2
B. 624 cm^2
C. 128 cm^2
D. 432 cm^2

Answer: A

Sol: perimeter 4a = 100
=> a = 25
Length of one diagonal is d_1 = 14 cm
Then,
$(14)^2 + (d_2)^2 = 4 \times (25)^2$
=> $d_2^2 = 2500 - 196$
=> $d_2 = \sqrt{2304}$
=> $d_2 = 48$
Area of the rhombus is 1/2 × 14 × 48
=> 336 cm^2

Q.67 **Two trains - A and B having the lengths 185 m and 175 m, respectively, are running in the same direction on parallel lines. If the speed of A and B be 87 km/h and 95 km/h, respectively, what will be the time (in seconds) taken by them to cross each other?**

A. 160
B. 166
C. 162
D. 164

Answer: C

Sol: **Given:**
Length of Train A = 185 m
Length of Train B = 175 m
Speed of Train A = 87 km/h
Speed of Train B = 95 km/h
Formula Used:
Distance = Speed × Time
Solution:
Relative speed (same direction) = 95 - 87 = 8km/h = $8 \times \frac{5}{18} = \frac{20}{9}\, m/sec$
Total Length = 185 + 175 = 360 m
Time = $\frac{360}{\frac{20}{9}} = \frac{360 \times 9}{20} = 162\, sec$
Thus, Train A and Train B cross each other in **162 sec.**

Q.68 **The speed of a boat in still water is 9 km/h. If it takes three times more time to go against the current than to go in the direction of the current, what will be the speed of the current?**

A. 6 km/hr
B. 4.5 km/hr
C. 5 km/hr
D. 5.5 km/hr

Answer: B

Sol: Let the speed of stream be x

Given, Upstream : Downstream

Time = 3 : 1

Speed = 1 : 3

So, $\frac{9-x}{9+x}=\frac{1}{3}$ $\Rightarrow$ x = 4.5 km/hr

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Q.69 Find the average of the following sets of numbers.
700, 450, 806, 572, 534, 691, 696, 384, 680

A. 612.7
B. 612.9
C. 612.5
D. 612

Answer: C

Sol: Average

$= \frac{700+450+806+572+534+691+696+384+680}{9}$

= 612.5

Q.70 The denominator of a fraction is 3 less than the numerator of a fraction. If 2 is added to the numerator and 5 is subtracted from the denominator then obtained fraction is in the ratio of 7:6. Find the original fraction

A. 69/66
B. 68/65
C. 65/68
D. 73/66

Answer: B

Sol: **Given:**

Let numerator $= x$, denominator $= x - 3$

After changes:

New numerator $= x + 2$, New denominator $= x - 8$

Given ratio $= \frac{7}{6}$

Formula Used:

$\frac{a}{b} = \frac{c}{d} => ad = bc$

Solution:

$\frac{x+2}{x-8} = \frac{7}{6}$

$=> 6(x + 2) = 7(x - 8)$

$=> 6x + 12 = 7x - 56$

$=> 68 = x$

Numerator $= 68$, Denominator $= 65$

Final Answer: $\frac{68}{65}$

Q.71 If $a^3 + b^3 = 7743$ and a + b = 29, then find the value of $(a - b)^2 + ab$.

A. 279
B. 259
C. 194
D. 267

Answer: D

Sol: **Given:**

$a^3 + b^3 = 7743$

$a + b = 29$

Identity Used:

$a^2 - ab + b^2 = (a^2 - 2ab + b^2) + ab = (a - b)^2 + ab$

Solution:

Substitute these values into the identity:

$7743 = 29 \times (a^2 - ab + b^2)$

So,

$a^2 - ab + b^2 = \frac{7743}{29} = 267$

Recall the identity:

$(a - b)^2 = a^2 - 2ab + b^2$

Rewrite $a^2 - ab + b^2$ as:

$a^2 - ab + b^2 = (a^2 - 2ab + b^2) + ab = (a - b)^2 + ab$

Therefore:

$(a - b)^2 + ab = 267$

Q.72 **The price of oil increases by 40%. By what percentage should a household reduce its oil consumption to maintain the same expenditure?**

A. 28.57%
B. 33.33%
C. 25%
D. 30%

Answer: A

Sol: **Given:**

The price of oil increases by 40%.

Concept Used:

To keep the total expenditure constant when the price of a good increases, the consumption should be adjusted inversely in proportion to the price increase. This involves finding the percentage decrease in consumption that offsets the percentage increase in price.

Solution:

Let the original consumption be 100 units and the original price be ₹1 per unit.

Thus, total expenditure = 100 × 1 = ₹100.

After a 40% price increase, the new price = ₹1.40 per unit.

To keep expenditure constant, new consumption should satisfy 1.40 × new consumption = ₹100.

New consumption = $\frac{100}{1.40} \approx$ 71.43 units.

Percentage reduction in consumption = $\frac{(100 - 71.43)}{100} \times 100$ = 28.57%.

Q.73 **Marked price of a car is Rs. 600000. Rahul buys that car at two successive discounts of 30 percent and 20 percent. If after using the car, he sells the car for Rs. 478000, then what is the profit percentage?**

A. 39.87 percent

B. 42.26 percent
C. 36.85 percent
D. 33.33 percent

Answer: B

Sol: C.P. of car for Rahul= $600000\times\frac{70}{100}\times\frac{80}{100}=$ Rs. 336000

S.P. of car = Rs. 478000

Profit %= $\frac{478000-336000}{336000}\times 100 = 42.26\%$

Q.74 A can do a work in 18 days and B can do this work in 27 days. They start the work together and work for 8 days and C can do the remaining work in 5 days. How many days C can complete this work.

A. 15 days
B. $17\frac{1}{2}$ days
C. $19\frac{2}{7}$ days
D. 16 days

Answer: C

Sol: A ⟶ 18 — 3 Efficiency

54

B ⟶ 27 — 2 Efficiency

A + B = 5

A + B, 8 days work = 5 × 8 = 40

Remaining work = 54 − 40

= 14

C's efficiency = $\left(\frac{14}{5}\right)$

Then C can do this work = $\frac{54}{\frac{14}{5}}$

$=\frac{54\times5}{14}$

$=19\frac{2}{7}$ days

Q.75 The efficiencies of A, B and C are in the ratio 7 : 6 : 9. Working together, they can complete a piece of work in 135 days. In how many days will, C alone be able to complete 65% of that work?

A. $202\frac{3}{5}$ days
B. $214\frac{1}{2}$ days
C. $197\frac{3}{5}$ days
D. 211 days

Answer: B

Sol: $\frac{135\times22}{9}\times\frac{65}{100}=214\frac{1}{2}$ days

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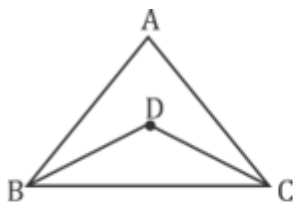
Q.76 In a triangle ABC, if there is a point D inside a triangle such that BD and CD bisect ∠B and ∠C, respectively, and ∠A = 106°, then find ∠BDC.

A. 153°
B. 143°
C. 146°
D. 150°

Answer: B

Sol:



$\angle B + \angle C + \angle A = 180°$

$\angle B + \angle C = 180° - \angle A = 180° - 106°$

$= 74°$

$\frac{1}{2}(\angle B + \angle C) = \frac{1}{2} \times 74° = 37°$

$\angle D + \frac{1}{2}(\angle B + \angle C) = 180°$

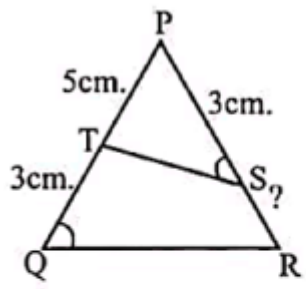
$\angle D = 180° - 37° = 143°$

Q.77 In Δ PQR, S and T are points on side PR and PQ respectively such that, ∠ PQR = ∠ PST. If PT = 5 cm., PS = 3 cm. and TQ = 3 cm, then length of SR is-

A. 5 cm.
B. 6 cm.
C. 31/3 cm.
D. 41/3 cm.

Answer: C

Sol:



$\Delta PQR \sim \Delta PST$

$\begin{bmatrix} \angle P = \angle P \\ \angle PST = \angle PQR \end{bmatrix}$ AA Property

$\therefore \frac{PQ}{PS} = \frac{PR}{PT}$

$\frac{8}{3} = \frac{x+3}{5} \Rightarrow 40 = 3x + 9 \Rightarrow x = \frac{31}{3}$ cm.

Q.78 A cylindrical tank has a capacity of 2772 m^3. If the diameter of its base is 42 m, find its depth.

A. 1m
B. 2m
C. 3m
D. 4m

Answer: B

Sol: $\pi r^2 h = 2772$

$\frac{22}{7} \times 21 \times 21 \times h = 2772$

$22 \times 3 \times 21 \times h = 2772$

$1386 \times h = 2772$

$\boxed{h = 2m}$

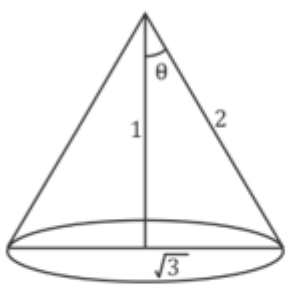
Q.79 What is the vertical angle of the cone whose lateral surface area is $\frac{4\sqrt{3}}{6}$ times of the base area?

A. 135°
B. 125°

C. 110°
D. 120°

Answer: D

Sol:



$\pi rl = \frac{4\sqrt{3}}{6}\pi r^2$

$\frac{l}{r} = \frac{2}{\sqrt{3}}$

$\theta = 60°$

Vertical angle = $2\theta = 120°$

Q.80 $\frac{1}{12}$ part of a wire is white. $\frac{1}{3}$ part of the remaining wire is blue and the remaining $2\frac{4}{9}$ metre wire is red. What is the total length of the wire?

A. 8 metre
B. 4 metre
C. 2/9 metre
D. 9/36 metre

Answer: B

Sol:

let the total length of wire be LCM of 12, 3 and 9 i.e 36x

White part of the wire = $\frac{1}{12} \times 36x = 3x$

Remaining wire is 36x - 3x = 33x

Blue part of the wire = $\frac{1}{3}$ part of the remaining wire = $\frac{1}{3} \times 33x = 11x$

Remaining wire is 33x - 11x = 22x

$\frac{22}{9}$ metre of the remaining wire is red = $22x = \frac{22}{9} \Rightarrow x = \frac{1}{9}$ metre

the total length of wire is $36x = 36 \times \frac{1}{9} = 4$ metre

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Q.81 Which organelle is responsible for producing ATP through cellular respiration?

A. Endoplasmic reticulum
B. Nucleus
C. Golgi apparatus
D. Mitochondrion

Answer: D

Sol:

The correct answer is Mitochondrion.

· **The mitochondria** is often referred to as the "**powerhouse of the cell**".

· It is responsible for producing **adenosine triphosphate (ATP)**, which is the main energy currency of the cell.

· ATP production occurs through a process called **cellular respiration**, which involves the breakdown of glucose and other nutrients.

· The mitochondrion has its own DNA and is believed to have originated from an ancient symbiotic relationship between a primitive eukaryotic cell and a prokaryotic cell.

· This organelle is essential for energy-intensive processes within the cell, such as muscle contraction and active transport.

Additional Information

· The **structure of the mitochondrion** includes two membranes: an outer membrane and a highly folded inner membrane. The folds of the inner membrane are called **cristae**.

· The space inside the inner membrane is known as the **matrix**, which contains enzymes, mitochondrial DNA, and ribosomes.

· Mitochondria are also involved in other important cellular processes such as **apoptosis (programmed cell death)**, calcium storage, and the regulation of the cell cycle.

· Defects in mitochondrial function can lead to a range of metabolic disorders.

Q.82 **What is the defining characteristic of chordates in the Animal Kingdom?**

A. Segmentation
B. Notochord
C. Gills
D. Exoskeleton

Answer: B

Sol:

The correct answer is Notochord.

The notochord is a flexible, rod-like structure that provides support and is a key feature of chordates, differentiating them from other animal groups.

Q.83 **Oesophagus belongs to which major organ system in the human body?**

A. Respiratory system
B. Nervous system
C. Endocrine system
D. Digestive system

Answer: D

Sol: **The correct answer is (d) Digestive system**

Explanation:

The **oesophagus** is a part of the **digestive system**. It is a muscular tube that connects the throat (pharynx) with the stomach and is responsible for transporting food and liquids from the mouth to the stomach.

Information Booster:

- The **oesophagus** plays a critical role in the digestive system by moving food via **peristalsis**, a series of wave-like muscle contractions.
- It connects the **mouth** to the **stomach**, allowing swallowed food to reach the stomach for digestion.
- The **digestive system** includes various organs such as the **mouth**,**oesophagus**,**stomach**,**small intestine**, and **large intestine**, all working together for digestion and absorption of nutrients.
- **Acid reflux** and other conditions related to the oesophagus can lead to digestive issues such as **heartburn** or **gastroesophageal reflux disease (GERD)**.

Additional Information:

- **Respiratory system** – The oesophagus is not part of the respiratory system, which includes the **lungs**,**trachea**, and **bronchi**.
- **Nervous system** – The oesophagus is not part of the nervous system, which controls and coordinates body functions through the **brain** and **nerves**.

- **Endocrine system** – The oesophagus is not part of the endocrine system, which includes glands like the **thyroid** and **pancreas** responsible for hormone production.

Q.84 **Which of the following hormone is not secreted by Pancreas?**

A. Glucagon
B. Insulin
C. Relaxin
D. Somatostatin

Answer: C

Sol:

The **pancreas** is an endocrine gland responsible for secreting important hormones related to glucose metabolism and digestion. The hormones secreted by the pancreas include **insulin, glucagon, and somatostatin**. However, **Relaxin is NOT secreted by the pancreas; it is primarily produced by the ovaries and placenta in females**.
Information Booster: 1. **Glucagon (Secreted by Pancreas - α-cells of Islets of Langerhans):**
· **Function:** Increases blood glucose levels by stimulating glycogen breakdown in the liver.
· **Antagonistic to Insulin:** It works in opposition to insulin to maintain glucose homeostasis.
2. **Insulin (Secreted by Pancreas - β-cells of Islets of Langerhans):**
· **Function:** Lowers blood glucose levels by promoting glucose uptake into cells and converting it into glycogen (glycogenesis).
· **Deficiency:** Causes **Diabetes Mellitus**.
3. **Somatostatin (Secreted by Pancreas - δ-cells of Islets of Langerhans):**
· **Function:** Inhibits the secretion of insulin and glucagon, helping regulate glucose metabolism.
· **Also produced in the Hypothalamus:** Inhibits Growth Hormone (GH) secretion.
4. **Relaxin (Secreted by Ovaries & Placenta, NOT Pancreas):**
· **Function:** Helps relax ligaments in the pelvis during pregnancy and facilitates childbirth.
· **Also found in males (small amounts):** Produced by the prostate gland but has no significant role.
Additional Information: · **(a) Glucagon:** Secreted by the **alpha (α) cells of the pancreas**, helps increase blood sugar levels.
· **(b) Insulin:** Secreted by the **beta (β) cells of the pancreas**, helps lower blood sugar levels.
· **(c) Relaxin: Not secreted by the pancreas**; it is produced mainly by the **ovaries and placenta** during pregnancy.
· **(d) Somatostatin:** Secreted by the **delta (δ) cells of the pancreas**, regulates insulin and glucagon secretion.

Q.85 **Oxalic acid is naturally present in which of the following kitchen ingredients?**

A. Lemon
B. Vinegar
C. Spinach
D. Milk

Answer: C

Sol: **The correct answer is (C) Spinach**
Explanation:

Oxalic acid is naturally found in spinach and several other vegetables. It is an organic compound that can form insoluble salts when combined with calcium, often referred to as calcium oxalate. While oxalic acid is present in many plants, spinach is particularly known for having a significant amount.

Information Booster:

- Oxalic acid in spinach can affect the absorption of minerals like calcium and iron.
- It is found in other foods like rhubarb, beets, and kale as well.
- Oxalic acid can contribute to kidney stone formation in sensitive individuals when consumed in large quantities.
- Cooking spinach can reduce its oxalic acid content.
- It is a naturally occurring substance, not artificially added to food.

Additional Information:

- **Lemon:** While lemon is acidic, it does not contain oxalic acid. Its main acid is citric acid.
- **Vinegar:** Vinegar contains acetic acid, not oxalic acid.
- **Milk:** Milk is rich in calcium but does not contain oxalic acid.

Q.86 **Liver fluke belongs to phylum _____.**

1. Aschelminthes
2. Platyhelminthes
3. Cnidarian
4. Annelida

A. Aschelminthes
B. Platyhelminthes
C. Cnidarian
D. Annelida

Answer: B

Sol: The correct answer is **(b) Platyhelminthes**

Explanation:

The **Liver fluke** is a **parasitic flatworm** that belongs to the **phylum Platyhelminthes**.

- **Scientific name: Fasciola hepatica**
- It is an **endoparasite** found in the **liver of herbivorous animals** like sheep and cattle.
- It causes a disease called **fascioliasis**.
- Liver flukes have a **dorsoventrally flattened body** and lack a specialized circulatory and respiratory system.

Information Booster:

Phylum Platyhelminthes:

- Also known as **flatworms**
- Mostly **parasitic**
- **Triploblastic** and **bilaterally symmetrical**
- Lack body cavity (**acoelomates**)
- Common examples: Planaria, Taenia solium (tapeworm), Fasciola hepatica (liver fluke)

Additional Knowledge:

Aschelminthes:

- Roundworms
- E.g., Ascaris

Cnidarian:

- Aquatic animals with stinging cells
- E.g., Hydra, Jellyfish, Sea anemone

Diploblastic and **radially symmetrical**

Annelida:

- Segmented worms
- E.g., Earthworm, Leech, Nereis
- **Coelomates** with metamerism

Q.87 **Which of the following element is required for the growth of root tip?**

A. Calcium
B. Iron

C. Zinc
D. Potassium

Answer: A

Sol: **The correct answer is (A) Calcium**
Explanation:

Calcium is essential for the growth of root tips as it plays a crucial role in cell division and elongation in the root meristem. It is a key component of the cell wall structure and is involved in signaling pathways that regulate root growth.

Information Booster:

1. **Calcium** is vital for maintaining the integrity of the cell wall in growing roots.
2. It acts as a secondary messenger in many plant signaling pathways related to growth.
3. Calcium helps in the proper functioning of enzymes that facilitate root tip growth.
4. It aids in the stabilization of the plant cell membrane.
5. Adequate calcium ensures proper development of root cap cells.
6. It also assists in nutrient uptake by roots.

Additional Information:

- **Iron**: Required for chlorophyll synthesis and electron transport, not directly related to root tip growth.
- **Zinc**: Involved in enzyme activation and protein synthesis, but its role in root tip growth is secondary.
- **Potassium**: Essential for osmotic regulation and enzyme activation, but does not have a primary role in root tip growth.

Q.88 **Which of the following is the functional unit for absorption of digested food?**

A. Pyloric caeca
B. Vermiform appendix
C. Brunner's glands
D. Villi

Answer: D

Sol: **The correct answer is (D) Villi**
Explanation:

The **villi** are the functional units for the absorption of digested food. They are tiny, finger-like projections found in the inner lining of the small intestine. The surface of the villi is covered with even smaller projections called **microvilli**, which increase the surface area for nutrient absorption. This is where the majority of nutrient absorption occurs in the digestive system.

Information Booster:

- Villi are essential for the efficient absorption of nutrients like amino acids, sugars, and fatty acids.
- Each villus contains a network of blood vessels and lymphatic vessels, called lacteals, to transport absorbed nutrients.
- Microvilli increase the surface area exponentially, enhancing absorption efficiency.
- The absorption process is facilitated by enzymes that break down food into smaller molecules.
- The villi also play a role in the transport of absorbed nutrients into the bloodstream.

Additional Information:

- **Pyloric caeca**: These are blind sacs located near the junction of the stomach and intestines in some animals, involved in digestion but not absorption.
- **Vermiform appendix**: A small tube connected to the large intestine, with no direct role in food absorption.

- **Brunner's glands**: Found in the duodenum, these glands secrete mucus to protect the intestine lining, but they do not directly aid in absorption.

Q.89 **Which of the following organism is the smallest living cells and completely lack cell wall?**

A. Yeast
B. Amoeba
C. Slime mould
D. Mycoplasma

Answer: D

Sol: **The correct answer is (D) Mycoplasma**
Explanation:

Mycoplasma are the smallest living cells and are unique in that they completely lack a **cell wall**. They are a type of bacteria that can survive without a cell wall, making them distinct from most other bacteria, which have a rigid cell wall. Mycoplasma are known for their small size and their ability to cause various diseases in plants and animals.

Information Booster:

- Mycoplasma species are the smallest known free-living organisms.
- They are **pleomorphic**, meaning they can change shape due to the absence of a rigid cell wall.
- Mycoplasma can cause respiratory and urinary tract infections in humans.
- They are resistant to antibiotics that target cell walls, such as penicillin.
- Mycoplasma are often used in research as model organisms due to their simplicity.
- Their small size allows them to pass through filters that trap most bacteria.

Additional Information:

- **Yeast**: A type of fungus that has a cell wall made of chitin and is much larger than mycoplasma.
- **Amoeba**: A single-celled organism that lacks a fixed shape but still has a cell membrane and internal structures like a nucleus.
- **Slime mould**: A group of protists that exhibit both fungal and animal-like characteristics, and they have cell walls in their vegetative state.

Q.90 **Depletion of which gas in the atmosphere can lead to an increase incidence of skin cancer?**

A. Ozone
B. Carbon dioxide
C. Hydrogen sulphide
D. Nitrous oxide

Answer: A

Sol: **The correct answer is (A) Ozone**
Explanation:

The **depletion of ozone** in the atmosphere leads to an increase in the amount of harmful ultraviolet (UV) radiation reaching the Earth's surface. UV radiation is a major cause of skin cancer, as it can damage the DNA in skin cells, leading to mutations and eventually cancer. The ozone layer acts as a protective shield, absorbing most of the sun's harmful UV radiation.

Information Booster:

- The ozone layer is located in the stratosphere and absorbs most of the sun's **UV-B radiation**.
- Ozone depletion is primarily caused by chemicals like chlorofluorocarbons (CFCs).

- Increased UV radiation can lead to higher rates of skin cancers, such as melanoma.
- Ozone depletion is also linked to cataracts and other eye damage.
- Efforts like the **Montreal Protocol** have significantly reduced the use of ozone-depleting substances.
- The thinning of the ozone layer is a global environmental concern due to its effects on human health and ecosystems.

Additional Information:

- **Carbon dioxide**: While it contributes to global warming, it does not directly lead to skin cancer.
- **Hydrogen sulphide**: This gas is toxic and can lead to respiratory issues but is not associated with skin cancer.
- **Nitrous oxide**: It is a greenhouse gas and contributes to global warming but does not directly affect skin cancer.

Q.91 **Under the broad classification of kingdom Animalia based on common fundamental characteristics, Asterias (starfish) belongs to which of the following phyla?**

A. Echinodermata
B. Mollusca
C. Arthropoda
D. Annelida

Answer: A

Sol: **The Correct Answer is: (A) Echinodermata**

Explanation:

Asterias, commonly known as **starfish**, belongs to the phylum **Echinodermata**. Members of this phylum are exclusively **marine**, exhibit **radial symmetry** (in adults), and have a **water vascular system** used for movement and feeding. They also possess an **endoskeleton made of calcium carbonate** and a **true coelom**.

Information Booster:

• **Echinoderms** have a unique **water vascular system** with tube feet.
• They exhibit **radial symmetry** in adults and **bilateral symmetry** in larvae.
• Examples include **starfish (Asterias), sea urchins, and sea cucumbers**.
• They lack a head, heart, or brain but have a decentralized nerve net.
• Echinoderms have **remarkable regenerative abilities**.
• They are considered **closely related to chordates** in evolutionary terms.

Additional Information:

• **Mollusca** – Includes snails, octopuses, and clams; they have soft bodies, often with shells.
• **Arthropoda** – Largest phylum; includes insects, crustaceans, and arachnids with jointed legs.
• **Annelida** – Segmented worms like earthworms and leeches; have bilateral symmetry and a true coelom.

Q.92 **Prolonged use of computers, tablets and cell phones can lead to digital strain. Which of the following is NOT a symptom of digital eye strain?**

A. Headache
B. Skin rash
C. Blurred vision
D. Dryeyes

Answer: B

Sol: **The correct answer is (B) Skin rash**

Explanation:

Digital eye strain, also known as computer vision syndrome, occurs due to prolonged use of digital screens such as computers, tablets, and cell phones. Common symptoms include headaches, blurred vision, and dry eyes. However, **skin rash** is not a typical symptom of digital eye strain.

Information Booster:

1. **Headache** is a common symptom of digital eye strain, often caused by eye fatigue or tension.
2. **Blurred vision** can occur when focusing on screens for extended periods without breaks.
3. **Dry eyes** are a common issue because screen use often reduces blink rate, leading to insufficient moisture.
4. The condition can cause discomfort, but it is generally temporary with proper rest and screen habits.
5. To prevent digital eye strain, one should follow the 20-20-20 rule: every 20 minutes, take a 20-second break and look at something 20 feet away.
6. Using anti-glare screens and adjusting screen brightness can also help alleviate symptoms.

Additional Information:

- **Skin rash** : Skin rash is generally unrelated to digital eye strain, but can be a symptom of allergies or skin conditions unrelated to screen use.
- **(Headache)**, **(Blurred vision)**, **(Dry eyes)** are all common symptoms of digital eye strain, linked to prolonged exposure to screens.

Q.93 **Which of the following statement/s is/are correct ?**
(A) Alzheimer's disease is a degenerative brain disease resulting in progressive memory loss.
(B) Dementia is not a disease, but a syndrome.
Select the correct answer using the code given below :

A. (A) only
B. (B) only
C. Both (A) and (B)
D. Neither (A) nor (B)

Answer: C

Sol: **The correct answer is: (c) Both (A) and (B)**
Explanation:

- **Statement A – Correct:**
  Alzheimer's disease is a **neurodegenerative disorder** that leads to **progressive loss of memory and cognitive function**. It is the most common cause of dementia.

- **Statement B – Correct:**
  Dementia is **not a single disease**, but a **syndrome** – a group of symptoms affecting memory, thinking, and social abilities. It can be caused by various conditions, including Alzheimer's, Parkinson's, and stroke.

Information Booster:

- **Alzheimer's** is responsible for **60–70% of dementia cases worldwide**.
- Symptoms include **confusion, disorientation, language problems**, and **personality changes**.
- **Dementia** can be **reversible** in some cases (e.g., due to vitamin deficiencies or thyroid issues).
- Alzheimer's has **no cure**, but treatment can manage symptoms.
- Risk factors include **age, genetics, lifestyle, and cardiovascular health**.

Q.94 **Dilute aqueous solution of which among the following is used as a weak antiseptic for eyes ?**

A. Mixture of chloroxylenol and terpineol
B. Tincture of Iodine
C. Boric Acid
D. Sulphur Dioxide

Answer: C

Sol: **The correct answer is (C) Boric Acid**
Explanation:

A dilute aqueous solution of **Boric Acid** is commonly used as a weak antiseptic for the eyes. It is gentle on the eyes and is used in eye drops to relieve irritation and treat minor infections. Its mild antiseptic properties help in preventing bacterial growth and soothing the eyes.

Information Booster:

1. Boric acid has antifungal and antibacterial properties, making it useful in eye care.
2. It is often used in eye drops for treating minor eye infections or irritation.
3. Boric acid is known for its mildness, making it safe for the delicate tissues of the eye.
4. It helps maintain the pH balance in the eyes.
5. Boric acid has been used in medical applications for over a century.
6. It is also used in the treatment of conjunctivitis and as a soothing agent for eye irritation.

Additional Information:

- **Mixture of chloroxylenol and terpineol** – This mixture is an antiseptic used in skin care but is not commonly used for eye care.
- **Tincture of Iodine** – Iodine is a strong antiseptic but is too harsh for direct use in the eyes.
- **Sulphur Dioxide** – Sulphur dioxide is not used as an antiseptic for eyes; it is primarily used in food preservation and other industrial applications.

Q.95 **Which preservative is used in Jelly making?**

A. Pectin
B. Sugar
C. Sulphite
D. Sulphur dioxide

Answer: B

Sol:

The Correct Answer is Sugar
In jelly making, sugar is the primary preservative used. Sugar not only sweetens the jelly but also acts as a preservative by drawing water out of the fruit mixture, which helps prevent the growth of microorganisms. The high concentration of sugar in jelly ensures its preservation and contributes to its texture and consistency.
Jelly is made by extracting the juice from fruits, boiling it with sugar, and simmering it to achieve a semi-transparent, gel-like consistency. The sugar, combined with pectin (naturally present in fruits), helps the jelly set and preserves it for longer periods.
· Jelly is typically made by simmering the strained juice of fruits with sugar and sometimes pectin to help it set.
· Sugar is the main ingredient that acts as both a sweetener and a preservative, keeping the jelly safe from spoilage.
Additional Information:
· **Pectin**: While pectin is not a preservative, it is an essential ingredient in jelly making because it helps the jelly set and form its gel-like structure. Pectin is a naturally occurring carbohydrate found in fruits.
· **Sulphite**: Sulphites are used to preserve color and protect against microbial spoilage in certain foods, such as dried fruits and wines, but are not used in jelly making.
· **Sulphur Dioxide (SO2)**: This is an industrial compound used in some preservation processes, especially in winemaking and other food preservation methods, but it is not used in jelly making.

Q.96 **Match the terms in column A with their respective properties in column B.**

Column A	**Column B**
a. Glucose	Intermediate substance in breakdown of glucose

b. Yeast Glucose is converted into pyruvic acid

c. Glycolysis Uses nutrients for fermentation process

d. Pyruvic acid Best organic substrate for respiration

A. i-b, ii-a, iii-d, iv-c.
B. i-d, ii-c, iii-b, iv-a.
C. i-a, ii-b, iii-c, iv-d.
D. i-d, ii-c, iii-a, iv-b

Answer: B

Sol: The correct answer is (b) i-d, ii-c, iii-b, iv-a.
Explanation:

Column A	Column B
i. Glucose	**Best organic substrate for respiration**
ii. Yeast	**Uses nutrients for fermentation**
iii. Glycolysis	**Glucose is converted into pyruvic acid**
iv. Pyruvic acid	**Intermediate substance in the breakdown of glucose**

Additional Knowledge:

- **Glucose**: Apart from glycolysis, glucose can also undergo processes like the **pentose phosphate pathway** for cellular biosynthesis.
- **Yeast**: Yeast fermentation is used in various industrial processes, including alcohol production and leavening bread.
- **Glycolysis**: This process is universal across nearly all living organisms, indicating its essential role in energy production.
- **Pyruvic acid**: In the presence of oxygen, pyruvic acid enters the **Krebs cycle** for further energy production.

Q.97 Which species of green algae, commonly known as stonewort, is often mistaken for a plant?

A. Chara
B. Kelp
C. Gracilaria
D. Sargassum

Answer: A

Sol: The Correct Answer is **A: Chara**.

Explanation:

Chara is a **genus of green algae** found in **freshwater**. It resembles **higher plants** due to its **stem-like and leaf-like structures** but is classified as algae.

Key Points:

- Belongs to the **Charophyte** group, closely related to land plants.
- Found in **freshwater bodies** like ponds and lakes.
- Has **calcified cell walls**, giving it a rough texture, hence the name "stonewort."
- Plays a crucial role in **oxygenation and habitat formation** in aquatic ecosystems.

Additional Information:

- **Kelp** – Large **brown algae**, forms **underwater forests**.
- **Gracilaria** – A **red algae**, used for **agar production**.
- **Sargassum** – A **brown algae**, floats in **marine environments**.

Q.98 **Which of the following is a food-borne disease caused by the consumption of contaminated food or beverages?**

A. Malaria
B. Tuberculosis
C. Chicken pox
D. Cholera

Answer: D

Sol: The correct answer is **(d) Cholera**

Explanation:

Cholera is a **food-borne and water-borne disease** caused by the bacterium **Vibrio cholerae.**

It spreads through the **consumption of contaminated food or water** that contains the bacterium.

The primary sources of contamination include:

- **Unhygienic food handling**
- **Consumption of raw or undercooked seafood**
- **Drinking untreated or contaminated water**

Information Booster

1. **Symptoms of Cholera:**
   - Profuse **watery diarrhea ("rice-water stools")**
   - Severe **dehydration**
   - Nausea and vomiting
   - Muscle cramps due to electrolyte loss
2. **Treatment:**
   - **Oral Rehydration Therapy (ORT)**
   - **Intravenous (IV) fluids** in severe cases
   - **Antibiotics** like doxycycline in serious infections

Additional Knowledge

- **Malaria –** Malaria is caused by the **Plasmodium** parasite and spread by the **bite of infected Anopheles mosquitoes**.
- **Tuberculosis:** TB is caused by Mycobacterium tuberculosis and primarily spreads **through airborne droplets**.
- **Chicken Pox:** Chickenpox is a **viral infection** caused by the **Varicella-zoster virus** and spreads **through respiratory droplets and direct contact**.

Q.99 **What is the root-like structure at the base of an algae (seaweed) that binds the algae to a hard substrate like a stone?**

A. Stipe
B. Frond

C. Midrib
D. Holdfast

Answer: D

Sol: The correct answer is **(d) Holdfast**

Explanation:

The root-like structure at the base of algae (such as seaweed) that anchors the plant to a hard substrate like a stone is known as the **holdfast**. Although it resembles roots, a holdfast does not absorb nutrients or water like true roots.

Its primary function is to secure the algae firmly to a surface to prevent it from being swept away by currents or waves. Holdfasts are found in marine algae like kelp and other seaweeds.

Information Booster:

1. The structure is flexible, allowing the algae to stay securely attached even in rough waters.
2. Holdfasts are particularly important for large seaweeds like **kelp**, which can grow to great lengths.
3. The holdfast does not play a role in the transportation of water and nutrients, as these are absorbed through the algae's surface.

Additional Knowledge:

- **Stipe** – The **stipe** is the stem-like structure in some algae, providing support and carrying nutrients and water to the fronds.
- **Frond** – The **frond** is the leaf-like part of algae, responsible for photosynthesis.
- **Midrib** – The **midrib** is the central vein in the fronds of some plants.

Q.100 **Which of the following groups represents essential amino acid?**

A. Alanine, isoleucine, leucine, lysine
B. Glycine, proline, serine, and tyrosine
C. Alanine, arginine, asparagine, aspartic acid
D. Histidine, isoleucine, leucine, lysine

Answer: D

Sol: The Correct Answer is **D: Histidine, isoleucine, leucine, lysine**.

Explanation:

Essential amino acids are those that the body cannot synthesize and must be obtained from the diet. The correct group contains essential amino acids like **histidine, isoleucine, leucine, and lysine**, which are vital for various bodily functions, including protein synthesis, enzyme activity, and immune function.

Key Points:

- **Essential amino acids** include **histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, valine**.
- These amino acids must be **obtained through diet** as the human body cannot synthesize them.

Additional Information:

- **Alanine, isoleucine, leucine, lysine** – This option contains a mix of essential and non-essential amino acids, making it incorrect.
- **Glycine, proline, serine, and tyrosine** – These are **non-essential amino acids** that the body can synthesize.
- **Alanine, arginine, asparagine, aspartic acid** – These are also **non-essential amino acids**, meaning they do not need to be consumed through diet.