DDCET – 2026 PRACTICE PAPER SET – 1 Solution

Booklet Series

A

- This is the detailed solution of **DDCET – 2026 Practice Paper Set – 1**, which was provided along with the **DDCET Practice Booklet**. The purpose of this solution set is to help students analyze their performance, understand the correct approach to solving questions, and improve their problem-solving skills for the upcoming DDCET exam.

Best wishes for your **DDCET-2026** preparation!

Team DESI Students

1. Predict the products for the following reaction.

$H_2SO_4(aq) + 2NaOH(aq) \rightarrow$

(A) $2NaOH(aq) + SO_4(g)$

(B) $3NaSO_4(aq) + H_2(g)$

(C) $Na_2OH_2(aq) + 2SO_2(g)$

(D) $Na_2SO_4(aq) + 2H_2O(l)$

Correct Ans: D

Solution

⇒ When an acid and a base react, they form a salt (sodium sulfate) and water through a neutralization reaction.

$$H_2SO_4(aq) + 2NaOH(aq) \rightarrow Na_2SO_4(aq) + 2H_2O(l)$$

2. What is the product of the neutralization reaction between hydrochloric acid sodium (HCl) and hydroxide $(NaOH)$?

(A) Sodium chloride $(NaCl)$ and water (H_2O)

(B) Hydrogen gas (H_2) and oxygen gas (O_2)

(C) Carbon dioxide (CO_2) and water (H_2O)

(D) Nitric acid (HNO_3)

Correct Ans: A Solution

⇒ The product of the neutralization reaction between hydrochloric acid (HCl) and sodium hydroxide $(NaOH)$ is Sodium chloride $(NaCl)$ and water (H_2O).

$HCl + NaOH \rightarrow H_2O + NaCl$

3. What is the key factor influencing the selection of a suitable location for geothermal power plants?

(A) Proximity to oceans

(B) Presence of volcanic activity

(C) High wind speeds

(D) Dense vegetation

Correct Ans: B

Solution

⇒ Regions with volcanic activity commonly possess the requisite geological conditions for effective geothermal power generation, encompassing hot rocks and reservoirs of steam or hot water.

4. Which gas is evolved when aluminum reacts with sulfuric acid?

(A) Oxygen (O_2)

(B) Hydrogen (H_2)

(C) Sulfur dioxide (SO_2)

(D) Carbon dioxide (CO_2)

Correct Ans: B

Solution

⇒ Acids react with metals to produce hydrogen gas.

⇒ Aluminum reacts with sulfuric acid to produce aluminum sulfate and hydrogen gas.

$2Al + 3H_2SO_4 = Al_2(SO_4)_3 + 3H_2$

5. A ray of light passes from air into a medium with a refractive index of 1.5. If the angle of incidence is 30 degrees, what is the angle of refraction?

(A) 19.47 degrees

(B) 45 degrees

(C) 60 degrees

(D) 30 degrees

Correct Ans: A

Solution

Given data:

⇒ Refractive index, $\mu = 1.5$

⇒ Angle of incidence, $\theta_1 = 30°$

⇒ Angle of refraction, $\theta_2 = ?$

According to Snell's Law:

$$\frac{\sin\theta_1}{\sin\theta_2} = \mu$$

$$\frac{\sin 30°}{\sin\theta_2} = 1.5$$

$$\frac{\sin 30°}{1.5} = \sin\theta_2$$

$$\sin\theta_2 = 0.3333 \implies \theta_2 = \sin^{-1}(0.3333) = 19.47°$$

6. The force between two charges is initially 16 N when they are 2 meters apart. If the distance between them is doubled to 4 meters, what will be the new force?

(A) 4 N

(B) 16 N

(C) 8 N

(D) 64 N

Correct Ans: A

Solution

Given data:

⇒ $F_1 = 16\ N$

⇒ $d_1 = 2\ m$

$\Rightarrow d_2 = 4\ m$

According to Coulomb's law

The magnitude of the electrostatic force (F) between two point charges $F = k\frac{Q_1Q_2}{d^2}$

$F \propto \frac{1}{d^2}$

$\frac{F_2}{F_1} = (\frac{d_1}{d_2})^2$

$F_2 = F_1 \times (\frac{d_1}{d_2})^2$

$F_2 = 16 \times (\frac{2}{4})^2$

$F_2 = 4\ N$

7. Given the reverberation time (RT) in seconds and the total absorption (A) of a room, how can the volume (V) of the room be calculated using Sabine's formula?

(A) $V = \frac{0.165}{RT \times A}$

(B) $V = \frac{RT \times A}{0.165}$

(C) $V = \frac{RT \times A}{3.165}$

(D) $V = \frac{0.165 \times A}{RT}$

Correct Ans: B

Solution

Sabine's formula for reverberation of time:

$RT = \frac{0.165 \times V}{A}$

Where,

V is the volume of the room in cubic meters

A is the total absorption in the room in m^2-O.W.U. RT is the reverberation time in seconds

8. If an object's actual length is 10.5 cm and it is measured as 10.2 cm, what is the absolute error?

(A) 0.3 cm

(B) 0.02 cm

(C) 0.2 cm

(D) 0.1 cm

Correct Ans: A

Solution

Given data:

⇒ Measured value = 10.2 cm

⇒ Actual value = 10.5 cm

Absolute error = |Measured value - Actual value| Absolute error = |10.2-10.5|=|-0.3|=0.3 cm

Note:

Absolute Error:

⇒ The absolute error can be calculated by taking the absolute value of the difference between the measured value and the actual value.

9. Formula for kinetic energy (KE) is _____.

(A) $(1/2)mv^2$

(B) mgh/t

(C) Fdt

(D) P/t

Correct Ans: A

Solution

Kinetic Energy (KE):

⇒

The energy that an object possesses due to its motion is called "Kinetic Energy".

Formula:

$KE = \frac{1}{2}mv^2$

Where,

KE is the kinetic energy in Joule

m is the mass of the object in kg

v is the velocity of the object in m/s

10. Unit of power is _____.

(A) volt

(B) joule

(C) watt

(D) kelvin

Correct Ans: C

Solution

Power:

⇒ The watt (W) is the unit of power.

⇒ Power is the rate at which work is done or the rate at which energy is transferred or converted.

⇒ One watt is defined as one joule per second.

⇒ Mathematically, the watt can be expressed as:

$Watt(W) = \frac{Joules(J)}{Seconds(s)}$ "

11. The definition of the unit of electric current, Ampere, is as follows:

(A) One Joule per Coulomb

(B) One Ohm per Volt

(C) One Volt per Ampere

(D) One Coulomb per second

Correct Ans: D

Solution

$I = \frac{Q}{t}$

12. Which type of corrosion occurs when two dissimilar metals are in contact in the presence of an electrolyte?

(A) Galvanic corrosion

(B) Stress corrosion cracking

(C) Uniform attack corrosion

(D) Pitting corrosion

Correct Ans: A

Solution

⇒ Galvanic corrosion sets up an electrochemical cell, where the more reactive metal corrodes faster while protecting the less reactive metal.

13. Capacitance is inversely proportional to:

(A) Resistance

(B) Charge

(C) Current

(D) Voltage

Correct Ans: D

Solution

⇒ Capacitance is an inherent characteristic of a capacitor, an electronic device employed for the purpose of storing electrical energy. It signifies the capacity of a capacitor to accumulate electric charge in response to a potential difference (voltage).

⇒ Mathematically: $C = \frac{Q}{V}$

⇒ SI unit: farad (F)

14. A charge of $2\,\mu C$ experiences a force of $6\,N$ in an electric field. What is the electric field intensity at the location of the charge? (A)

$3 \times 10^6\ N/C$

(B) $3 \times 10^{-6}\ N/C$

(C) $30 \times 10^6\ N/C$

(D) $30 \times 10^{-6}\ N/C$

Correct Ans: A

Solution

Given data:

⇒ Charge $q = 2\,\mu C = 2 \times 10^{-6}\,C$

⇒ Force $F = 6\,N$

The force (F)) experienced by a charged particle in an electric field

$F = qE$

$E = \frac{F}{q} = \frac{6}{2\times10^{-6}} = 3 \times 10^{6}\,N/C$

15. The velocity of a substance of 100 gm f e increases from 25 m/s to 50 m/s in 5 s. So how much external force would have been applied to this object?

(A) 0.5 N

(B) 500 N

(C) 0.25 N

(D) 50 N

Correct Ans: A

Solution

Given data:

⇒ $F = 100\,gm = 0.1\,kg$

⇒ Initial velocity $v_i = 25\,m/s$

⇒ Final velocity $v_f = 50\,m/s$

⇒ Time $\Delta t = 5\,s$

Acceleration $a = \frac{v_f - v_i}{\Delta t} = \frac{50-25}{5} = 5\,m/s^2$

External Force $F = m \times a$

External Force $F = 0.1 \times 5 = 0.5\,N$

16. How do you create an unordered list in HTML?

(A) $< ol >$

(B) $< item >$

(C) $< list >$

(D) $< ul >$

Correct Ans: D

Solution

⇒ In HTML, the $< ul >$ tag is used to create an **unordered list**, where list items are marked with bullets by default.

⇒ Each item in the list is defined using the $< li >$ tag.

17. A wave is described by the equation $Y = 0.05(\sin 100\pi t - 0.02x)$. Angular velocity of this wave is _____ *rad/second*.

(A) 1000π

(B) π

(C) 10π

(D) 100π

Correct Ans: D

Solution

Given data:

⇒ Wave equation $Y = 0.05(\sin 100\pi t - 0.02x)$. ..... (1)

$Y = A(\sin \omega t \pm kx)$..... (2)

Where,

$A-$ Amplitude

$\omega-$ Angular frequency

$x-$ Displacement

equation (2) compare with equation (1)

$\omega = 100\pi\, rad/second$

18. Consider the following statements: (1) Embedded computer system boot immediately. (2) In embedded computer system, the loading is pre-computed and stored on the ROM when the device is made. Which of the statements give above is/are made. ?

(A) Only (1)

(B) Only (2)

(C) Both (1) and (2)

(D) Neither (1) or (2)

Correct Ans: C

Solution

⇒ Embedded computer systems boot immediately:

→ Embedded systems are designed for specific tasks and have minimalistic hardware and software requirements. They boot up quickly because their initialization routines are simpler than general-purpose computers.

⇒ Loading is pre-computed and stored on ROM:

→ Embedded systems typically use Read-Only Memory (ROM) to store firmware, which contains pre- computed instructions and data required for the system to operate. This eliminates the need to load an operating system from an external source, enabling fast and efficient operation.

19. Which natural factor contributes to variations in the Earth's climate over long periods?

(A) Solar radiation

(B) Volcanic eruptions

(C) Plate tectonics

(D) Earth's magnetic field

Correct Ans: A

Solution

⇒ Changes in solar radiation over extended periods contribute to long-term variations in climate.

20. The units used to measure electric field intensity are determined.

(A) Coulombs (C)

(B) Newtons (N)

(C) Volts (V)

(D) Newtons per coulomb (N/C)

Correct Ans: D

Solution

Electric field intensity $E = \frac{F}{q}$

Where,

F - Force in newton (N)

q - Charge in coulomb

21. Voltage applied is 240V and current passing through a conductor is 0.9 A, then power = _____watt.

(A) 184

(B) 216

(C) 196

(D) 216

Correct Ans: B

Solution

Given data:

$\Rightarrow V = 240\ V$

$\Rightarrow I = 0.9\ A$

$P = V \times I$

$P = 240 \times 0.9 = 216\ W$

22. In steady state, the temperature of meter scale at the ends are $40°C$ **and** $30°C$**. Find temperature gradient.**

(A) $10°K/cm$

(B) $10°C/cm$

(C) $10°C/m$

(D) $10°K/m$

Correct Ans: C

Solution

Given data:

⇒ Temperature at one end $= 40°C$

⇒ Temperature at the other end $= 30°C$

∴ Difference in temperature $\Delta T = 40 - 30 = 10°C$

⇒ Length of the meter scale means Distance between two points $\Delta X = 1\ m$

Temperature gradient $= \frac{\Delta T}{\Delta X}$

Temperature gradient $= \frac{10}{1} = 10°C/m$

Note:

Temperature gradient:

⇒ It is the ratio of the difference in temperature ΔT to the distance between two points ΔX.

⇒ Temperature gradient $= \frac{\Delta T}{\Delta X}$

⇒ In steady state, temperature gradient is same throughout the distance between two points.

⇒ SI unit: kelvin per meter (K/m).

23. What is the role of the Intergovernmental Panel on Climate Change (IPCC)?

(A) Environmental conservation

(B) Climate change research

(C) Weather forecasting

(D) Ozone layer protection

Correct Ans: B

Solution

⇒ The IPCC evaluates scientific information concerning climate change and delivers reports to policymakers.

24. In MS word, mail merge is used for

(A) Writing the mail directly from word document

(B) Writing the similar letter to different persons

(C) Checking errors in mail address

(D) Writing address on the envelop only

Correct Ans: B

Solution

⇒ In MS Word, mail merge is used for creating a batch of documents that are personalized for each recipient.

25. Molten ionic compounds are able to conduct electricity because

(A) Electrons are transferred

(B) Cations and anions can move freely

(C) Covalent bonds are broken

(D) They decompose into metals

Correct Ans: B

Solution

⇒ The strong electrostatic force of attraction between cations and anions in an Ionic compound holds the ions together, preventing movement in a solid state.

⇒ However, when the compound is in a molten or liquid state, the inter-ionic attraction weakens, allowing the ions to move freely and conduct electricity.

26. How is the zero error of a Vernier caliper typically corrected?

(A) By adjusting the main scale

(B) By adjusting the Vernier scale

(C) By adding or subtracting a correction factor

(D) Zero error cannot be corrected in a Vernier caliper

Correct Ans: B

Solution

Zero error of Vernier caliper:

⇒ If the vernier scale zero division and the main scale zero division exactly coincide with each other, the error is called zero error.

⇒ This can typically be done by adjusting the Vernier scale.

27. Heat conduction is more efficient in materials with:

(A) High specific heat

(B) Low thermal conductivity

(C) High thermal conductivity

(D) Low specific heat

Correct Ans: C

Solution

⇒ Heat conduction is more efficient in materials with high thermal conductivity.

Note:

Thermal Conductivity:

⇒ It is a property of a material that describes its ability to conduct heat.

⇒ Unit: watts/meter -kelvin (W/m K)

28. What does a high thermal conductivity value indicate?

(A) The material is a good conductor of heat

(B) The material is a poor conductor of heat

(C) The material is at a high temperature

(D) The material is a good insulator

Correct Ans: A

Solution

Thermal Conductivity:

⇒ It is a property of a material that describes its ability to conduct heat.

⇒ Unit: watts/meter -kelvin (W/m K)

⇒ A high thermal conductivity means that the material is efficient at transferring heat means heat can move through the material quickly and easily.

29. Which of the following is also known as brain of computer?

(A) Control unit

(B) Central Processing unit

(C) Arithmetic and language unit

(D) Monitor

Correct Ans: B

Solution

⇒ The Central Processing Unit (CPU) is often referred to as the "brain" of the computer because it performs all the essential computations and controls the execution of instructions.

⇒ It consists of:

⟶ Control Unit (CU): Directs the flow of data and instructions.

⟶ Arithmetic Logic Unit (ALU): Handles mathematical and logical operations.

30. What is the color with the shortest wavelength in the visible spectrum?

(A) Red

(B) Green

(C) Violet

(D) Blue

Correct Ans: C

Solution

⇒ Among the given options, Violet light has the shortest wavelength in the visible spectrum.

⇒ Red light has the longest wavelength in the visible spectrum.

⇒ The colors of the visible spectrum, arranged in order of increasing wavelength, are typically remembered using the acronym **ROYGBIV**, which stands for Red, Orange, Yellow, Green, Blue, Indigo, and Violet.

31. What is the primary advantage of tidal power compared to other renewable sources?

(A) Predictable energy generation

(B) Low installation costs

(C) High energy density

(D) Minimal environmental impact

Correct Ans: A

Solution

⇒ Tidal power exhibits a foreseeable and dependable pattern grounded in gravitational forces, simplifying the prediction of energy generation.

32. Which of the subsequent statements regarding random errors is accurate?

(A) Random errors occur due to consistent mistakes in measurement.

(B) Random errors can be corrected by calibration.

(C) Random errors can be reduced by taking repeated measurements.

(D) Random errors are always systematic in nature.

Correct Ans: C

Solution

Random errors:

⇒ Random errors arise due to variations in experimental conditions and exhibit an unpredictable nature. Each occurrence of these errors impacts measurements in a distinct manner.

⇒ Taking multiple measurements and calculating the average can help minimize random errors, thereby reducing the influence of unpredictable variations and yielding a more precise approximation of the actual value.

33. Which of the following is not a product of the reaction between metallic oxides and acids?

(A) Water

(B) Salt

(C) Oxygen

(D) Carbon dioxide

Correct Ans: C

Solution

⇒ Oxygen is not a product of the reaction between metallic oxides and acids.

34. $Mass \times velocity =$ _____.

(A) Acceleration

(B) Force

(C) Velocity

(D) Linear momentum

Correct Ans: D

Solution

Linear Momentum:

⇒ It is defined as the product of the mass of the body and its velocity.

⇒ Formula: Momentum = mass × velocity

⇒ SI unit: $kg\ ms^{-1}$

⇒ CGS unit: $g\ cms^{-1}$.

⇒ It is a vector quantity.

35. Which of the following is a common property of both acids and bases?

(A) Conduct electricity

(B) React with metals to produce hydrogen gas

(C) Change the color of litmus paper

(D) Have a pH of 7

Correct Ans: A

Solution

⇒ **Acids** have following characteristic properties:

1. Sour taste: Acids have a sour taste in an aqueous solution.
2. pH: Acids have a pH value less than 7. The lower the pH value, the stronger the acid.
3. Litmus: Acids turn blue litmus red.
4. React with metals: Acids react with metals to produce hydrogen gas.
5. Conduct electricity

⇒ **Bases** have following characteristic properties:

1. Bases turn red litmus paper blue
2. Bases taste bitter
3. Bases are slippery and soapy to touch
4. pH greater than 7
5. Some bases conduct electricity

36. Consider the following reactions : $CuSO_4 + Fe \rightarrow FeSO_4 + Cu$ $FeSO_4 + Zn \rightarrow ZnSO_4 + Fe$ **Choose the correct option.**

(A) Zn is most reactive and Fe is least reactive

(B) Fe is most reactive and Cu is least reactive

(C) Zn is most reactive and Cu is least reactive

(D) Cu is most reactive and Fe is least reactive

Correct Ans: C

Solution

⇒ Metals that can replace other metals in a solution are generally more reactive than the metal already present in the solution.

⇒ So, iron (Fe) is more reactive than copper (Cu), and zinc (Zn) is more reactive than iron (Fe).

37. A $2\ kg$ **block of copper absorbs** $8000\ J$ **of heat, and its temperature rises by** $40°C$**. What is the heat capacity of copper?**

(A) $200\ J/°C$

(B) $20\ J/°C$

(C) $2\ J/°C$

(D) $2000\ J/°C$

Correct Ans: A

Solution **Given data:**

⇒ $\Delta T = 40°C$

⇒ $Q = 8000\ J$

$\Rightarrow H_C = \frac{Q}{\Delta T}$

$\Rightarrow H_C = \frac{8000}{40} = 200\ J/^\circ C$

Note:

Heat Capacity (H_C)

$\Rightarrow$ It is the ratio of the amount of heat (Q) given to a body to a change in its temperature (ΔT).

$\Rightarrow H_C = \frac{Q}{\Delta T}$

$\Rightarrow$ SI Unit: J/K

$\Rightarrow$ Other Unit: $Cal/K\ or\ J/^\circ C\ or\ Cal/^\circ C$

38. Which type of pollution is associated with "acid rain"?

(A) Air pollution

(B) Water pollution

(C) Soil pollution

(D) Noise pollution

Correct Ans: A

Solution

$\Rightarrow$ Resulting from air pollution, acid rain occurs due to the emission of acidic pollutants into the atmosphere.

39. The unit m/s is the unit of which quantity?

(A) centripetal force

(B) centrifugal force

(C) Acceleration

(D) velocity

Correct Ans: D

Solution

Velocity:

$\Rightarrow$ It is defined as the rate of change of displacement with respect to time.

$\Rightarrow$ Formula: Velocity $= \frac{\Delta x}{\Delta t}$

$\Rightarrow$ SI unit: m/s

40. $100^\circ C =$ _____ K

(A) -273.15

(B) 100

(C) 0

(D) 373.15

Correct Ans: D

Solution **Given data:**

$\Rightarrow T_C = 100^\circ C$

Relation between Kelvin scale and Celsius scale:

$T_K = T_C + 273.15$

$T_K = 100 + 273.15 = 373.15\ K$

Note:

Relation between Kelvin scale and Celsius scale:

$T_K = T_C + 273.15$

Where,

T_K = Temperature on Kelvin scale

T_C = Temperature on Celsius scale

41. Which generation of computers used vacuum tubes?

(A) First Generation

(B) Fourth Generation

(C) Second Generation

(D) Third Generation

Correct Ans: A

Solution

⇒ First-generation computers (1940s-1950s) used vacuum tubes as the primary technology for circuitry and magnetic drums for memory.

⇒ These computers were large, consumed a lot of power, and produced a lot of heat.

⇒ Examples include ENIAC and UNIVAC.

42. In which type of wave do the particles of the medium move perpendicular to the direction of wave propagation?

(A) Surface wave

(B) Transverse wave

(C) Longitudinal wave

(D) Electromagnetic wave

Correct Ans: B

Solution

Longitudinal wave

⇒ The particles of the medium move parallel to the direction of propagation of wave.

⇒ Examples: Sound waves, etc.

Transverse wave

⇒ The particles of the medium move perpendicular to the direction of propagation of wave.

⇒ Examples: Light waves (electromagnetic waves), Water surface waves, etc.

43. Metals are often used to make bells due to which property?

(A) Malleability

(B) Sonorousness

(C) Luster

(D) Ductility

Correct Ans: B

Solution

⇒ Metal has the ability to produce sound, which is known as sonorousness.

⇒ This quality makes it ideal for creating bells and strings for musical instruments.

44. Which among the following is (are) double displacement reaction(s)

i. $Pb + CuCl \rightarrow PbCl_2 + Cu$

ii. $Na_2SO_4 + BaCl_2 \rightarrow BaSO_4 + 2NaCl$

iii. $C + O_2 \rightarrow CO_2$

iv. $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

(A) (i) and (iv)

(B) (ii) only

(C) (i) and (ii)

(D) (iii) and (iv)

Correct Ans: B Solution

$Na_2SO_4 + BaCl_2 \rightarrow BaSO_4 + 2NaCl$

⇒ In this reaction, Na and Ba replaces each other.

⇒ Hence this is double displacement reaction.

45. A wave has a wavelength of 3 meters and a time period of 0.02 seconds. What is its velocity?

(A) 150 m/s

(B) 300 m/s

(C) 75 m/s

(D) 225 m/s

Correct Ans: A

Solution

Given Data:

⇒ $\lambda = 3\ m$

⇒ $t = 0.02\ s$

We know that $f = \frac{1}{t} = \frac{1}{0.02} = 50\ Hz$

$v = f \cdot \lambda$

$v = 50 \times 3 = 150\ m/s$

Note:

Frequency:

⇒ It is the number of oscillations or cycles of a wave that occur in a unit of time.
⇒ It is denoted by f
⇒ Unit: hertz (Hz), cycle per second (c/s)

Wavelength:
⇒ It is defined as the distance between two successive points that are in phase.
⇒ It is denoted by λ
⇒ Unit: meter (m) or Angstrom unit $(1\ A^{\circ} = 10^{-10}\ m)$
For transverse wave: wavelength is the distance between two consecutive crests or troughs.
For longitudinal wave: wavelength is the distance between two consecutive compressions or rarefactions.

Relation between velocity, wavelength and frequency
$v = f \cdot \lambda$
Where,
λ = Wavelength
v = Velocity
f = Frequency

46. An example of non-ohmic resistance is

(A) Tungsten wire
(B) Diode
(C) Carbon resistance
(D) Copper wire

Correct Ans: B

Solution

⇒ A diode serves as an illustration of non-ohmic resistance.
⇒ Materials/Components such as tungsten wire, carbon resistance, and copper wire typically demonstrate ohmic behavior within their operating ranges.

47. The conversion factor for converting joules to ergs is _____.

(A) 10^{-5}
(B) 10^{-7}
(C) 10^{-11}
(D) 10^{7}

Correct Ans: D

Solution

⇒ In the CGS (Centimeter-Gram-Second) system, the unit of energy is the erg. The erg is a small unit of energy.
⇒ In the MKS (Meter-Kilogram-Second) system and SI (International System of Units), the unit of energy is the joule.
⇒ The relationship between the erg and the joule:

$1 \text{ erg} = 10^{-7} \text{ joules} \implies 1 \text{ joule} = 10^{7} \text{ erg}$

48. Coefficient of linear expansion describe as _____.

(A) The change in area of a material with temperature

(B) The change in length of a material with temperature

(C) The change in volume of a material with temperature

(D) The change in density of a material with temperature

Correct Ans: B

Solution

Coefficient of linear expansion (α)

⇒ It is defined as the fractional change in length per unit change in temperature.

⇒ Mathematically: $\alpha = \frac{\frac{\Delta L}{L}}{\Delta T}$

Where,

α = Coefficient of linear expansion

ΔL = Change in length

L = Original length

ΔT = Change in temperature

⇒ Unit: $1/^{\circ}C$ or $^{\circ}C^{-1}$

⇒ It is depend on nature of material

49. What is the method employed to obtain a measurement with a micrometer screw gauge?

(A) By multiplying the main scale reading and the Vernier scale reading

(B) By subtracting the initial reading from the final reading

(C) By adding the main scale reading and the Vernier scale reading

(D) By reading the main scale and Vernier scale

Correct Ans: C

Solution

⇒ To get the final measurement by micrometer screw gauge, simply add the reading from the main scale to the reading from the Vernier scale. This combination gives you a super precise measurement.

50. Consider a circuit comprising of two distinct resistances that are interconnected in a series configuration.

(A) The total resistance is equal to the difference between the individual resistances.

(B) The total resistance is equal to the reciprocal of the sum of the reciprocals of the individual resistances

(C) The total resistance is equal to the sum of the individual resistances.

(D) The total resistance is equal to the product of the individual resistances Correct

Ans: C

Solution

Consider 3 resistance:

Formula for equivalent resistance in parallel:

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

Formula for equivalent resistance in series:

$$R_{eq} = R_1 + R_2 + R_3$$

1. **Consider,** $x + y = 3, 3x + 3y = 7.$

(A) The system of equations does not possess a solution.

(B) The system of equations has infinite number of solution.

(C) The system of equations admits a solution

(D) none of these

Correct Ans: A

Solution

Here determinant of coefficient matrix $A = \begin{bmatrix} 1 & 1 \\ 3 & 3 \end{bmatrix}$

$D = \begin{vmatrix} 1 & 1 \\ 3 & 3 \end{vmatrix} = 0$, and so the system of equation does not possess a solution.

2. **The vector whose initial and final points coincide is called** _____

(A) unit vector

(B) coinitial vectors

(C) equal vectors

(D) zero vector

Correct Ans: D Solution

⇒ The vector whose initial and final points coincide is called zero vector or a null vector. It has zero magnitude and can be considered to have any direction.

3. $\cos^2 41^\circ + \cos^2 49^\circ =$_____

(A) 1

(B) 0

(C) 2

(D) -1

Correct Ans: A

Solution

$\cos^2 41^\circ + \cos^2 49^\circ$

$= \cos^2 41^\circ + (\cos 49^\circ)^2$

$= \cos^2 41^\circ + (\cos (90^\circ - 41^\circ))^2$

$= \cos^2 41^\circ + (\sin 41^\circ)^2$

$= \cos^2 41^\circ + \sin^2 41^\circ = 1$

4. **Which of the following is the integral of $\cosh(x)$ with respect to x?**

(A) $-\cosh(x) + C$

(B) $\cosh(x) + C$

(C) $-\sinh(x) + C$

(D) $\sinh(x) + C$

Correct Ans: D

Solution

The derivative of $\sinh(x)$ is $\cosh(x)$, so the integral of $\cosh(x)$ is:

$$\therefore \int \cosh(x)\, dx = \sinh(x) + C$$

5. **Find the correct answer:** $\frac{\log \sqrt{9}}{\log 9}$

(A) $\frac{1}{2}$

(B) $\frac{1}{4}$

(C) $\frac{2}{1}$

(D) $\frac{4}{1}$

Correct Ans: A

Solution

$\Rightarrow$ **Given :** $\frac{\log \sqrt{9}}{\log 9}$

$$\implies \frac{\frac{1}{2}\log 9}{\log 9} = \frac{1}{2}$$

6. **The value of** $\lim\limits_{x \to 0} \frac{e^x - 1}{x}$ **is** _____ .

(A) 1

(B) -1

(C) ∞

(D) 0

Correct Ans: A

Solution

$$\lim_{x \to 0} \frac{e^x - 1}{x}$$

This is of the form $\frac{0}{0}$, so by L'Hospital's rule and differentiate the numerator and denominator:

$$= \lim_{x \to 0} \frac{e^x - 0}{1}$$

$$= \lim_{x \to 0} e^x$$

$$= 1$$

7. $\begin{vmatrix} 1-x & 2 & 3 \\ 0 & x & 0 \\ 0 & 0 & x \end{vmatrix} = 0$ **then** $x =$_____

(A) 1 *only*

(B) 0, 1

(C) 0 *only*

(D) −1, 0, 1

Correct Ans: B

Solution

$$\begin{vmatrix} 1-x & 2 & 3 \\ 0 & x & 0 \\ 0 & 0 & x \end{vmatrix} = 0$$

$$\Longrightarrow (1-x) \times (x \times x - 0) = 0$$

$$\Longrightarrow (1-x) \times (x^2) = 0$$

$$\Longrightarrow x = 1 \text{ or } x = 0$$

8. **For the parametric equations** $x = 5t^3, \quad y = 2t^3 + 3t$, **find the** $\frac{dy}{dx}$

(A) $\frac{2}{5}$

(B) $\frac{2t^2+3}{15t^2}$

(C) $\frac{2t^2+1}{5t^2}$

(D) $\frac{2t^2+3}{5t^2}$

Correct Ans: C

Solution

$$Given : x = 5t^3, \quad y = 2t^3 + 3t$$

$$\therefore \frac{dx}{dt} = 15t^2, \quad \frac{dy}{dt} = 6t^2 + 3$$

$$\Rightarrow \frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}}$$

$$\therefore \frac{dy}{dx} = \frac{6t^2+3}{15t^2} = \frac{2t^2+1}{5t^2}$$

9. **Find the value of derivative for the function** $f(x) = (x^2 + 2)(3x)$ **at** $x = 3$.

(A) 87

(B) 81

(C) 99

(D) 72

Correct Ans: A

Solution

$Given: f(x) = (x^2 + 2)(3x) = 3x^3 + 6x$

$\therefore f'(x) = 9x^2 + 6$

$\implies f'(3) = (9 \times (3^2)) + 6 = 81 + 6 = 87$

10. **What is the rate of change of acceleration w.r.t time of the volume of a sphere at $t = 3$ sec if the rate of change of its radius with respect to time is given by $\frac{dr}{dt} = t + 1$ and the radius at $t = 3$ sec is 1 $meters$?**

(A) $32\pi\ m/s^2$

(B) $42\pi\ m/s^2$

(C) $132\pi\ m/s^2$

(D) $122\pi\ m/s^2$

Correct Ans: C Solution

Given: $\frac{dr}{dt} = t + 1 \implies \frac{d^2r}{dt^2} = 1,$

Volume of sphere, $V = \frac{4}{3}\pi r^3$

$\therefore Acceleration\ a = \frac{d^2V}{dt^2} = \frac{d}{dt}\frac{d}{dt}(\frac{4}{3}\pi r^3)$

$\implies a = \frac{4}{3}\pi\frac{d}{dt}(3r^2\frac{dr}{dt}) = 4\pi\frac{d}{dt}(r^2\frac{dr}{dt})$

$\implies a = 4\pi[2r(\frac{dr}{dt})^2 + r^2\frac{d^2r}{dt^2}]$

$\therefore a = 4 \times \pi\ [[2 \times 1 \times (3 + 1)^2] + [1^2(1)]] = 132\pi\ m/s^2$

11. **The function $f: x \to 1$ is**

(A) constant function

(B) cubic function

(C) quadratic function

(D) identity function

Correct Ans: A

Solution

⇒ A constant function is a function that has the same value for every input value.

12. **If $cosx = \frac{1}{2}$, then $cos3x$ =_____.**

(A) 0

(B) -1

(C) $\frac{1}{\sqrt{2}}$

(D) 1

Correct Ans: B

Solution

$cos3x = cos(2x + x)$

$= cos2xcosx - sin2xsinx$

$= (2cos^2x - 1)cosx - (2sinxcosx)sinx$

$= 2cos^3x - cosx - 2sin^2xcosx$

$= 2cos^3x - cosx - 2(1 - cos^2x)cosx$

$= 2cos^3x - cosx - 2cosx + 2cos^3x)$

$= 4cos^3x - 3cosx$

$= 4 \times (\frac{1}{2})^3 - 3 \times \frac{1}{2}$

$= 4 \times (\frac{1}{8}) - 3 \times \frac{1^2}{2}$

$= \frac{1}{2} - \frac{3}{2} = -1$

13. To evaluate $\int \sin^2 x\, dx$, which method is most appropriate?

(A) Integration by parts

(B) Substitution

(C) Both integration by parts and substitution

(D) None of the above

Correct Ans: D

Solution

⇒ Trigonometric identities offer a simpler route to simplify this integral, bypassing the need for integration by parts or substitution techniques.

$I = \int \sin^2 x\, dx = \int [\frac{1-\cos 2x}{2}]\, dx$

14. The angle between the lines $2x - y + 3 = 0$ and $x + 2y + 3 = 0$ is _____.

(A) $30°$

(B) $45°$

(C) $60°$

(D) $90°$

Correct Ans: D

Solution

The angle between two lines $a_1x + b_1y + c_1 = 0$, and $a_2x + b_2y + c_2 = 0$ is:

$\theta = \tan^{-1} \frac{a_2b_1 - a_1b_2}{a_1a_2 + b_1b_2}$

here, by placing coefficient from the two line equations,

$\theta = \tan^{-1} \frac{(1)(-1) - (2)(2)}{(2)(1) + (-1)(2)} = \tan^{-1} \frac{-3}{0}$

$\implies \theta = 90°$

15. The equation for the circle with center $(0, 1)$ and radius of 5 is _____. (A)

$x^2 + y^2 - 2y = 24$

(B) $x^2 + y^2 + 2y = 24$

(C) $x^2 + y^2 - 2y = 4$

(D) $x^2 + y^2 + 2y = 4$

Correct Ans: A

Solution

Equation for the circle with center (x_c, y_c) and radius of r is:

$(x - x_c)^2 + (y - y_c)^2 = r^2$

By placing center $(x_c, y_c) = (0, 1)$ and 5 $(x - 0)^2 + (y - 1)^2 = 5^2$

$\Longrightarrow x^2 + y^2 - 2y + 1 = 25$

$\Longrightarrow x^2 + y^2 - 2y = 24$

16. If $\int 3x\,dx = f(x) + C$, then $f(x)$ is

(A) $\frac{3^x}{\log_e 3}$

(B) $\frac{3^x}{\log_e 9}$

(C) $3^x \log_e 3$

(D) $3^x \log_e 9$

Correct Ans: A

Solution

$\Rightarrow$ Differentiation and integration are inverse operations of each other.

$\therefore \frac{d}{dx}\left(\frac{3^x}{\log_e 3}\right) = \frac{3^x}{\log_e 3} \times \log_e 3 = 3^x$

17. If A is a square matrix $A - A^T$ is _____ matrix.

(A) Symmetric

(B) Skew symmetric

(C) Diagonal

(D) Column

Correct Ans: B

Solution

If $A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}$

$A^T = \begin{bmatrix} a_{11} & a_{21} \\ a_{12} & a_{22} \end{bmatrix}$

And $A - A^T = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} - \begin{bmatrix} a_{11} & a_{21} \\ a_{12} & a_{22} \end{bmatrix}$

$$\Longrightarrow A - A^T = \begin{bmatrix} 0 & a_{12} - a_{21} \\ a_{21} - a_{12} & 0 \end{bmatrix}$$

$$\Longrightarrow A - A^T = \begin{bmatrix} 0 & a_{12} - a_{21} \\ -(a_{12} - a_{21}) & 0 \end{bmatrix}$$

It is skew symmetric matrix because main diagonal of a skew symmetric matrix consists of zeros, while the entries above the main diagonal are the negatives of the corresponding entries below.

18. If $x^3 + y^3 = 9xy$, find the $\frac{dy}{dx}$

(A) $\frac{x^2-y}{3x-y^2}$

(B) $\frac{x^2-3y}{3x-y^2}$

(C) $\frac{x^2-3y}{3x-y^2}$

(D) $\frac{x^2-y}{x-y^2}$

Correct Ans: C

Solution

$x^3 + y^3 = 9xy$

⇒ Take derivative both side,

$$\Longrightarrow 3x^2 + 3y^2 \frac{dy}{dx} = 9(1.y + x\frac{dy}{dx})$$

$$\Longrightarrow x^2 + y^2 \frac{dy}{dx} = 3y + 3x\frac{dy}{dx}$$

$$\Longrightarrow x^2 - 3y = \frac{dy}{dx}(3x - y^2)$$

$$\frac{dy}{dx} = \frac{x^2-3y}{3x-y^2}$$

19. In matrices $(AB)^{-1}$ equals to _____

(A) B^{-1}

(B) A^{-1}

(C) $B^{-1}A^{-1}$

(D) $A^{-1}B^{-1}$

Correct Ans: C

Solution

In matrices $(AB)^{-1}$ equals to $B^{-1}A^{-1}$.

$(AB)^{-1}(AB) = I$

$\Longrightarrow (AB)^{-1}(AB)B^{-1} = IB^{-1}$ (Post multiplied both sides by B^{-1})

$\Longrightarrow (AB)^{-1}(A)(BB^{-1}) = B^{-1}$

$\Longrightarrow (AB)^{-1}(A)(I) = (AB)^{-1}(A) = B^{-1}$

$\Longrightarrow (AB)^{-1}(A)(A^{-1}) = B^{-1}(A^{-1})$ (Post multiplied both sides by A^{-1})

$\Longrightarrow (AB)^{-1}(I) = B^{-1}A^{-1}$

$\Longrightarrow (AB)^{-1} = B^{-1}A^{-1}$

20. **If** $\int \sec^2(4-7x)\,dx = a\tan(4-7x) + C$, **find the value of** a.

(A) $\frac{4}{7}$

(B) $\frac{1}{4}$

(C) $-\frac{1}{7}$

(D) $\frac{1}{7}$

Correct Ans: C

Solution

$\int \sec^2(4-7x)\,dx = \frac{\tan(4-7x)}{-7} + C$

$\therefore a = -\frac{1}{7}$

21. **When two vectors are added, the magnitude of resulting vector is _____ the sum of magnitude of two vectors.**

(A) equal to

(B) greater than

(C) less than or equal to

(D) greater than or equal to

Correct Ans: C

Solution

⇒ When two vectors are added, the magnitude of resulting vector is *less than or equal to* the sum of magnitude of two vectors.

22. **What is the product of** $cot52°$ **and** $tan38°$**?**

(A) $cot^2 52^\circ$

(B) $tan^2 52^\circ$

(C) $cot^2 38^\circ$

(D) $sec^2 38^\circ$

Correct Ans: A

Solution

$cot 52^\circ \times tan 38^\circ$

$cot 52^\circ \times tan(90^\circ - 52^\circ)$

$cot 52^\circ \times cot 52^\circ \; cot^2 52^\circ$

23. Choose the correct option for the given logarithm function: $3ln\, x + 4ln\, y = ln\, a$.

(A) $x \times y^3 = a$

(B) $x^3 \times 4y^4 = a$

(C) $3x^3 \times 4y^4 = a$

(D) $x^3 y^4 = a$

Correct Ans: D

Solution

Given : $3ln\, x + 4ln\, y = ln\, a$

$\rightarrow ln\, x^3 + ln\, y^4 = ln\, a$

$\implies ln\, x^3 y^4 = ln\, a$

$\implies x^3 y^4 = a$

24. If $\log_a(16) = 2$ **and** $\log_a(4) = 1.5$**, what is** $\log_a(64)$**?**

(A) 2

(B) 3.5

(C) 1.5

(D) 0.5

Correct Ans: B

Solution

$\Rightarrow$ Use product law of logarithms,

$\rightarrow \log_a(64) = \log_a(16 \times 4) = \log_a 16 + \log_a 4 = 2 + 1.5 = 3.5$

25. What is the value of $\lim\limits_{x \to 4} \frac{x^2 - 2x - 8}{x - 4}$?

(A) 0

(B) 2

(C) 8

(D) 6

Correct Ans: D

Solution

$$\Longrightarrow \lim_{x\to 4} \frac{x^2-2x-8}{x-4}$$

$$\Longrightarrow \lim_{x\to 4} \frac{(x-4)(x+2)}{x-4}$$

$$\Longrightarrow \lim_{x\to 4} (x+2) = 6$$

26. Choose the correct verb form for the following sentences. Dal, Bati, and Churma _____my favorite dish.

(A) is

(B) are

(C) a

(D) the

Correct Ans: A

Solution

⇒ Even though "Dal, Bati, and Churma" are three items, they are collectively considered a single dish or a single entity, especially when talking about them as a favorite food.

⇒ Therefore, a singular verb is appropriate. The correct sentence is "Dal, Bati, and Churma is my favorite dish."

27. Choose the sentence with the correct use of preposition:

(A) He is interested about learning French.

(B) He is interested in learning French.

(C) He is interested on learning French.

(D) He is interested for learning French.

Correct Ans: B

Solution

⇒ The correct preposition for expressing interest in an activity is "in," not "about," "on," or "for."

28. In technical writing, data is typically presented in the form of:

(A) Personal opinions

(B) Hypothetical scenarios

(C) Tables, graphs, and charts

(D) Abstract discussions

Correct Ans: C

Solution

⇒ Data in technical reports is usually presented through tables, graphs, and charts, which provide clarity and help readers interpret the information accurately.

29. Which sentence is grammatically correct?

(A) She prefer to play the guitar over the piano.

(B) She prefers to play the guitar over the piano.

(C) She prefer playing the guitar over the piano.

(D) She prefers playing the guitar over piano.

Correct Ans: B

Solution

⇒ "She prefers" is the correct subject-verb agreement for a singular subject (she), while "prefer" is used for plural subjects.

30. In a technical report, which section usually comes before the "Methodology"?

(A) Results

(B) Conclusion

(C) Data Analysis

(D) Introduction

Correct Ans: D

Solution

⇒ The "Introduction" is the section that precedes the methodology in a technical report, where the context and purpose of the report are usually outlined.

31. Select a proper verb for the following sentences.

One thousand rupees _____not a big amount these days.

(A) is

(B) a

(C) are

(D) the

Correct Ans: A

Solution

⇒ "One thousand rupees" is considered a single unit of money, not individual rupees.

⇒ Therefore, it is treated as a singular subject, requiring a singular verb. The correct sentence is "One thousand rupees is not a big amount these days.

32. Replace the underlined phrase grammatically and conceptually with the help of the given options. If the given sentence is correct then select the option 'The given sentence is correct'.

The gender wage gap are a measure of what male employees are **paid in comparison to female employees.**

(A) is a measuring of what male employees is

(B) is a measure of what male employees is

(C) is a measure of what male employees are

(D) The given sentence is correct

Correct Ans: C

Solution

⇒ The correct option to replace the underlined phrase is: "is a measure of what male employees are."

⇒ So, the corrected sentence would be: "The gender wage gap is a measure of what male employees are paid in comparison to female employees."

⇒ The original sentence contains a subject-verb agreement error. "Gap" is singular, so the verb "are" should be replaced with "is" to match.

33. Passage :

Curiosity, the natural human desire to learn and explore, is a driving force behind innovation and progress. It fuels our questions, motivates us to seek answers, and ultimately expands our understanding of the world around us. From a young age, children demonstrate their curiosity through endless questions and a thirst for knowledge. However, as we grow older, various factors can dampen our curiosity, leading to a decline in creativity and a stagnant perspective.

Q.1: What is the main purpose of the passage? Q.2: What happens when our curiosity declines?

(A) Ans.1: Describe types of human curiosity
Ans.2: We become more open-minded

(B) Ans.1: Explain curiosity's negative impact on children
Ans.2: We experience increased creativity

(C) Ans.1: Argue for the importance of curiosity
Ans.2: Our perspective becomes stagnant

(D) Ans.1: Provide tips to maintain curiosity
Ans.2: Our understanding of the world expands

Correct Ans: C

Solution

⇒ **Explanation 1 :**Option C aligns with the passage's emphasis on the value of curiosity for development

⇒ **Explanation 2 :**The passage states that a decline in curiosity leads to a less dynamic perspective

34. Passage :

The invention of the wheel revolutionized human transportation and paved the way for numerous technological advancements. From carts to cars, the wheel has been an integral part of our daily lives for thousands of years. Its simple yet ingenious design has enabled the efficient movement of goods and people, transforming societies and facilitating trade across vast distances. Even in the modern era of airplanes and high-speed trains, the wheel remains a cornerstone of transportation technology, demonstrating its timeless significance in shaping human civilization.

Q.1: What did the invention of the wheel revolutionize? Q.2:
How has the wheel impacted human societies?

(A) Ans.1: Communication.
Ans.2: By slowing down transportation

(B) Ans.1: Transportation.
Ans.2: By facilitating movement of goods and people.

(C) Ans.1: Transportation.
Ans.2: By hindering trade.

(D) Ans.1: Education.
Ans.2: By facilitating movement of goods and people Correct

Ans: B

Solution

⇒ Explanation 1: The passage mentions that the invention of the wheel revolutionized human transportation. It paved the way for various technological advancements and enabled the efficient movement of goods and people.

⇒ Explanation 2: The passage states that the wheel has enabled the efficient movement of goods and people, transforming societies and facilitating trade across vast distances. It has played a crucial role in shaping human civilization by making transportation more efficient and enabling trade and communication over long distances.

35. Passage :

Teamwork involves collaborating with others to achieve a shared goal. It requires effective communication, cooperation, and individual contributions. Effective teamwork can lead to numerous benefits, including increased productivity, improved problem-solving, and enhanced creativity. In today's world, teamwork is crucial in various settings, from schools and workplaces to community projects.

Q.1: What is the main idea of the passage?

Q.2: What skill is NOT explicitly mentioned as essential for teamwork?

(A) Ans.1: The benefits of individual work
Ans.2: Time management

(B) Ans.1: Importance of clear communication in life
Ans.2: Active listening

(C) Ans.1: Advantages and skills required for teamwork
Ans.2: Individual responsibility

(D) Ans.1: The different types of teams
Ans.2: Creative thinking

Correct Ans: C

Solution

⇒ **Explanation 1 :**Option C captures the key points about teamwork's benefits and required skills

⇒ **Explanation 2 :**The passage emphasizes communication, cooperation, and individual contributions, not individual responsibility

36. Which element is essential in the Shannon-Weaver model of communication?

(A) Noise

(B) Non-verbal cues

(C) Feedback

(D) Social context

Correct Ans: A

Solution

⇒ The Shannon-Weaver model includes "noise" as an element that can interfere with message clarity, focusing on potential disruptions in the communication process.

37. Identify the sentence with the correct article usage:

(A) She gave me an advice on the matter.

(B) She gave me a advice on the matter.

(C) She gave me the advice on the matter.

(D) She gave me advice on the matter.

Correct Ans: D

Solution

⇒ "Advice" is an uncountable noun, so the article "an" is incorrect. "Advice" does not need an article, so "She gave me advice" is the correct choice.

38. Which of the following best describes "decoding" in communication?

(A) Translating a message into symbols

(B) Interpreting the sender's message

(C) Creating a feedback message

(D) Adding noise to the process

Correct Ans: B

Solution

⇒ Decoding involves interpreting and understanding the sender's message, essential for effective communication.

39. What is the primary goal of feedback in the communication process?

(A) To confirm the message was received

(B) To change the topic

(C) To end the conversation

(D) To add noise to the message

Correct Ans: A

Solution

⇒ Feedback helps the sender know the message was received and understood, enabling adjustments for clearer communication.

40. Fill in the blank with the appropriate forms of the verb given in the bracket. Amar told me that he _____(will) come for the party.

(A) would

(B) would have

(C) will

(D) will have

Correct Ans: A

Solution

⇒ In indirect speech, when the reporting verb is in the past tense ("told"), the future tense "will" changes to "would." Therefore, "Amar told me that he would come for the party" is correct.

41. Passage :

Honeybees are vital pollinators, playing a crucial role in the reproduction of plants and the overall health of ecosystems. However, honeybee populations have been declining worldwide in recent years, raising concerns about the impact on food security and biodiversity. Several factors contribute to this decline, including habitat loss, pesticides, and diseases.

Q.1: What is the main topic of the passage?
Q.2: Which factor is NOT mentioned as a cause?

(A) Ans.1: The importance of honey as a food source
Ans.2: Introduction of invasive species

(B) Ans.1: The dangers of pesticides to humans
Ans.2: Habitat loss

(C) Ans.1: The decline of honeybee populations and its impact Ans.2:
Climate change

(D) Ans.1: Diseases affecting honeybees
Ans.2: Overuse of antibiotics

Correct Ans: C

Solution

⇒ **Explanation 1 :**Option C encompasses the broad idea of honeybee decline and its consequences
⇒ **Explanation 2 :**The passage focuses on human-related factors, not broader climate shifts

42. An effective subject line for a professional email should be:

(A) Vague to keep the reader curious

(B) Detailed with a call to action

(C) As long as possible for clarity

(D) Too general to capture attention

Correct Ans: B

Solution

⇒ A subject line with a clear and action-oriented tone is most effective in ensuring the recipient knows the purpose of the email and feels compelled to open it.

43. Passage :

Sleep is a critical physiological process essential for physical and mental health. During sleep, our bodies repair tissues, consolidate memories, and regulate hormones. Insufficient sleep can lead to a variety of negative consequences, including fatigue, impaired concentration, and increased risk of chronic diseases.

Q.1: What is the main function of sleep?
Q.2: What is a potential consequence of insufficient sleep?

(A) Ans.1: Relaxation and rest
Ans.2: Increased creativity

(B) Ans.1: Processing emotions
Ans.2: Improved problem-solving skills

(C) Ans.1: Repairing the body and mind
Ans.2: Difficulty concentrating

(D) Ans.1: Providing entertainment Ans.2:
Enhanced decision-making

Correct Ans: C

Solution

⇒ **Explanation 1 :**Option C summarizes the passage's focus on sleep's restorative and memory-consolidating functions

⇒ **Explanation 2 :**The passage emphasizes impaired concentration as a consequence of sleep deprivation

44. In communication, what role does "encoding" play?

(A) It creates barriers in communication

(B) It is how the receiver interprets the message

(C) It translates thoughts into symbols or words

(D) It involves decoding the message

Correct Ans: C

Solution

⇒ Encoding is the process of translating thoughts or ideas into words or symbols before sending the message.

45. Which type of communication occurs without words?

(A) Verbal communication

(B) Non-verbal communication

(C) Written communication

(D) Feedback communication

Correct Ans: B

Solution

⇒ Non-verbal communication includes gestures, facial expressions, and body language, which convey meaning without words.

46. When writing a persuasive letter, what should the writer focus on in the opening paragraph?

(A) Asking for immediate action

(B) Creating a connection with the reader

(C) Presenting facts

(D) Offering a solution

Correct Ans: B

Solution

⇒ The opening paragraph of a persuasive letter should aim to create a connection with the reader, which helps to engage them and set the tone for persuasion.

47. Choose the correct verb form for the following sentences. Either Rancho or his friends _____present in the class.

(A) was

(B) were

(C) is

(D) none of the above

Correct Ans: B

Solution

⇒ When the subject of a sentence is connected by "Either...or," the verb agrees with the nearest subject. In this case: The nearest subject to the verb is "his friends," which is plural.

⇒ Therefore, the verb should also be plural. Hence, the correct sentence is "Either Rancho or his friends were present in the class."

48. Select the sentence with proper subject-verb agreement:

(A) The students is ready for the trip.

(B) The student are ready for the trip.

(C) The student is ready for the trip.

(D) The students are ready for the trip.

Correct Ans: D

Solution

⇒ "Students" is plural, so it requires the plural verb "are." "Student" is singular and requires the singular verb "is."

49. Fill in the blank with appropriate option. A lot of work _____to be done.

(A) remain

(B) remaining

(C) remained

(D) remains

Correct Ans: D

Solution

⇒ The subject of the sentence, "A lot of work," is singular, even though it refers to a potentially large quantity. Therefore, the verb must also be in a singular form. The correct sentence is "A lot of work remains to be done."

50. What is the correct way to address a recipient in a formal letter when their name is not known?

(A) Dear Sir or Madam

(B) To whom it may concern

(C) Dear Mr./Ms.

(D) Hello

Correct Ans: B

Solution

⇒ "To whom it may concern" is used when the recipient's name is unknown, ensuring a formal and respectful tone in the letter