Section A
(Multiple Choice Questions)
Choose the best alternative to the following questions and write in the answer sheet

1.
a. Which medicinal plant has the antimicrobial property that can activate digestive process?
i. Neem ii.Heart leaved moonseed iii.Asiatic pennywort iv.Holy Basil

Answer: ✔ iv. Holy Basil (Tulsi)
Explanation: Tulsi has antimicrobial and digestive-enhancing properties and is widely used in traditional medicine.

b.If the Earth could be squeezed to the size of the Moon, what would be the effect on the value of acceleration due to gravity of the Earth?
i.Increases
ii. Decreases
iii.becomes zero
iv.remains the same

Answer: ✔ i. Increases
Explanation:

$g = GM/R^2$

Mass M of Earth remains same,

Radius of earth decreases which is inversely proportional to the gravity so gravity increases.

c. Which of the following fact is correct?
i. Electric motor changes electrical energy into kinetic energy.
ii.Both electric motor and generator work on same principle.
iii. Electric generator changes electric energy into mechanical energy.
iv. Both electric motor and generator changes mechanical energy into electrical energy.

Answer: ✔ i. Electric motor changes electrical energy into kinetic energy
Explanation:

Electric motor: converts electric energy → mechanical/kinetic energy

Electric generator: converts **mechanical energy → electrical energy**

They **do not work exactly on the same principle**, so other options are wrong.

d. On which of the following factors does specific heat capacity depend upon?
i.mass of matter ii. Volume of matter iii. Temperature of matter iv.nature of matter

Answer: ✔ iv. Nature of matter
Explanation:

Specific heat depends on the **material/substance**, not its mass, volume, or temperature.

e. Which of the following group of fundamental units represent the derived unit of energy joule(J)?
i. Kgms-2
ii.kgms-1
iii.kgm2s-2
iv. Kgms-3

Answer: ✔ iii. kg·m²·s⁻²
Explanation:

Energy (work) = Force × distance = (kg·m·s⁻²) × m = kg·m²·s⁻²

f. If 500N force is applied on the piston A, how much force is produced on piston B?
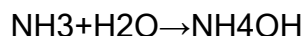i.875N ii.975N iii. 1075N iv.1175N

$P1 = P2$
$F1/A1 = F2/A2$
$500 / 200 = F2/ 350$
$F2 = 875N$

Group B

Write the name of compound which is formed when ammonia dissolves in water.

Ammonium hydroxide (NH_4OH)

$NH_3 + H_2O \rightarrow NH_4OH$

Why is carbon dioxide gas collected in an erect gas jar?
Because **CO_2 is heavier than air**, so it **settles downward**.

Write a precaution to be taken by a good netizen.
Do **not share personal information online** and **avoid cyberbullying**
What changes does a negative catalyst do in the rate of chemical reaction?
It slows down the chemical reaction.

Group C

Write any two characteristics of worker bee?

Sterile female bee.

Collects nectar and pollen, builds hive, and tends the brood.

Mention any two effects climate change.

Increase in global temperature (global warming).

Melting of glaciers and rising sea levels.

Write any two difference between independent and dependent variables.

Feature	Independent Variable	Dependent Variable
Definition	Variable that is **changed or controlled**	Variable that **changes in response**
Example	Stretch of rubber	Distance traveled by paper

Write the class of sparrow and division of fern.

Sparrow → **Class: Aves**

Fern → **Division: Tracheophyta**

In the given figure, What does 16N represent? What should be weight of object to float on the water?
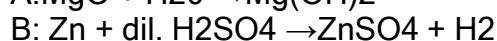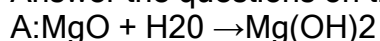
16N → **Upthrust exerted by water**

For object to float → **Weight = Upthrust = 16N**

Differentiate between the flat universe and closed universe in two points.

Feature	Flat Universe	Closed Universe
Density	Average density = critical density	Average density > critical density
Fate	Expands forever at decreasing rate	Eventually collapses (Big Crunch)

Answer the questions on the basis of given chemical equations
A: $MgO + H_2O \rightarrow Mg(OH)_2$
B: $Zn + dil. H_2SO_4 \rightarrow ZnSO_4 + H_2$
i. Out of these two chemical equations, which one is the combination reaction?
   Answer: A ($MgO + H_2O \rightarrow Mg(OH)_2$)
ii. H_2SO_4 is used instead of dil.H_2SO_4 in chemical reaction B?

Reaction will be **violent**, release heat, and **may produce sulfur dioxide**.

Concentrated acid is **not safe** for this reaction.

Draw neat and clean diagram of laboratory preparation of carbon dioxide. Write the name of salt used in this process.

(Use book)

Salt used: Calcium carbonate ($CaCO_3$)

Among the animals Peacock, Cocrodile, Snake, Whale and Sea-horse, which is the mammals and which is the least developed animals?

Mammals: Whale

Least developed animal: Sea-horse (less complex body, fewer organs)

How much heat energy is required to raise the temperature of 700g water from 5°C to 40°C?

Q = msdt

Group D

Write any two characteristics of each of s-block and p-block elements of modern periodic table.

S-block elements

Outer electron configuration ends in s¹ or s² .

Highly reactive metals that form **basic oxides and hydroxides**.

P-block elements

Outer electron configuration ends in p¹ to p⁶ (e.g., C: 2p², Cl: 3p⁵).

Varied properties – includes **metals, non-metals, and metalloids**; oxides can be **acidic, basic,etc.**

Find the independent and dependent variables in the following events.
i. More growth of plant in sunlight
ii. Measuring the stretch of catapult and the distance covered by the stone thrown by it.

i. More growth of plant in sunlight

Independent variable: Amount of sunlight (the factor being changed)

Dependent variable: Growth of the plant (height, number of leaves, or size)

ii. Measuring the stretch of catapult and the distance covered by the stone thrown by it

Independent variable: Stretch of the catapult (how much it is pulled)

Dependent variable: Distance traveled by the stone

i.   When 240V is passed in the primary coil of a transformer, 480 V is induced in a secondary coil, if there are 300 turns in primary coil, how many turns will be in secondary coil?

   Vs/Vp = Ns/Np

ii.   Why is the core of a transformer laminated?
iii.   Can transformer be used in Dc circuit? Give reason.

ii. Why is the core of a transformer laminated?

Answer: To **reduce energy loss due to eddy currents**.

iii. Can a transformer be used in DC circuit? Give reason.

Answer: ✗ No, transformer cannot be used in a DC circuit
Reason:

Transformers work on **changing magnetic flux**, which requires **alternating current (AC)**.

DC does not produce changing flux, so **no voltage is induced** in secondary coil.

In the given figure, mass of A and B are 6 x 1024 kg and 400kg respectively and the radius of A is 6400km.

i. Calculate the gravitational force between the objects A and B.
ii. To what height the body B should be taken from the surface of the body 'A' so that the value of acceleration due to gravity becomes 6m/s2?

   I. F = GMm/R2
   II. go = g {r/(r + h)2}