Time Allowed: 3 hours **Maximum Marks: 80**

General Instructions:

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective type questions carrying 1 mark each.
4. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.
5. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

Section A

1. The inter-particle forces are the strongest in **[1]**

   a) Sodium Bromide b) Ammonia

   c) Carbon dioxide d) Ethyl alcohol

2. Work done is said to be zero if the applied force is _____ to the direction of displacement. **[1]**

   a) perpendicular b) power

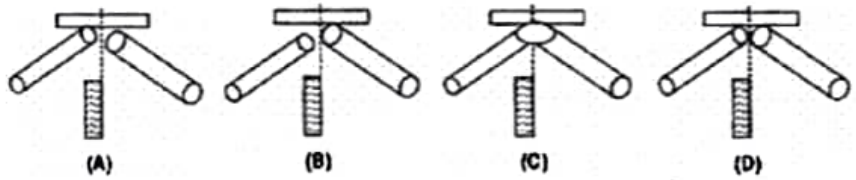
   c) joule d) mass

3. The well defined nucleus is absent in _____. **[1]**

   a) Prokaryotic cell b) Plant cell

   c) Animal cell d) Eukaryotic cell

4. Which of the following is the correct experimental set-up for verification of laws of reflection of sound? **[1]**



   a) D b) C

   c) A d) B

5. When a 12 N force acts on 3 kg mass for a second, the change in velocity is (in m/s) **[1]**

a) 18 b) 36

c) 2 d) 4

6. If an electric iron 1200W is used for 30 minutes every day, then electric energy consumed in the month of April is: **[1]**

a) 8 kWh b) 10 kWh

c) 18 kWh d) 20 kWh

7. The substance found in the cell wall of cork or bark that makes it impervious to water is **[1]**

a) cutin b) lignin

c) suberin d) lipids

8. The membrane of the Golgi apparatus has connections with those of: **[1]**

a) nuclear membrane b) endoplasmic reticulum

c) cell membrane d) mitochondria

9. Preventive and control measures adopted for the storage of grains include **[1]**

a) strict cleaning b) fumigation

c) all of these d) proper drying

10. Reflection of sound obeys the law **[1]**

a) $\angle i = 2 \angle r$ b) $\angle i = \angle r$

c) $\angle i < \angle r$ d) $\angle i > \angle r$

11. What happens on adding dilute HCl to a mixture of iron filling and sulphur powder? **[1]**

a. H_2S is formed.

b. A colourless and odourless gas is formed.

c. A greenish solution appears.

d. FeS is formed.

a) (a), (b) and (c) are correct b) (b) and (c) are correct

c) All of these d) (a) and (b) are correct

12. While determining the density of a metal block using a spring balance and a measuring cylinder, a student followed the following steps in this experiment. **[1]**

A. Noted the water level in the measuring cylinder without the metal block.

B. Immersed the metal block centrally in water, without touching the sides and bottom of the cylinder.

C. Noted the water level in the measuring cylinder with the metal block inside it.

D. Removed the metal block from the water and immediately weighed it using a spring balance.

The incorrect step in the procedure is :

a) step C

b) step B

c) step A

d) step D

13. How many moles are present in 40 g of He? **[1]**

a) 10 moles

b) 13 moles

c) 14 moles

d) 12 moles

14. Contractile proteins are present in _____ tissue. **[1]**

a) areolar

b) adipose

c) nervous

d) muscular

15. When a body falls freely towards the earth, then its total energy **[1]**

a) increases

b) decreases

c) remains constant

d) first increases and then decreases

16. The cell organelles (other than the nucleus) which contain DNA are: **[1]**

a) Plastids and lysosomes

b) Golgi apparatus and lysosomes

c) Plastids and mitochondria

d) Mitochondria and Golgi apparatus

17. **Assertion (A):** Fumigation of the grains using chemicals is done before storage in warehouses. **[1]**
Reason (R): Fumigation gives a nice colour to the grains.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

18. **Assertion (A):** The acceleration experienced by an object during free fall is dependent on its mass. **[1]**
Reason (R): All objects hollow or solid, big or small, should fall at the same rate.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

19. **Assertion (A):** The flash of lightning is seen before the sound of thunder is heard. **[1]**
Reason (R): Speed of sound is greater than speed of light.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

20. **Assertion (A):** When a bullet is fired from a gun, there is a forward force on the bullet and recoil of gun. **[1]**
Reason (R): Every action has an equal and opposite reaction.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

Section B

21. Calculate the number of aluminium ions in 0.051 g of aluminium oxide (Al_2O_3) **[2]**

22. The room temperature on Celsius scale is 25^oC. Convert it into the other two scales of measurement. **[2]**

OR

Give an experiment to show that ammonium chloride undergoes sublimation.

23. Mention two differences between blood platelets? **[2]**

24. What are lysosomes, peroxisomes and centrosome and write their functions? **[2]**

25. Differentiate between distance and displacement? **[2]**

26. A boat at anchor is rocked by waves, whose consecutive crests are 100 m apart. If the wave velocity of moving crests is 20 ms^{-1}, calculate the frequency at which the boat will rock? **[2]**

OR

Prove that $V = \upsilon\lambda$, where the symbols have their usual meanings.

Section C

27. Shashank placed an iron cuboid of dimensions 4 cm × 7 cm × 10 cm on a tray containing fine sand. He placed the cuboid in such a way that it was made to lie **[3]**

on the sand with its faces of dimensions

i. 4 cm × 7 cm,

ii. 7cm × 10cm,

iii. 4 cm × 10 cm.

If the density of iron is nearly 8 g cm^{-3} and g =10 ms^{-2}, find the minimum and maximum pressure as calculated by Shashank.

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28. Why do not the dispersed phase particles in a colloidal solution combine with one other? **[3]**

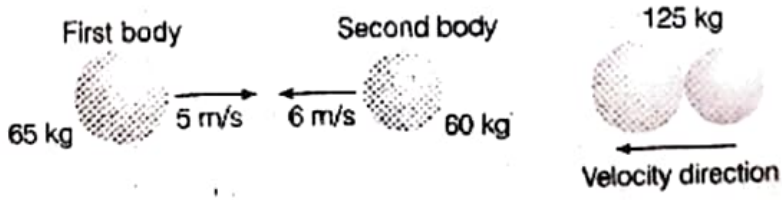
29. Observe the given below image of the tissue and answer the following questions: **[3]**

i. Identify the type of tissue shown in the given image.

ii. Where is it found?

iii. Why this tissue acts as an insulator?

30. Two bodies as shown in the figure collide with each other and join thereafter, with what velocity will they move after combining together? **[3]**



31. Differentiate between physical and chemical change? **[3]**

OR

Why is it that a wooden chair should be called a solid and not a liquid?

32. Write a short note on uniform circular motion. **[3]**

OR

Two trains A and B of length 400 m each are moving on two parallel tracks with uniform speed of 72 kmh^{-1} in the same direction with A ahead of B. The driver of B decides to overtake A and accelerates by 1 ms^{-2}. If after 50s, the guard of B just passes the driver of A, what was the original distance between them?

33. Differentiate between homogeneous and heterogeneous mixtures with examples. **[3]**

Section D

34. Describe valency by taking the examples of silicon and oxygen. **[5]**

OR

Show diagrammatically the electron distribution in a sodium atom and a sodium ion and also give their atomic number.

35. Write differences between animal tissue and plant tissue. **[5]**

OR

Draw well-labeled diagrams of various types of muscles found in the human body.

36. Write the main functions of atleast ten cell components. **[5]**

Section E

37. **Read the text carefully and answer the questions:** **[4]**

Sulphur dioxide is a colorless gas with a pungent odor. It is a liquid when under pressure, and it dissolves in water very easily. Sulphur dioxide in the air comes mainly from activities such as the burning of coal and oil at power plants or from copper smelting. In nature, sulphur dioxide can be released into the air from volcanic eruptions.

'SO_2 is an air pollutant released during the burning of fossil fuels and from automobile exhaust'.

(i) What are the valencies of sulphur in SO_2 and SO_3?

(ii) Find out the number of molecules in 5 moles of SO_2.

(iii) Calculate the number of moles in 320 g of SO_2 gas.

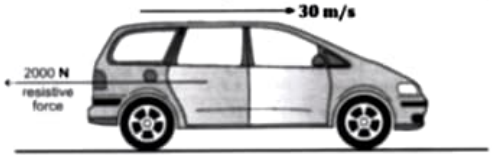
OR

Calculate the molar mass of 10 moles of sodium sulphite.

[Given, atomic masses of S = 32 u, O = 16 u, Na = 23 u and $N_A = 6.022 \times 10^{23}$ per mol]

38. **Read the text carefully and answer the questions:** **[4]**

A car of mass 900 kg is travelling at a steady speed of 30 m/s against a resistive force of 2000 N, as illustrated in figure.



(i) Calculate the kinetic energy of the car.

(ii) Calculate the energy used in 1.0 s against the resistive force.

OR

What is the minimum power that the car engine has to deliver to the wheels?

39. **Read the text carefully and answer the questions:** **[4]**

Culture fishery is rearing and harvesting of fish in small water bodies. The best method of culture fishery is composite fish culture, Here, fishes are selected on

the basis of their growth rate, palatability, area of feeding and tolerance towards others. All of them have their exclusive zone and type of feeding. There are three zones-surface, middle zone and bottom. Each zone can have 2 or even 3 feeding options.

You have studied the various fishes that can be accomodated in different zones of pond culture.

(i) How many fishes can be accommodated at the bottom zone?

(ii) What types of fish can occur on the surface zone of fresh water fish ponds?

(iii) Where is fish Catla found in a fresh water culture pond?

OR

Which fish feeds on filamentous algae and decaying vegetation?