

Science Model Exam paper 2081

Class – 10

Full marks – 75

Pass marks - 30

Section A: Multiple choice questions.

[10 × 1 = 10]

1. Circle the correct alternative of the following questions

a. How many bits are there in binary system 1100?

- i. 4 ii. 8 iii. 12 iv. 16

The correct answer is: i, The binary number 1100 has 4 bits. Each digit (1 or 0) in a binary number represents one bit.

b. Which of the following are called vascular cryptogams?

- i. Pteridophytes
ii. Bryophytes
iii. Gymnosperms
iv. Algae

The correct answer is i. Pteridophytes

Pteridophytes are called vascular cryptogams because they have vascular tissues (xylem and phloem) for the conduction of water and nutrients, but they do not produce seeds (cryptogams).

c. The classification that Whittaker proposed has five kingdoms which helps to understand the evolution of organisms as well. Which of the following arrangements of organisms is the correct order regarding evolution?

- i. Sea horse, parrot, Hyla, snake
ii. Sea horse, hyla, parrot, elephant
iii. Elephant, hyla, snake, parrot
iv. Elephant, hyla, parrot, snake

The correct answer ii. Sea horse → *Hyla* (a genus of tree frogs, representing amphibians) → Parrot (a bird) → Elephant (a mammal).

This follows the evolutionary trend:

Sea horse (Fish - aquatic vertebrate)

Hyla (Amphibian - adapted to both water and land)

Parrot (Bird - evolved from reptiles)

Elephant (Mammal - more advanced in evolution)

d. Which of the following represents endangered mammal species in Nepal?

- i. Himalayan musk
- ii. Sarus crane
- iii. Black stork
- iv. Gharial

The correct answer is I. Himalayan musk deer

Explanation:

Himalayan musk deer (*Moschus leucogaster*) is an endangered mammal species found in Nepal, primarily in the high-altitude forests of the Himalayas. It is threatened due to habitat loss and poaching for its musk gland.

Sarus crane (II) and Black stork (III) are birds, and Gharial (IV) is a reptile, not a mammal.

e. The gravitational force between two objects is F. If masses of both are halved without changing distance between them, the value of gravitational force will be

- i. $\frac{1}{4} F$
- ii. $\frac{1}{2} F$
- iii. F
- iv. 2F

Now, the new force F' is:

$$F' = \frac{G \left(\frac{m_1}{2}\right) \left(\frac{m_2}{2}\right)}{r^2}$$

$$F' = \frac{Gm_1m_2}{4r^2}$$

$$F' = \frac{1}{4} F$$

Correct answer:

- i. $\frac{1}{4} F$

f. Why do objects float more easily in sea water than in river?

- i. Density of Sea water is more than river
- ii. Density of Sea water is less than river
- iii. Object is lighter than river
- iv. Object is heavier than sea water

The correct answer i. Density of sea water is more than that of river

g. When a ray of light enters the glass slab from air, then which of the following is not correct statement ?

- i. The ray of light bends away from the normal
- ii. The ray of light bends towards the normal
- iii. The ray of light emerges without deviation
- iv. None of the statement is correct

The correct answer is: I

The ray of light bends away from the normal (This statement is incorrect).

h. Which of the following defines Hubble 's law?

- i. Velocity of galaxy is directly proportional to time
- ii. Velocity of galaxy inversely proportional to mass of universe
- iii. Velocity of galaxy is directly proportional to its distance
- iv. Velocity of galaxy inversely proportional to its distance

The correct answer is: III

Velocity of galaxy is directly proportional to its distance

Explanation:

Hubble's Law states that:

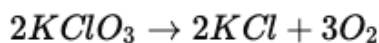
$$v = H_0 \cdot d$$

i. What is denoted by X in the given reaction?



- i. O
- ii. O₂
- iii. O₃
- iv. 2O

The correct answer is: II. O₂



j. A statement and an argument is given below

Statement : DDT is a fumigant pesticide

Argument : when this pesticide enters through the target pests via feeding due to which pests die

- i. Statement is correct but argument is incorrect
- ii. Statement is incorrect but argument is correct
- iii. Both statement and argument is correct
- iv. Both statement and argument is incorrect

The correct answer is: IV.

Statement is correct but argument is incorrect

Explanation:

a. DDT (Dichlorodiphenyltrichloroethane) is not a fumigant pesticide.

b. DDT primarily enters pests through ingestion (feeding) or direct contact, affecting the sodium ion channels in neurons, causing paralysis.

Section B

2. Very short answer type questions

[9 × 1 = 9]

a. Write the importance of analysis of unit equations.

Answer: To prove accuracy of an equation 1 mark

Converts one unit to another form

(Or, any other importance)

b. State Law of floatation

Answer: Weight of floating body is equal to wt. of liquid displaced 1 mark

c. Write the difference between drone bee and worker bee on the basis of number of chromosomes.

Answer: Drone bee has 16 chromosome 1 mark

Worker bee has 32 chromosome

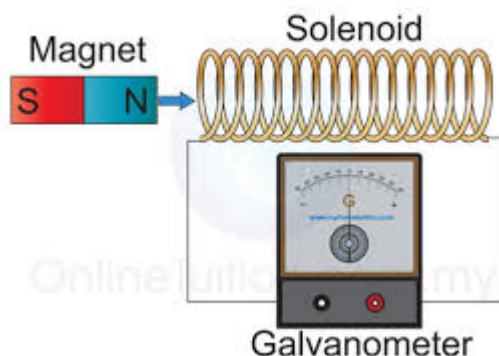
d. What changes in volume will be observed when water is heated from 0° C to 10° C?

Answer: 0° C to 4° C density increases, volume decreases

At 4° C density maximum

Beyond 4° C density decreases 1 mark

e. What happens when the bar magnet is placed inside solenoid at rest as shown in the diagram?



Answer: No deflection 1 mark

f. What is the condition for flat universe?

Answer: Density of universe is equal to critical density 1 mark

g. Write the name of main ore of copper.

Answer: Chalcopyrite/copper pyrite 1 mark

h. The laboratory report of Nirajan shows the count of blood cells as follows

RBC – 47 lakh/mm³

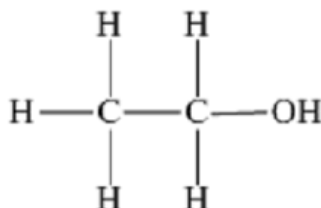
WBC – 12000 numbers/mm³

Platelets –2 lakh/mm³

Is this report normal or not? Why?

Answer: No, number of wbc more than normal 1 mark

i. Write the IUPAC name of the given hydrocarbon.



Answer: Ethanol 1mark

Section C

Short answer type questions

[14 × 2 = 28]

3. Prove that joule (j) = kgm²s⁻².

Answer: Work done (w) = F × d

$$J = N \times m$$

$$J = \text{kgm/s}^2 \times m$$

$$J = \text{kgm}^2/\text{s}^2 \quad \dots\dots\dots 2 \text{ marks}$$

4. Fill in the blank spaces appropriately. [0.5 x 4]

organisms	Respiratory organ	Blood temperature	Chamber of heart
Fish	Gills	Cold Blooded	Two chamber
Frog	lungs, moist skin	Cold Blooded	Three chamber

5. Write any two differences between autosome chromosomes and sex chromosomes.

Answer: differences

autosome`	sex chromosome
determine somatic traits	determine sex
44 chromosomes	2 chromosomes

6. How does DNA testing is advantageous?

Answer: In forensics

In parental identification

(Or any related points) 2 marks

7. Nepal has been facing the extreme problem of endangered animals. What is the major cause of this problem? What can we do to mitigate this problem? Write a point

Answer: Cause – illegal hunting/poaching

Mitigate- strict law and implementation

(Or, any other points) 2 marks

8. The use of parachute while falling is not safe on the moon. Can you say, why?

Answer: Because of freefall, no atmosphere on the moon 2 marks

9. Rohan mixed 5 ml of ammonium hydroxide and 5 ml of Hydrochloric acid in a test tube.

a. What type of chemical reaction takes place in the test tube?

b. Write the balanced chemical equation of the reaction

Answer:

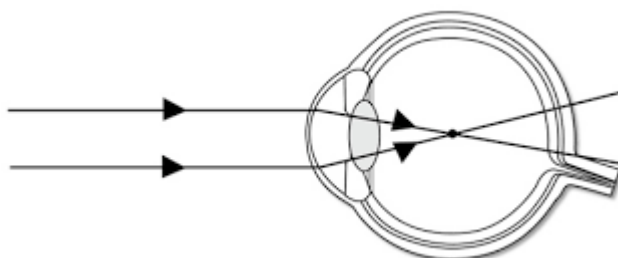
a) acid base/neutralization reaction 1 mark

b) $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$ 1 mark

10. How does the chemical reactivity vary in metals along the group ?

Answer: Reactivity increases, due to increase in size, and easy to lose e- 2 marks

11. The diagram represents a type of defect of vision. Study it and answer the following questions.



- a. What type of defect of vision is it?

Answer: Shortsightedness 0.5 mark

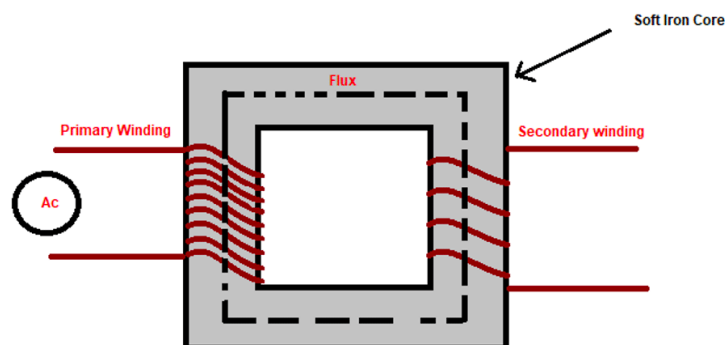
- b. Mention the cause of this defect.

Answer: eyeball elongated or focal length decreased 0.5 mark

- c. What is the remedy of such defect? Show it in a diagram.

Answer: Proper diagram with concave lens 1 mark

12. Study the given diagram and answer the following questions.



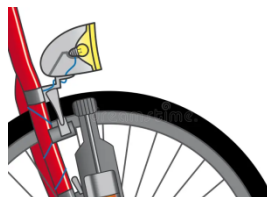
a. What type of transformer is shown in the figure?

Answer: Step down transformer 1 mark

b. Why is this used in mobile charger?

Answer: to decrease input voltage 1 mark

13. Study the diagram and answer the following questions.



a. Name the device given in the diagram and on which principle does it work?

Answer: dynamo, electromagnetic induction 1 mark

b. What changes in brightness is seen , if the speed of rotation is turned first slowly and then fast?

Answer: initially dim , and the brightness increases 1 mark

14. A cardiologist guides a thin flexible tube to the narrowed part of heart artery to treat a health condition. Name the health problem and the surgical method used. Also state a point of cause of this disease.

Answer: Heart attack, angioplasty 1 mark

Cause- stress, high BP, any other points 1 mark

15. Write down the structural formula of glycerin. Mention it's one use

Answer: Structural formula of glycerine 1 mark

Any one use 1mark

16. Write any two differences between soap and detergent.

Answer: differences

soap	detergent
bio degradable	non biodegradable
less cleaning action	better cleaning action

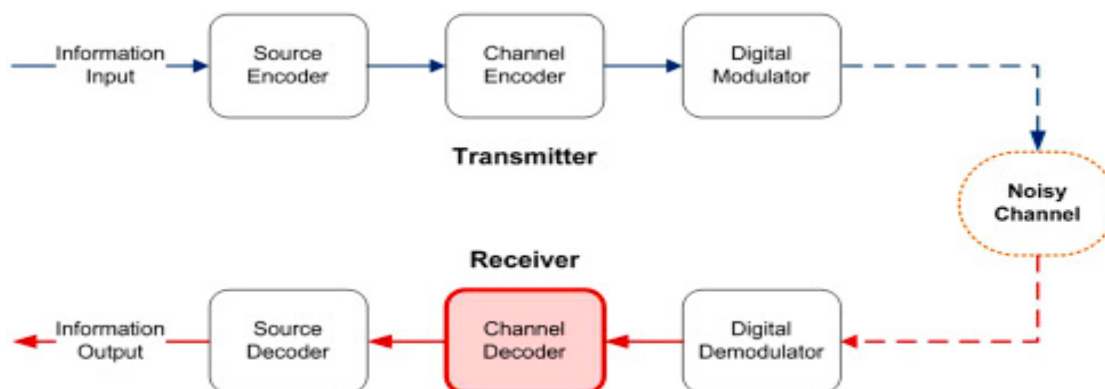
Or any two differences 2 marks

Section D

Long answer type questions

[7 × 4 = 28]

17. Mention the function of components of digital communication system with its schematic diagram.



.....1mark

function of each component 0.5 x 6 = 3 marks

18. State Mendel's second law of heredity. Draw a chart of the result obtained by the crossing between long winged drosophila and short winged drosophila

Statement of Mendel's law of heredity 1mark

flow chart :

Parents	LL	ll
gametes	L L	l l
F ₁ gen	Ll Ll	Ll Ll
	100% hybrid long	
Gamets	L l	L l
F ₂ gen	LL Ll Ll ll	
	pure long Hybrid long Pure short	

Genotype ratio - 1:2:1

phenotype ratio : 3:1 3 marks

19. Write any two symptoms of uric acid and two preventive measures.

Answer: Symptoms of uric acid

- jointache, swelling or any other points 2 marks

Preventive measures

Drink a lot of water, consume baking soda, cherries OR any other points 2 marks

20. Hot water of the mass 10kg at 95° C is cooled for taking a bath by mixing 22 kg of water at 16° C. What is the final temperature of the water? Neglect the heat loss to the surroundings.

solution

Hot water
mass(m_1) = 10 kg

temperature (t_1) = 95° C

specific heat capacity of water (s) = 4200 J/kg °C

final temperature (t) = ?

Principle of calorimetry Heat loss = heat gain

$$m_1 s (t_1 - t) = m_2 s (t - t_2) \quad \dots\dots\dots 1 \text{ mark}$$

substituting the values

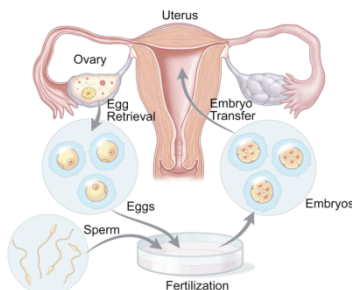
$$10 \times 4200 \times (95 - t) = 22 \times 4200 \times (t - 16)$$

$$950 - 10t = 22t - 352$$

calculation finding the value of $t = 40.687^\circ \text{C}$ 3 marks

21 a. Which process is shown in the figure? Describe this process in brief.

b. How is this process shown, is boon for the infertile couples? explain.



a) IVF, fusion of male and female gametes outside the body to form zygote and allowed to form embryo and implanted in uterus and develops into a foetus and in to a child.

b. Infertile couples can be hopeful for baby

Chance of healthy baby

IVF help the couples to fulfill dream to parenthood

22. Draw a well labelled diagram showing Laboratory preparation of the gas which is used to make blue print map with its principle and balanced chemical equation.

Answer: gas used in blue print is ammonia gas 0.5 mark

labelled diagram 2 marks

principle and balanced reaction 1.5 mark

23. Study the given table and answer the following questions

Elements	Electronic configuration
A	$1s^2, 2s^2 2p^6$
B	$1s^2, 2s^2 2p^6, 3s^2$
C	$1s^2, 2s^2 2p^6, 3s^2 3p^5$

i) Identify A and B

ii) Write the group and valency of B

iii) Name the compound formed between B and C

i. A- neon(Ne). B- magnesium (Mg)

ii. Group – IIA valency-2

iii. Magnesium chloride