

Model Question of JSC Exam 2016

Subject: Science

Time: 2 Hours 10 Minutes

Full Marks: 60

(Answer any 6 questions from the following questions)

1. Rifa has dry skin and the root of her teeth bleeds. On the other hand, her mother becomes tired easily, even with light work, has dizziness and loss of appetite. The doctor has recommended Rifa to eat citrus fruits, especially amloki, shaddock and told her mother to have food enriched with iron.
- (a) What is fundamental metabolism? 1
- (b) 'Hotchpotch is type of mixed food' - Explain. 2
- (c) What is the symptoms of Rifa's disease? 3
- (d) What will happen to Rifa's mother if she does not follow the doctor's advice? Analyze. 4

Ans:

- (a) Fundamental metabolism means metabolism of carbohydrate, protein, lipid etc.
- (b) In Hotchpotch more than 1 nutrition elements are present. So, Hotchpotch is a mixed food.
- (c) Rifa has dry skin and the root of her teeth bleeds. Rifa is suffering from vitamin C deficiency problems.

In adults, acute shortage of vitamin C shows the following symptoms

- Structure of bones cannot be strong
- bones become weak and fragile
- skin becomes dry, itches and the healing of wound is delayed.

For this reason doctor advised her to eat vitamin C enriched food. Vitamin C is found extensively in all citrus fruits like lemon, orange, shaddock, pine apple, guava, amloki, green vegetables like cabbage, cauliflower, tomato, lettuce.

Fresh vegetables and fruits contain more vitamin 'C' than the ripe ones.

- (d) If Rifa's mother doesn't follow the doctor's advice she may suffer from anemia. Iron is the constituent elements of haemoglobin of red blood corpuscles. People with iron deficiency may experience this disease. If the children and pregnant women lack iron in their food, they suffer from anemia. Usually children attacked with round worm may experience this disease.

Symptoms:

- weakness and drowsiness of head and body
- unusually rapid palpitation
- dizziness and hard breathing particularly even with light work
- loss of weight and appetite.

2. Apsari observed three animals in the laboratory she found the first animal is cold blooded and soft skinned. The second animal is warm blooded and has feathers and the third animal has flame cells present in its body.

(a) What is coelenteron?

(b) What is meant by binomial name?

(c) Explain the common characteristics of the third animal mentioned above.

(d) In the stem above, the first and second animal has the same phylum but they are of different classes. Analyze.

Answer:

(a) Body cavity known as coelenterons.

(b) The system of scientific naming of an organism with two parts is termed as binomial nomenclature. It serves only one aim that is to know every organism by its unambiguous name.

(c) The third animal has flame cells present in its body. So, third animal belongs to Phylum Platyhelminthes.

General characteristics of the animals of Phylum Platyhelminthes:

- Body flat, bisexual and mostly parasitic.
- Ecto-parasite or endo-parasite.
- Body covered with thick cuticle.
- Body bears sucker and hooks.
- Flame cell present and acting as excretory organ.
- Digestive system incomplete or absent.

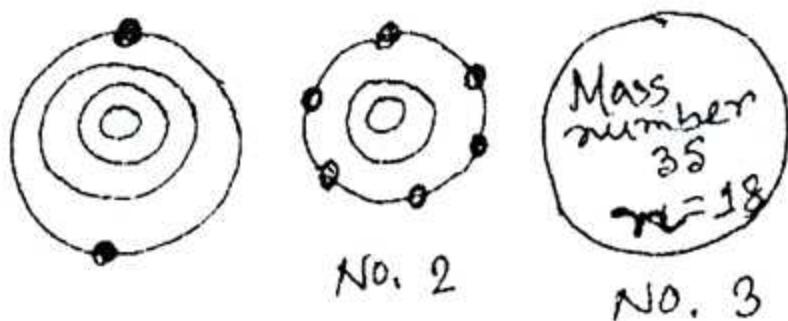
(d) The first animal is amphibia class its characteristics are:

- i. Skin without scales
- ii. Skin thin, soft, moist & with many glands.
- iii. Cold blooded
- iv. Laying eggs in water.

2nd class animals are Aves. Characteristics are:

- i. Body is covered with feather.
- ii. Two wings, two legs, 1 beak.
- iii. Presence of air rear with lung helps in flight.
- iv. Warm blooded.

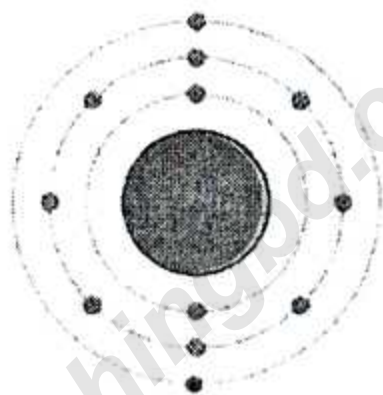
3.



- What is Atomic number?
- What do you mean by radioactive isotopes?
- From the stem, draw the electronic configuration of the Atom No.1
- The above mentioned atoms are able to form which kind of compound? Give your opinion.

Answer:

- The number of protons in the nucleus of an atom of an element is its atomic number.
- The unstable isotopes which radiate different radiations and particles due to radioactive decay are called radioactive isotope
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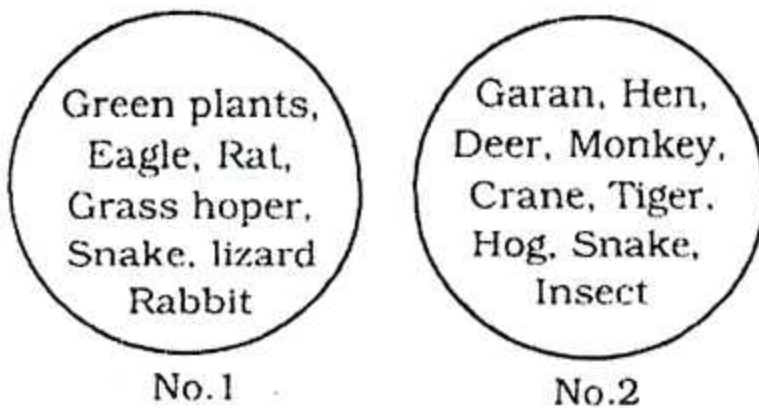
The electronic configuration is 2,8,2. It is Magnesium.

- Since No.1 atom has 2 electrons in the last orbit and No.2 atom has 6 electrons in the outer orbit. So, by losing and receiving electron, atom become ionized. They form compound of salt.
4. One day, Alam went fishing with a spear but the spear slips from his hand and gets stuck on the water puddle. The spear looked bulky and slanted. He tried many times but he could not catch any fish. When Alam tells this to his brother, he teaches Alam strategies to catch fish with spear. Later on, Alam had no problem fishing with spear.
- What is cornea?
 - What do you mean by critical angle?
 - Explain why did the spear look bulky and slanted.
 - Alam failed the first time but he succeeded later. Analyze the reason.

Ans:

- (a) Frontal part of the sclera is called cornea.
- (b) **Critical angle:** When ray of light passes from a denser medium to a rarer medium, the incident angle of denser medium for which the angle of refraction is 90° is called critical angle. Critical angle depends on the colour of the medium. Critical angle of definite pair of media is different for different colours.
- (c) It appears so because of refraction. Light is refracted from the denser medium water into rarer medium and enters into eyes. Every part of the emerged spear is raised upwards. As a result it looks bulky and slanty.
- (d) The fish stays at a position which a bit lower than where it appears to be. If you hunt the fish with a spear, you have to aim it at a deeper position than its apparent position. Something similar happens about the appearance of steps under transparent water. The real position of a step under water is lower than it appears when we look obliquely. People failing to realize it, may have a fall. Such events you can see if you visit the Sera Island of saint martin. The water there is very transparent stones and algae under water appears much closer to the eye than they really are. This happens due to refraction of light.

5.



- (a) What is phytoplankton?
- (b) What is meant by food chain?
- (c) What type of ecosystem can be formed with the help of the elements in circle No. 2? Analyze.
- (d) Is possible to make a food web with the elements of circle No. 2? Give your opinion.

Answer:

- (a) In a pond ecosystem producers are minute floating on suspended small plants, these are known as phytoplankton.
- (b) The transfer of food energy from producers through a series of food levels i.e. herbivores (primary consumers) to carnivores (secondary and tertiary consumers) to decomposers in the ecosystem is called food chain. The food chain is a feeding relationship in which a carnivore eats a herbivore which has been eating plants.
- (c) Ecosystem of a forest can be formed with the help of the elements in circle No. 2.

The sundari, garan, gewa, kewra, golpata, etc. are the major plants of the forest. They are the producers of the ecosystem. Insects, birds, deer, etc. are primary consumers. Jackals, tortoises, cranes etc. are secondary consumers. Tiger, hogs, etc. are among the tertiary consumers. Among them hogs are omnivorous. The Royal Bengal Tiger, chita, monkey, spotted deer, wild hogs, crocodiles, different types of snakes, birds and insects are the major animals of the forests.

6. Farah used blue litmus paper to identify two compounds in the lab. She saw that the litmus paper turned red after putting it in one solution. This solution is used in IPS and detergent. He added lime water to this solution.
- (a) What kind of acid is in amlaki? 1
- (b) What do you mean by organic acid? 2
- (c) Explain what will happen if lime water is added to the compound mentioned in the stem.
- (d) What kind of material is present in the compound of the stem above? Give your opinion. 4

Answer:

- (a) Ascorbic acid.
- (b) Acids that are formed in fruits and vegetables are called organic acid.
- (c) Lime water is $\text{Ca}(\text{OH})_2$ and IPS, detergent uses H_2SO_4 .
- $$\therefore \text{Ca}(\text{OH})_2 + \text{H}_2\text{SO}_4 \rightarrow \text{CaSO}_4 + 2\text{H}_2\text{O}$$
- (d) H_2SO_4 (Sulphuric acid) is present in the stem above. It is an acid so it turns blue litmus to red litmus.
7. Razi made a parallel circuit with 3 bulbs. The potential difference between the circuits two points is 220 volt and the electric current is 4.4 ampere. To measure the electric current and potential difference, he connected two equipments to the circuit.
- (a) What is Alternating current? 1

- (b) What is meant by Ohm's law? 2
 (c) Measure the resistance of the circuit. 3
 (d) From the above mentioned stem, is there a difference between the two equipments? Give your opinion. 4

Answer:

(a) When the flow of current changes its direction periodically, it is called alternating current.

(b) Ohm's law state that, "The current passing through a particular conductor at constant temperature is proportional to the voltage difference between the ends of the conductor."

According to ohm's law,

$$I \propto V$$

$$\text{or, } I = GV$$

$$\text{or, } I = \frac{V}{R}$$

Where, I = current, V = Potential difference, G = proportionality constant and R = resistance.

(c) Given, voltage = 220V

Current = 4.4A

From, ohm's law, we know that,

$$I = \frac{V}{R}$$

$$\Rightarrow R = \frac{V}{I}$$

$$\Rightarrow R = \frac{220}{4.4}$$

$$\Rightarrow R = 50 \text{ ohm.}$$

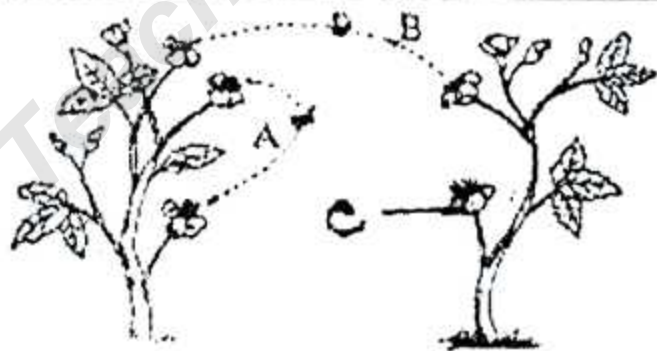
The value of the total resistance of the bulb is 50 ohm.

(d) Yes. The two equipment is ammeter and voltmeter. The difference between ammeter and voltmeter is as follows:

Ammeter	Voltmeter
i. The instrument which is used for measuring electricity is called ammeter.	i. The instrument which is used for measuring the potential between any two points of a circuit is called voltmeter.
ii. Ammeter is used for measuring electricity of the circuit.	ii. Voltmeter is used to measure the potential difference of the circuit.
iii. Electricity can be measured directly in ampere.	iii. Potential difference can be measured directly in volt.

iv.	It is given series connection with the circuit.	iv.	It is given parallel connection with the circuit.
v.	Lower resistance is used in ammeter, so electricity can pass more through ammeter.	v.	Very high potential is used in voltmeter, so very less amount of electricity can pass through voltmeter.
vi.	Ammeter is denoted by 'A'.	vi.	Voltmeter is denoted by 'V'.
vii.	As the active resistance of ammeter is low, it does not affect the main flow of electricity if it is connected in series with the circuit.	vii.	As the active resistance of voltmeter is high, it is connected in parallel with the circuit. So that less amount of electricity can flow through it.
viii. i.	The more electricity passes through the circuit, the more will be the oscillation of the indicator of the ammeter.	viii.	If the potential difference is more, the oscillation of the voltmeter indicator will be more.

8.



- What is Bulbil? 1
- Why is potato called a modified stem? 2
- Explain the formation of C in the diagram above. 3
- Which of the two figures, A and B play role in creating new characteristics? Give your answer with logic. 4

Answer:

- The improper development of axillary buds of some plants forms round shaped structure called bulbil.
- Potato is called a modified stem. Stem tubers are formed by outgrowths from the lowest axillary buds which turn downwards into the soil. Eventually the tip of the underground stem fills with starch and swells rapidly to form a tuber. Potato is also a kind of tuber.

(c) 'C' indicates fruits. Formation of fruit is given below:

The process of growing these fruits start by the transformation of ovaries of gynoecium of flower. The transformation occurs in the ovary after pollination and fertilization. The ovules transform into seeds. After fertilization, the ovary alone or in combination with other floral parts turns into fruits.

(d) 'B' playing role is creating new characteristics. Because 'B' indicates cross pollination. Here, two different types of plants participate. So, here is more chance than self pollination to create new varieties.

9. Adil was talking on the telephone. Suddenly he hears on the television that danger signal 5 is announced in Mongla.

(a) What is the name of the first American artificial satellite? 1

(b) The earth was born from stars - Explain. 2

(c) Adil was talking on the telephone with the help of the satellite, explain how it works. 3

(d) From the stem mentioned above, which satellite alerts the coastal people? Give your opinion. 4

Answer:

(a) Explorer – 1

(b) Scientists think that the sun, the planets and their satellites are formed from a huge cloud of gas and dust around 4500 million years ago. A star near the cloud exploded, making the cloud spin. As the cloud spun around and stuck together to form lumps. In time the stars crashed into each other and that formed satellites. The cloud in the same way gathered into lump around the planets to form their satellites. The planets and satellites do not radiate light or heat because they are not big enough to start nuclear reaction as happened in stars. The Earth has one satellite.

(c) Adil was talking on the telephone with the help of communication satellite.

When we use the telephone the signal is sent through a dish antenna a radio wave to an artificial satellite. The satellite transmits the radio signal to the antenna of the receiving country. From there it reaches the telephone of the person with whom we are talking.

(d) Weather satellites alerts the coastal people.

These satellites transmit images of the weather and earth's environment. They helped to show that the ozone layer was being depleted. The news that we get through radio, television and newspaper are obtained by the use of weather satellites. It is due to weather satellites the weather forecast is possible about rainfall, wind and cyclone is possible quite in advance.

Subject: Science (MCQ)

Time: 40 Minutes

Full Marks: 40

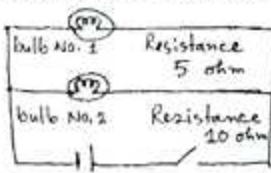
[N: B: Tick (✓) the right answer in the supplied answer script against the serial number of the M.C.Q. Each question carries one mark].

- In which phylum all animals are marine?
(a) Annelida (b) Arthropoda
(c) Mollusca (d) Echinodermata
 - In whose life cycle larva stage does not exist?
(a) Ascidia (b) Toad
(c) Crocodile (d) Butterfly
 - What is the outer layer of seed coat?
(a) tegmen (b) testa
(c) epicotyle (d) hypocotyle
 - What is the essential whorl of a flower?
(a) receptacle (b) petal
(c) stamen (d) carpel
 - How spirogyra, Mucor etc reproduces—
i. by artificial vegetative reproduction,
ii. by natural vegetative reproduction
iii. by segmentation
Which one is correct?
(a) i and ii (b) i and iii
(c) ii and iii (d) i, ii and iii
 - How many membrane are present in a plant?
(a) 2 (b) 3
(c) 4 (d) 5
 - Which cell absorbs water?
(a) Active (b) Inactive
(c) living (d) Non-living
 - By which process food, oxygen etc exchange from blood to lymph?
(a) diffusion (b) osmosis
(c) transpiration (d) photosynthesis
 - Which organism have RNA chromosome?
(a) T₂-fuz (b) TMV
(c) HIV (d) H₁N₁
 - Metaphase stage—
i. All the chromosome come at the equator
ii. Chromosomes get attached by the spindle fibre
iii. the centromere of the chromosome divides into two parts
Which one is correct?
(a) i and ii (b) i and iii
(c) ii and iii (d) i, ii and iii
 - Who first discovered the hormone named Auxin?
(a) Carolus Linnaeus (b) Aristotle
(c) Charles Darwin (d) Mendal
 - Which part of the brain hangs?
(a) Pons (b) Medulla
(c) Cerebrum (d) Cerebellum
- Read the following statement and answer questions no. 13 and 14.
- Atoms which are without charge. Thus by receiving or losing electrons, atoms become ionized. In this way atoms of elements form molecules of compound, example:
 $Na \rightarrow Na^+ + e^-$
 $F + e^- \rightarrow F^-$
- How many electrons excluded from the first reaction?
(a) 0 (b) 1
(c) 2 (d) 3
 - Ion of element forms—
i. by receiving electron
ii. by losing electron
iii. by sharing electron
Which one is correct?
(a) i and ii (b) i and iii
(c) ii and iii (d) i, ii and iii
 - Which one is limitation of Dalton's law?
(a) the smallest particle of an element is an atom
(b) atoms are divisible
(c) atoms are indivisible
(d) all atoms have same mass number
 - The weight of a body is 980 N (newton) on anywhere on earth. What is the mass?
(a) 980 kg (b) 100kg
(c) 10 kg (d) 9.8 kg
 - What is the formula of acceleration due to gravity?
(a) $F = G \frac{m_1 m_2}{d^2}$ (b) $mg = \frac{Mm}{d^2}$
(c) $g = \frac{GMm}{d^2}$ (d) $g = \frac{GM}{R^2}$
 - What is the unit of mass?
(a) gram (b) Kilogram
(c) newton (d) metre
 - Which one is the example of pisces class?
(a) starfish (b) prawn
(c) sea-horse (d) whale
 - Nucleic Acids are —
i. RNA ii. DNA iii. ATP
Which one is correct?
(a) i and ii (b) i and iii
(c) ii and iii (d) i, ii and iii
 - Which is the formula of Ferric oxide?
(a) FeO (b) Fe₂O₃
(c) FeO₂ (d) Fe₃O₂

22. CO₂ -what is the valency of this carbon?

- (a) 1 (b) 2
(c) 3 (d) 4

Answer questions 23 and 24 from the following figure.



23. What is the I of bulb No.1 ?

- (a) 5 ampere (b) 25 ampere
(c) 50 ampere (d) 100 ampere

24. If we connect the two bulbs with the series then we can observe—

- i. the flow of electricity will become slower
ii. both of the bulb will be lighten up brightly
iii. if one get damage then the other one will not work.

Which one is correct?

- (a) i and ii (b) i and iii
(c) ii and iii (d) i, ii and iii

25. Which acts as anode in dry cell?

- (a) NH₄Cl (b) MnO₂
(c) Zn (d) C

26. What will be produced by heating CuCO₃?

- (a) CuO (b) CO₂
(c) Cu(OH)₂ (d) Cu

27. What protects the eye from external harmful effects?

- (a) sclera (b) choroid
(c) Irish (d) pupil

28. When an angle of 30° is being created and transfers from the air through glass and if again it passes out through air then we can observe—

- i. the refracted ray will come towards the normal into glass medium
ii. the angle of refraction from glass medium will create an angle of 30° or smaller than that
iii. the emitted angle will be of 30°.

Which one is correct?

- (a) i and ii (b) i and iii
(c) ii and iii (d) i, ii and iii

29. What is different colour for people of different races?

- (a) pupil (b) Retina
(c) Irish (d) Sclera

30. How many satellite does Jupiter have?

- (a) 13 (b) 27
(c) 34 (d) 63

31. Who do not have satellite?

- (a) Mars and Mercury (b) Mercury and venus
(c) Venus and saturn (d) Saturn and Mercury

32. What is the colour of the medium star?

- (a) red (b) blue
(c) yellow (d) green

33. Which helps for the growth and production of blood corpuscles?

- (a) Thiamin (b) Riboflavin
(c) Pyridoxine (d) Cyanocobalamin

34. Which vitamin contains prothrombin?

- (a) A (b) B
(c) E (d) K

35. How many atoms are in the Ammonium sulphate?

- (a) 15 (b) 18
(c) 20 (d) 22

After reading the following statement answer questions 36 and 37.

Green plants confines Solar energy into Chemical energy. As a result, living things exist in Nature by winning unfavourable condition.

36. If energy could not reach earth, which process will not work?

- (a) diffusion (b) osmosis
(c) transpiration (d) photosynthesis

37. That energy—

- i. helps to produce food carbohydrate
ii. reaches to the earth by radiation
iii. produces CO₂ by chemical reaction

Which one of the following is correct?

- (a) i and ii (b) i and iii
(c) ii and iii (d) i, ii and iii

38. Where is Sundarbans situated in Khulna?

- (a) east (b) north
(c) south (d) west

39. What is Zooplankton?

- (a) Producer
(b) decomposer
(c) microscopic plant
(d) microscopic animal

40. Which is non soluble in water?

- (a) Al(OH)₃ (b) NaCl
(c) C₂H₁₂O₆ (d) CuSO₄

Answer:

1(d)	2(c)	3(b)	4(b)	5(c)	6(b)	7(c)	8(a)	9(b)	10(a)
11(c)	12(i)	13(b)	14(a)	15(c)	16(b)	17(d)	18(b)	19(i)	20(a)
21(b)	22(d)	23(i)	24(b)	25(c)	26(a)	27(a)	28(b)	29(c)	30(d)
31(b)	32(c)	33(d)	34(d)	35(i)	36(d)	37(a)	38(c)	39(d)	40(a)