DEENS

GRADE 10/SCIENCE
JANUARY 2020 / PRE-BOARD / 01

TIME: 3 HRS **MAX MARKS: 80**

General Instructions:

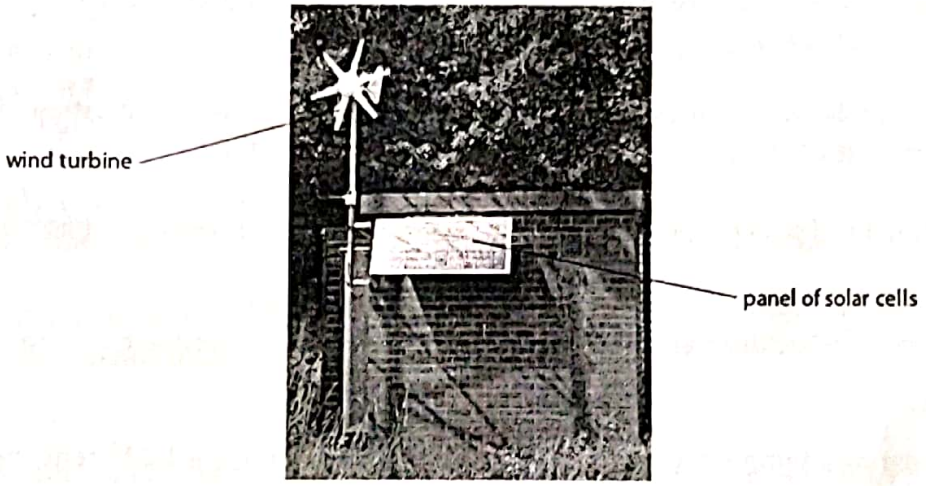
1. The question paper comprises three sections – A, B and C. Attempt all the sections.
2. All questions are compulsory.
3. Internal choice is given in each section.
4. All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
5. All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50 - 60 words each.
6. All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80 – 90 words each.
7. This question paper consists of a total of 30 questions.

SECTION A

1. Draw two possible isomers of the compound with molecular formula C_3H_6O. (1)

2. Why is atomic number considered to be a more appropriate parameter than atomic mass for the classification of elements in a periodic table? (1)

3. The photograph shows equipment used for generating electricity from renewable sources.

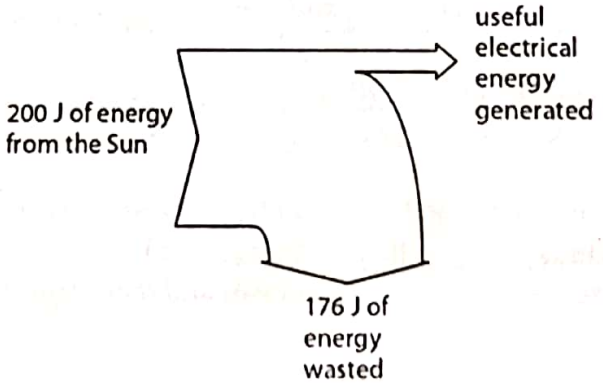


On a windy day, the wind turbine transfers 78 W of power.

(a) State the equation linking power, energy transferred and time. (1)

(b) Calculate the amount of energy the turbine transfers in 10 s (1)

(c)The Sankey diagram shows the energy transferred by the panel of solar cells. Calculate the ratio of useful energy to input energy. (1)



(d) The generator in the wind turbine transfers 294 J of energy in 1 minute. The generator current is 49 A. Calculate the output voltage of the generator. (1)

4. Mr. Jones is admitted to your unit with a diagnosis of new onset diabetes mellitus. His blood glucose has stabilized, and he is beginning to ask questions. How would you answer the following questions in a way that he will understand? He is still not feeling up to par, and can only tolerate short answers. (Remember to keep answers short and use caring and technical communication).
(a) What is diabetes? (1)
(b) What causes diabetes? (1)
(c) How do you treat this disease? (1)
(d) An appropriate diet plan would be: (1)

i) High sugar and low fat diet. ii) Low sugar and low protein diet.
iii) High Fat and low fiber diet. iv) Low sugar and high fiber diet.

5. The change in the focal length of human eye is caused due to: (1)
(a) Ciliary muscles (b) Pupil (c) Cornea (d) Iris

OR

The focal length of the eye lens increases when eye muscles
(a) are relaxed and lens becomes thinner (b) contract and lens becomes thicker
(c) are relaxed and lens becomes thicker (d) contract and lens becomes thinner

6. A cylindrical conductor of length l and uniform area of cross-section A has resistance R. Another conductor of length 2l and resistance R of the same material has area of cross section (1)
(a) A/2 (b) 3A/2 (c) 2A (d) 3A

7. Which of the following laboratory apparatus is not used during the verification of Ohm's law? (1)
(a) Voltmeter (b) Ammeter (c) Galvanometer (d) Rheostat

8. A well stained leaf peel mount when observed under the high power of a microscope shows nuclei in (1)
(a) only epidermal cells (b) only guard cells
(c) guard cells and epidermal cells (d) guard cells, epidermal cells and stoma

OR

While preparing a temporary mount of stomata, four students used different stains as given below:

Student	Stain
A	Acetocarmine
B	Methylene Blue
C	Safranin
D	Iodine

The correct stain was used by the student
(a) A (b) B (c) C (d) D

9. Name the cell components required for completion of aerobic respiration in a cell. (1)
(a) Chloroplast and nucleus (b) Ribosomes and ER
(c) Golgi body and lysosomes (d) Cytoplasm and mitochondria

10. Which of the following solutions will show a change in color when Zn granules are added to them? (1)

(a)$FeSO_4$ (b)H_2SO_4 (c)$Al_2(SO_4)_3$ (d)$MgSO_4$

11. 10 mL of a solution of NaOH is found to be completely neutralized by 8 mL of a given solution of HCl. If we take 20 mL of the same solution, the amount of HCl solution required to neutralise it will be (1)

(a)4 mL (b)8 mL (c)12 mL (d)16 mL

12. During extraction of metals, electrolytic refining is used to obtained pure metals. Which material will be used as anode and cathode for refining of silver metal in this process? (1)

(a) Anode: impure silver; Cathode: pure silver
(b) Anode: pure silver; Cathode: impure silver
(c) Anode: impure copper; Cathode: pure silver
(d) Anode: impure silver; Cathode: pure copper

OR

An element reacts with oxygen to form a compound with a high melting point. The compound also liberates heat when it is added to water. The element is likely to be

(a)calcium (b)carbon (c)silicon (d)iron

For question numbers 13 and 14, two statements are given- one labeled Assertion (A) and the other labeled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below

i) Both A and R are true and R is correct explanation of the assertion.
ii) Both A and R are true but R is not the correct explanation of the assertion.
iii) A is true but R is false.
iv) A is false but R is true.

13. **Assertion(A):** Li, Na and K form a Dobereiner triad. (1)
Reason(R): Dobereiner arranged elements on the basis of increasing atomic number.

14. **Assertion:** Alloys are used in electric heating devices. (1)
Reason: Alloys do not oxidise readily at high temperatures.

SECTION B

15. An ore when heated in the presence of air, liberates a gas which is responsible for acid rain. Identify the type of ore and give an outline for its extraction with chemical equations by taking an example. (3)

16. (a)Identify the oxidizing agents in the following reaction: (3)

i.$Pb_3O_4 + 8HCl \text{ ---------> } 3PbCl_2 + Cl_2 + 4H_2O$ ii.$CuO + H_2 \text{ ----------> } Cu + H_2O$

(b) A green salt on heating decomposes to give a brown residue. Name the salt and write the equation of the reaction involved. (1+1)

OR

A metal Salt MX when exposed to sun light produces metal 'M' and a gas X_2 .Metal M is used in making ornaments where as gas X_2 is used in making bleaching powder. The salt MX is itself used in black and white photography.

i). Identify metal M and gas X_2.

ii). Name the type of chemical reaction involved when salt MX is exposed to light. Also write the balanced chemical equation.

(3)

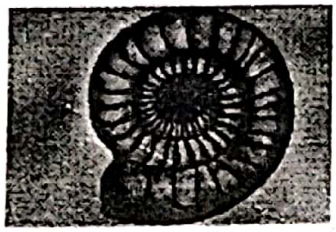
17.

1												13	14	15	16	17	18
	2																
A													B				C
	D	3	4	5	6	7	8	9	10	11	12		E				F

(a)Which element will form only covalent compound?
(b) Which element is a metal with valency of 2 ?
(c) Which element is most reactive among A,B,C,D,E&F?
(d) Write the common name for the group of element C and F
(e) Among element D & E which will have bigger atomic radius.
(f) Which element is a metalloid?

18. (a) A change in DNA that is useful for one property to start with can become useful later for a different function. Explain. (3)
b) Identify the fossils below:

i)



Ii)

OR

(a) Why does each gamete of an organism contain only one gene set?
(b) What is the importance of DNA copying?

19. (a) In terms of energy who is at an advantageous position, a vegetarian or a non vegetarian? Why?
(b) Why does an aquarium need regular cleaning while a pond does not? (3)

20. (a) What are the advantages of harvesting water at the community level?
(b) Name the traditional water harvesting structures in i) Rajasthan ii) Karnataka (3)

21. What is the difference between the manner in which movement takes place in a sensitive plant and the movement in our legs? (3)

22. A concave lens has focal length of 20 cm. At what distance from the lens a 5 cm tall object be placed so that it forms an image at 15 cm from the lens? Also find the size and nature of the image fomed. (3)

23. (a)It is established that an electric current through a metallic conductor produces a magnetic field around it. Is there a similar magnetic field produced around a thin beam of moving (i) alpha particles, (ii) neutrons? Justify your answer.

(b) A current carrying conductor experiences a magnetic force when placed in a magnetic field. When is this force maximum? (3)

24. A person can see clearly up to 3m. Name the defect of vision he is suffering from. What type of lens should be used to restore his normal vision. Find its power.

OR

A person can't see objects nearer than 50 cm. Name the defect of vision he is suffering from. What is the type and power of the lens required to enable him to read a book placed at 25 cm from the eye? (3)

SECTION C

25. A compound A ($C_2H_4O_2$) reacts with Na metal to form a compound 'B' and evolves a gas which burns with a pop sound. Compound 'A' on treatment with an alcohol 'C' in presence of an acid forms a sweet smelling compound 'D' ($C_4H_8O_2$). On addition of NaOH to 'D' gives back B and C. Identify A, B, C and D write the reactions involved. (5)

OR

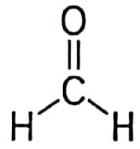
a) Complete the following reaction.

(i)CH_3CH_2OH + Alk.$KMnO_4$/heat-------->

(ii) Write balanced equation for the reaction of ethanoic acid with sodium carbonate.

(iii) Name the reaction that is commonly used in the conversion of vegetable oils to fats. Also write the chemical equation.

b) Write the IUPAC name of



c) Draw the electron dot structure of ammonia molecule.

26. a) Baking powder is added while baking breads and cakes to make them soft and fluffy.

i) Name its main ingredients.

ii) Explain the function of each ingredient.

iii) Write the equation of the chemical reaction taking place when the powder is heated during baking. (1+2+1)

b) A white powder is used for making toys and supporting fractured bones. Identify the substance and write a balanced equation for its reaction with water. (½+ 1/2)

27. What is translocation? Explain this process in plants. (5)

28. a) State briefly the changes that take place in a fertilized egg, till the birth of a child in the human female reproductive tract.

b) What is the role of the following parts in the human male reproductive system?

i) Scrotum ii) Testis iii) Urethra

OR

(a) List the advantages of vegetative propagation

(b) Describe the female reproductive parts of a flower. (5)

29. (a) Consider a conductor of resistance 'R', length 'L', thickness'd' and resistivity 'ρ'. Now this conductor is cut into four equal parts. What will be the new resistivity of each of these parts? Why? (5)

(b) Find the resistance if all of these parts are connected in:

(i) Parallel

(ii) Series

(c) Out of the combinations of resistors mentioned above in the previous part, for a given voltage which combination will consume more power and why?

30. Give reasons: (5)

(a) The sky appears dark instead of blue to an astronaut.

(b) The traffic light signals or danger signals are of red colour.

(c) Planets do not twinkle.

(d) Reddish appearance of the sky during sunrise and sunset.

(e) We should not connect too many appliances to a single power source.

OR

(a) What is dispersion of white light? What is the cause of such dispersion? Draw a diagram, to show the dispersion of white light by a glass prism.

(b) A glass prism is able to produce a spectrum when white light passes through it but a glass slab does not produce any spectrum. Explain why it is so?

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