(Part - A)

Time : 1 Hour

Instructions:
1) There are 50 Multiple Choice Questions (M.C.Q.) in Part - A and all questions are compulsory.
2) The questions are serially numbered from 1 to 50 and each carries 1 mark.
3) Read each question carefully, select proper alternative and answer in the O.M.R. sheet.
4) The OMR sheet is given for answering the questions. The answer of each question is represented by (A) O, (B) O, (C) O, (D) O. Darken the circle • of the correct answer with ball-pen.
5) Set No. of Question Paper printed on the upper-most right side of the Question Paper is to be written in the column provided in the OMR sheet.
6) Rough work is to be done in the space provided for this purpose in the Test Booklet only.

1) Which type of bond carbon atoms forms with other atoms?
   (A) Ionic bond  (B) Hydrogen bond
   (C) Metallic bond  (D) Covalent bond

2) Which of the following has higher surface area (SA) to volume (V) ratio?
   (A) Red blood cell
   (B) Bucky ball
   (C) DNA
   (D) Human Hair

Rough Work

B - 604  1 (P.T.O.)
3) Which of the following is not a characteristic of light?
(A) Light travels with $3 \times 10^8$ m$^{-1}$ speed.
(B) Light is an electromagnetic radiation which produces sensation in our eye
(C) Light travels on a straight path
(D) Light is a mechanical wave

4) Which of the following formula is wrong in accordance with Snell’s law?
(A) $\frac{n_1}{\sin \theta_1} = \frac{n_2}{\sin \theta_2}$
(B) $n_{21} = \frac{\sin \theta_1}{\sin \theta_2}$
(C) $n_1 \sin \theta_1 = n_2 \sin \theta_2$
(D) $\frac{1}{n_2} \sin \theta_1 = \frac{1}{n_1} \sin \theta_2$

5) When sunlight enters into an atmosphere, it gets refracted. Because of this atmospheric refraction, virtual image of sun is formed during sunset and sunrise as shown in below diagram.

![Diagram showing atmospheric refraction](image)

Due to this atmospheric refraction, the day ______
(A) becomes four minutes longer than the actual one.
(B) becomes four minutes shorter than the actual one.
(C) becomes longer in summer and shorter in winter.
(D) length of the day can not be said anything.
6) In modern communication, use of optical fiber is increased for sending information. The reason behind this is, speed of light is more than speed of electron. Optical fiber used in communication systems works on which principle?

(A) Reflection  
(B) Dispersion  
(C) Scattering  
(D) Total internal reflection

7) Which of the following is complementary colour of red colour?

(A) Magenta  
(B) Cyan  
(C) Green  
(D) Yellow

8) The SI unit of electric energy or heat energy is _______.

(A) joule (J)  
(B) Volt (V)  
(C) ampere (A)  
(D) watt (W)

9) If an electric bulb connected to 220V line draws an electric current of 0.5A, then what will be the resistance of filament of a bulb?

(A) 220Ω  
(B) 22Ω  
(C) 440Ω  
(D) 44Ω
10) Diya took two beakers for electricity experiment. When she connected the circuit with first beaker as shown in P, bulb starts glowing. Now she connected the circuit with second beaker, as shown in Q, bulb did not glow. To remove her confusion she again performed the experiment with first beaker and she founds that bulb is glowing. For the observation of second beaker Q, What is reason behind such observation?

(A) Filament of bulb was damaged  
(B) Battery of circuit was finished  
(C) Beaker Q contains distilled water  
(D) Beaker P contains distilled water

11) $V \rightarrow I$ graph is given below, observation of object P is done at $T_1$ temperature and observation of object Q is done at $T_2$ temperature. What we can conclude for these two temperature?

(A) $T_1 > T_2$  
(B) $T_1 < T_2$  
(C) $T_1 = T_2$  
(D) We can not predict from the graph
12) Who gave principle of electromagnetic induction?
   (A) Faraday
   (B) Oersted
   (C) Ampere
   (D) Volta

13) What is the reason for short circuit from the following?
   (A) Positive and negative wire connected with each of the accidently.
   (B) Insulating layer of wire gets damaged
   (C) The appliance becomes defective
   (D) All of them

14) With the help of which law the direction of induction electric current in the circuit can be determined?
   (A) Fleming’s left hand rule
   (B) Fleming’s right hand rule
   (C) Right hand thumb rule
   (D) Faraday’s law

15) Make the correct pair from below
   Artificial satellite Function
   (1) INSAT (P) Geographical survey
   (2) METSAT (Q) DTH transmission
   (3) CARTOSAT (R) Weather forecasting
   (A) (1 ↔ P), (2 ↔ R), (3 ↔ Q)
   (B) (1 ↔ R), (2 ↔ P), (3 ↔ Q)
   (C) (1 ↔ Q), (2 ↔ R), (3 ↔ P)
   (D) (1 ↔ P), (2 ↔ Q) (3 ↔ R)
16) Which statement is incorrect in reference to Galaxy from the following?

(A) A big cluster of star is known as galaxy
(B) There are three types of galaxies
   1) spiral
   2) elliptical
   3) irregular
(C) There are about $10^{11}$ stars in each galaxy
(D) Most of the stars are bluish in elliptical galaxy

17) Four friends are discussing about sun.

Shiv : Temperature of core region is about 2 crore K.
Vraj : Diameter of sun is 13,92,000km.
Nishant : Sun is star.
Shashank : Moving towards surface from core, its temperature reduces and becomes 6000k at surface

From the above discussion conclude that who is wrong?

(A) Shashank (B) Shiv
(C) Nishant (D) Vraj

18) By which poles of Mars are covered?

(A) Dry ice (B) Water ice
(C) Nitrogen (D) Iron

19) Metal oxide + water → ?

(A) Acid (B) Base
(C) Salt (D) None of these
20) 2 years old Dhyani crying while playing. Her mother shows that red ant bites her and due irritation she is crying. Which of the following chemical enters into her body due to ant bite?

(A) Sulphuric acid
(B) Hydrochloric acid
(C) Amino acid
(D) Formic acid

21) \( \text{H}_2\text{SO}_4(\text{aq}) + 2\text{NaOH}(\text{aq}) \rightarrow \text{P} + 2\text{H}_2\text{O}(l) \)

The substance P is _____.

(A) \( \text{NaSO}_4(l) \)  
(B) \( \text{Na}_2\text{SO}_4(\text{aq}) \)  
(C) \( \text{Na}_2\text{SO}_4(\text{s}) \)  
(D) \( \text{NaSO}_4(\text{aq}) \)

22) The table shows pH value of some foods

<table>
<thead>
<tr>
<th>Vegetables</th>
<th>pH</th>
<th>Citrus fruits</th>
<th>pH</th>
<th>dairy/Egg products</th>
<th>pH</th>
<th>starches</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beans</td>
<td>5.5</td>
<td>Lemons</td>
<td>2.3</td>
<td>Cheese</td>
<td>5.6</td>
<td>Corn</td>
<td>6.2</td>
</tr>
<tr>
<td>Peas</td>
<td>6.1</td>
<td>Limes</td>
<td>1.9</td>
<td>Eggs</td>
<td>7.8</td>
<td>Bread (White)</td>
<td>5.5</td>
</tr>
<tr>
<td>Spinach</td>
<td>5.4</td>
<td>Oranges</td>
<td>3.5</td>
<td>Milk</td>
<td>6.5</td>
<td>Potatoes</td>
<td>5.8</td>
</tr>
</tbody>
</table>

A patient has chronic indigestion due to an overproduction of stomach acid. Consumption of which food should she avoid most?

(A) Vegetables  
(B) Citrus fruits  
(C) Dairy/egg  
(D) Starches

23) What is the chemical formula of cryolite?

(A) \( \text{NaAlF}_6 \)  
(B) \( \text{Na}_3\text{AlF}_6 \)  
(C) \( \text{Na}_2\text{AlF}_6 \)  
(D) \( \text{NaAlF}_4 \)
24) The iron sheets used in the roof of the house are galvanised sheets. What is galvanised sheets?
   (A) Iron sheets coated with very fine layer of zinc
   (B) Zinc sheets coated with very fine layer of iron
   (C) Iron sheets coated with very fine layer of Aluminium
   (D) Aluminium sheets coated with very fine layer of Iron.

25) Which method is used for concentration of sulphide ores of metals?
   (A) Magnetic separation
   (B) Froth flotation method
   (C) Centrifugation
   (D) Liquefaction

26) Concentrated sulphuric acid is a mixture of _____.
   (A) 90% water and 10% H₂SO₄
   (B) 98% H₂SO₄ and 2% water
   (C) 90% H₂SO₄ and 10% water
   (D) 2% H₂SO₄ and 98% water

27) Physical properties of one gas is given below. From these properties identify the gas.
   i) Colourless, odourless and tasteless gas
   ii) Gas is lighter than air
   iii) It is insoluble in water
   iv) It does not show any effect on wet blue or red litmus paper. It is a neutral gas.
   (A) Dinitrogen gas
   (B) Ammonia gas
   (C) Dihydrogen gas
   (D) Dioxygen gas
28) The method that is used for direct extraction of sulphur from the core of the earth is called Frasch method. In this method, three concentric pipes are passed below the soil so that they touch the layer of the sulphur. Super heated water vapour is passed at 443K temperature in the soil of outermost cylinder. By which property of sulphur it melts?

(A) Low melting point  (B) High melting point
(C) High boiling point (D) Low boiling point

29) Which type of structure the substance shown in the diagram possess?

\[
\begin{align*}
\text{CH}_2 & \quad \text{CH}_2 \\
\text{H}_2\text{C} & \quad | \\
\text{H}_2\text{C} & \quad | \\
\text{CH}_2 & \quad \text{CH}_2
\end{align*}
\]

(A) simple chain  (B) branched chain
(C) cyclic  (D) sub branched chain

30) Make the correct pair of below given data.

<table>
<thead>
<tr>
<th>Carbonic compound</th>
<th>Molecular formula</th>
<th>No. of carbon</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Methane</td>
<td>(P) C$_2$H$_8$</td>
<td>(W) 5</td>
</tr>
<tr>
<td>(2) Pentene</td>
<td>(Q) C$<em>4$H$</em>{10}$</td>
<td>(X) 3</td>
</tr>
<tr>
<td>(3) Propane</td>
<td>(R) CH$_4$</td>
<td>(Y) 4</td>
</tr>
<tr>
<td>(4) Butane</td>
<td>(S) C$<em>8$H$</em>{12}$</td>
<td>(Z) 1</td>
</tr>
</tbody>
</table>

(A) (1 ↔ R ↔ Z), (2 ↔ S ↔ W), (3 ↔ P ↔ X), (4 ↔ Q ↔ Y)
(B) (1 ↔ P ↔ X), (2 ↔ R ↔ Y), (3 ↔ Q ↔ Z), (4 ↔ S ↔ W)
(C) (1 ↔ Q ↔ Y), (2 ↔ P ↔ X), (3 ↔ R ↔ W), (4 ↔ S ↔ Z)
(D) (1 ↔ S ↔ W), (2 ↔ Q ↔ X), (3 ↔ R ↔ Y), (4 ↔ P ↔ Z)
31) To obtain the high octane number in gasolene, used in motor, 1ml tetraethyl lead is added to every 4 litre of gasolene. Which substance is added into this so that lead may not deposit on spark plug when gasolene is combusted?
   (A) Diethylene trichloride  
   (B) Triethylene dichloride
   (C) Diethylene tribromide
   (D) Diethylene dichloride

32) Which coal is used in production of steel?
   (A) Bituminous coal
   (B) Peat
   (C) Lignite
   (D) Anthracite

33) Suppose your neighbour Ramankaka has bad habit of drinking alcohol. And you know this is a bad habit which affects person's social, mental, economical and physical health. Now you take him to deaddiction centre with the help of your father. Which medicine will be prescribed by the doctor to him inorder to deaddict from alcohol?
   (A) Paracetamol
   (B) PABA
   (C) Copper sulphate solution
   (D) Disulfiram

34) Which functional group does CH₃COCH₃ contains?
   (A) −CHO  
   (B) −C = O
   (C) −COOH
   (D) −OH

35) Which of the following is used in conveyor belt?
   (A) PVC
   (B) Polythene
   (C) Neoprene
   (D) Teflon
36) Plant has autotrophic nutrition system. In this organisms synthesize their own food, like carbohydrate, from water and CO₂ with help of chlorophyll in presence of sun light. This process is known as photosynthesis. Which of the following reaction take place during photosynthesis process?

P : → Absorption of light energy by chlorophyll
Q : → Conversion of light energy into chemical energy
R : → Reduction of CO₂ into carbohydrate

(A) Only P  (B) Only P and Q
(C) P, Q, R All  (D) Only R

37) Which is the correct path of lymphatic system in human body?

(A) intercellular space → lymphatic capillaries → lymph vessels → large veins
(B) large veins → intercellular space → lymph vessels → lymphatic capillaries
(C) lymphatic capillaries → lymph vessels → intercellular space → large veins
(D) intercellular space → large veins → lymphatic capillaries → lymph vessels

38) Where is tricuspid valve found in human heart?

(A) Between two atria
(B) Between right atrium and right ventricle
(C) Between left atrium and left ventricle
(D) Between two ventricles

39) In plants, food and other substances are transported through

(A) xylem  (B) tracheids
(C) phloem  (D) vessels

40) During which process blood is filtered out in Bowman's capsule?

(A) Reabsorption  (B) Secretion
(C) Ultrafiltration  (D) None of these
41) In the following diagram label 1 and 2 shows which part of nerve cell?

(A) 1 Axon and 2 Soma (cell body)
(B) 1 Axon and 2 dendrite
(C) 1 Soma (cell body) and 2 Axon
(D) 1 Soma (cell body) and 2 dendrite

42) Falguniben has problem of bulging of eyeball. Which type of disorder she has?

(A) Hyperthyroidism  (B) Hypothyroidism
(C) Gigantism  (D) Diabetes

43) Which type of asexual reproduction following diagram shows?

(A) Budding  (B) Spore formation
(C) Multiple fission  (D) Regeneration
44) Human population is increasing at an enormous rate. To control the rate of increase in population some methods are given below. By which method pregnancy can be controlled?

1) Mechanical barrier
2) Chemical process
3) Surgery

(A) Only (1) and (2)  (B) (1), (2) and (3) all
(C) Only (3)  (D) Only (2) and (3)

45) Mendel performed his experiment on garden pea species and gave rules of heridity. Give the scientific name of the species.

(A) Zea mays  (B) Pisum sativum
(C) Phaseolus mungo  (D) Rana tigrina

46) Which is the correct path of evolution of eye?

(A) planaria → insects → octopus → vertebrates
(B) insects → planaria → octopus → vertebrate
(C) vertebrate → octopus → insects → planaria
(D) octopus → insects → planaria → vertebrates

47) Ecosystem is an interacting system made up of:

(A) Organism and their physical surroundings
(B) Producers and consumers
(C) Producers and their physical surroundings
(D) Consumers and their physical surroundings
48) Teacher and students discussing about conservation of energy and their discussion is given below:

Teacher: Whenever my students goes out from class, in recess, at home etc, they switch off lights and fans.

Student 1: My father always goes to office in his private car.

Student 2: My mother always uses pressure cooker for preparation of food.

Who is correct in reference with conservation of energy?
(A) only teacher
(B) teacher and student 2
(C) only student 1
(D) teacher, student 1 and student 2 all.

49) Which reptiles does not included in Red data book?
(A) Crocodile
(B) Python
(C) Snake
(D) Wall lizard

50) From where food chain starts and it ends?
(A) starts with carnivores and ends with omnivores
(B) starts with primary produces and ends with carnivores
(C) starts with omnivores and ends with primary produces
(D) starts with herbivores and ends with carnivores
11 (E)

(JULY, 2018)

(Part - B)

Time : 2 Hours / Maximum Marks : 50

Instructions :

1) Write in a clear hand writing.

2) There are four sections in Part - B of the question paper and total 1 to 18 questions are there.

3) All questions are compulsory. Internal options are given.

4) The numbers at right side represent the marks of the questions.

5) Start new section on new page.

6) Maintain sequence.

7) Draw neat labelled diagram as per instructions.

SECTION-A

Answer the following questions from 1 to 5 in short and to the point. Each question carries 2 marks.

1) Explain cylindrical fullerene.

OR

How can we tackle future challenges using nano technology?

2) What is electrical potential? Write its definition and its units.
3) What is pH scale? Why it was needed by S.P.L Sorensen to invent it? [2]

4) Explain any two products obtained from destructive distillation of mineral coal. [2]
   OR
   What is catenation? Explain tetravalency of carbon.

5) Write the names of two dams of Gujarat. How are dams useful to the society? [2]

SECTION - B

- Answer the questions from 6 to 10 in short and to the point. Each question carries of 2 marks.

6) What is asteroids? Explain it in brief. [2]

7) Explain excretion in human being (figure not required) [2]

8) Explain forebrain of human. [2]

9) What is a global problem? Which are they? [2]

10) What is a homologous organs? Explain it with examples. [2]
   OR
   What is an analogous organs? Explain it with examples.

11 (E)
Answer the questions from 11 to 15 to the point. Each question carries 3 marks.

11) What is the defect of vision in the human eye? Vishal unable to see the far object clearly. So which type of defect of vision does it posses, explain it. \[3\]

12) What is solenoid? Give the characteristics of magnetic field resulting from solenoid? \[3\]

OR

Write three difference between AC current and DC current.

13) Write name, formula and physical state of products of following chemical reactions. \[3\]

i) \(\text{Mg}_{(s)} + \text{H}_2 \text{O}_{(g)} \rightarrow\)

ii) \(\text{SO}_2(g) + \text{H}_2 \text{O}_{(l)} \rightarrow\)

iii) \(\text{SO}_2(g) + \text{H}_2 \text{SO}_4(aq) \rightarrow\)

14) What is polymer? How polythene is formed? Explain it. \[3\]

OR

Write preparation of ethanoic acid. Also write its any two uses.

15) Mention the physical changes observed in adolescent stage. \[3\]
Answer the following questions from 16 to 18 in details. Each question carries 5 marks.

16) Derive the formula of relation between radius of curvature (R), object distance (U) and image distance (V) for spherical mirrors. [5]

17) Explain the Bayer's method for extracting alumina from bauxite ore OR

Explain extraction of iron.

18) Write names, place of origin and work of any five digestive enzymes produced in human digestive system. [5]

OR

Explain respiration in different parts of plant using diagram.