GENERAL INSTRUCTIONS

1. The question paper contains 3 parts, part -1 is Physics, part -2 is Chemistry & part -3 is Biology and each part is of 30 marks.

2. Each part contains two sections: Section-I is subjective and Section - II is objective

3. The sheet given in the examination hall is the Answer Sheet and each part must be solved in separate answer sheets.

4. Calculators, log tables, slide rule, mobile or any other electronic gadgets in any form is not allowed.

5. Before answering the paper, fill up the required details in the blank spaces provided in the answer sheet.

6. There is no negative marking in the section-II.

******ALL THE BEST******
**PART -I (PHYSICS)**

**Section – I**

1. Define the following: (i) One Ampere (ii) Potential difference. 
   
2. Show how you would connect three resistors, each of resistance 6 $\Omega$, so that the combination has resistance of (a) 9 $\Omega$ (b) 4 $\Omega$. 
   
3. Explain different ways to induce current in a coil. 
   
4. State any 2 advantages associated with using solar cells to produce electricity? 

   **OR**

4. Imagine that you are sitting in a chamber with your back to one wall. An electron beam, moving horizontally from back wall towards the front wall, is deflected by a strong magnetic field to your right side. What is the direction of the magnetic field? 

5. What is nuclear fusion reaction? Why are such reactions not possible in the school laboratory? 

6. An electric heater is used on a 220 V supply and takes a current of 5A. 
   (a) What is its power? 
   (b) What is the resistance offered by the heater? 
   (c) What is the cost of using the heater for 1 hour, if 1 kWh costs 50 paise? 

7. State the rule to determine the direction of a 
   (a) Magnetic field produced around a straight conductor carrying current. 
   (b)Current induced in a coil due to its rotation in a magnetic field. 

8. (a) Compare and contrast bio-mass and hydroelectricity as sources of energy? 
   (b) What steps would you suggest to reduce energy consumption? 

9. Explain the following: 
   (a) Why is tungsten used almost exclusively for filament of electric lamps? 
   (b) Why are copper and aluminium wires usually employed for electricity transmission. 
   (c) Why magnetic field lines do not intersect each other? 
   (d) Why it is difficult to use hydrogen as a source of energy. 

   **OR**

   Draw a labelled diagram of an electric motor. Explain its principle and working. 

**Section – II**

10. Read the passage carefully and answer the following question 

An electrical fuse is a safety device against overloading of any electrical circuit. A fuse is always connected in the live wire and in series with the electrical circuit. Fuse wire is made from low melting alloy of tin and copper. In urban areas, the conventional cut-out type fuses are being replaced by MCB. The maximum current which can flow through a fuse without melting it, is called its rating. 

1. The full form of MCB is 
   (a) Minute circuit breaker (b) Miniature circuit breaker 
   (c) Minute current breaker (d) Miniature current breaker 

2. A fuse wire of 14 A can stand current up to 
   (a) 14 A (b) 15 A (c) 16 A (d) 17 A
3. Copper wire cannot be used as a fuse wire because
   (a) Copper has very low melting point
   (b) Copper has very low resistance
   (c) Copper is very expensive
   (d) Both (a) and (c)

11. **Choose the correct alternative**

1. While performing the experiment to study the dependence of current on potential difference, if the circuit that is used to measure current and voltage is kept ‘on’ for a long time, then
   a. the voltmeter will start giving wrong readings
   b. the ammeter’s zero error will change
   c. the resistor will get heated up changing the value of ‘R’
   d. the potential difference of the cell will change

2. Which of the following doesn’t have (+) plus, (−) minus sign marked on it
   (a) resistor  (b) ammeter
   (c) voltmeter  (d) battery

3. While performing the experiment to study the dependence of current on potential difference, across a resistor, following observations were made by four students, A, B, C and D.

<table>
<thead>
<tr>
<th>Student</th>
<th>Reading 1</th>
<th>Reading 2</th>
<th>Reading 3</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>V=0.5A</td>
<td>V=1.0V</td>
<td>V=1.5V</td>
</tr>
<tr>
<td></td>
<td>I=0.1A</td>
<td>I=0.2A</td>
<td>I=0.3A</td>
</tr>
<tr>
<td>B</td>
<td>V=0.8V</td>
<td>V=1.6V</td>
<td>V=2.4V</td>
</tr>
<tr>
<td></td>
<td>I=0.4A</td>
<td>I=0.8A</td>
<td>I=1.2A</td>
</tr>
<tr>
<td>C</td>
<td>V=1.0V</td>
<td>V=1.2V</td>
<td>V=1.4V</td>
</tr>
<tr>
<td></td>
<td>I=0.5A</td>
<td>I=1.4A</td>
<td>I=1.0A</td>
</tr>
<tr>
<td>D</td>
<td>V=2.4A</td>
<td>V=2.7V</td>
<td>V=3.0V</td>
</tr>
<tr>
<td></td>
<td>I=0.8A</td>
<td>I=0.9A</td>
<td>I=1.0A</td>
</tr>
</tbody>
</table>

The student who made wrong observation is:
   a. A
   b. B
   c. C
   d. D
PART-I (CHEMISTRY)
Section – I

1. Give reasons:
   a) Sodium, potassium and lithium are stored under oil.
   b) Aluminum is highly reactive metal, yet it is used to make utensils for cooking.
   c) Carbonate and sulphide ores are generally converted to oxides during the process of extraction.

2. Which one of the methods in column I, is applied for extraction of metals given in column II

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrolytic reduction</td>
<td>Aluminum, Zinc, Sodium, Iron, Magnesium, Tin</td>
</tr>
<tr>
<td>Reduction with carbon</td>
<td></td>
</tr>
<tr>
<td>Reduction with aluminium</td>
<td></td>
</tr>
</tbody>
</table>

3. What will happen when:
   a) Metal reacts with water (cold or hot)
   b) Metals react with steam
   c) Metals react with oxygen

4. Explain why an aqueous solution of ammonium chloride is acidic in nature? Illustrate your answer with help of a chemical equation.

5. Give chemical formula for following salts:
   a) Plaster of Paris
   b) Gypsum
   c) Bleaching powder
   d) Baking soda
   e) Washing soda
   f) Caustic soda

6. Under what soil condition do you think farmer would treat the soil of his fields with quick lime (CaO) or slaked lime (Ca(OH)\(_2\)) or chalk (CaCO\(_3\)).

7. Give information:
   a) Which gas is usually liberated when an acid reacts with a metal?
   b) What happens when dil. HCl is added to sodium carbonate? Write balanced chemical equation for the reaction.
   c) What happen when an acid reacts with a base? What is the special name for such a reaction.
   d) Why does distilled water not conduct electricity whereas rain water does?

8. What type of chemical reaction are represented by following equations:
   i) A + BC → AC + B
   ii) A + B → C
   iii) X + Y + Z
   iv) PQ + RS → PS + RQ
   v) A\(_2\)O\(_3\) + 2B → B\(_2\)O\(_3\) + 2A

9. In the following reaction:
   PbS\(_{(s)}\) + 4H\(_2\)O\(_2{(aq)}\) → PbSO\(_4{(s)}\) + 4H\(_2\)O\(_{(l)}\)
   a) Which substance is oxidizing agent?
   b) Which substance is oxidized?
10. When hydrogen is passed over copper oxide, copper and steam are formed. Write a balanced equation for this reaction and state which of the chemicals are:
   i) Elements
   ii) Compounds
   iii) Reactants
   iv) Products
   v) Metals
   vi) Non-metals

11. Complete the chart

<table>
<thead>
<tr>
<th>Indicator</th>
<th>General colour</th>
<th>Colour in acid</th>
<th>Colour in base/alkali</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue Litmus</td>
<td>Colourless</td>
<td>Colourless</td>
<td>Pink</td>
</tr>
<tr>
<td>Methyl orange</td>
<td>Yellow</td>
<td>Red</td>
<td>Red</td>
</tr>
</tbody>
</table>

**Section-II**

Select the correct alternative[6]:

1. One of the following does not happen during a chemical reaction. This is:
   a) Breaking of old chemical bonds and formation of new chemical bonds
   b) Formation of new substances with entirely different properties
   c) Atoms of one element change into those of another element to form new products
   d) A rearrangement of atoms takes place to form new products

2. Consider the following equation of the chemical reaction of a metal M:
   \[ 4M + 3O_2 \rightarrow 2M_2O_3 \]
   This equation represents:
   a) Combination as well as reduction reaction
   b) decomposition as well as oxidation reaction
   c) oxidation as well as displacement reaction
   d) combination as well as oxidation reaction

3. The property which is not shown by acids is:
   a) they have sour taste
   b) they feel soapy
   c) they turn litmus red
   d) their pH is less than seven

4. The salt whose aqueous solution will have no effect on either red litmus or blue litmus is:
   a) Potassium sulphate
   b) sodium carbonate
   c) ammonium sulphate
   d) sodium acetate

5. The least reactive metal among the following is:
   a) Sodium
   b) Silver
   c) Copper
   d) Lead

6. Which process comes just after concentration of ore during extraction of metals from ores:
   a) Refining
   b) conversion of concentrated ore into metal
   c) Conversion to oxide
   d) Electrolysis
PART – I (BIOLOGY)

Section – I

1. Define nutrition. (1)
2. What is reflex action and reflex arc? (1)
3. State the function of Auxin and cytokinin? (2)
4. State the function of bile juice. (2)
5. What are endocrine glands? Give the function of insulin and thyroxin. (2)
6. (i) What is the function of trypsin and salivary amylase? (1)
   (ii) What causes formation of lactic acid? (1)
7. Give the structure of cerebrum, state its function.
   OR
   Draw the structure of neuron and give the function of Meninges and CSF. (3)
8. Answer the following: (3)
   (i) What is double circulation?
   (ii) What is light dependent phase of photosynthesis?
   (iii) Why stomata are present on the lower surface of the leaf?
9. Distinguish between: (4)
   (i) Artery and vein
   (ii) Auricle and ventricle
10. (a) Draw a neat diagram of an excretory unit of human kidney and label the following parts. (3)
    (i) Bowman’s capsule
    (ii) Collecting duct
    (iii) Renal artery
    (iv) Glomerulus
    (b) In which part filtration of blood takes place. (1)

Section – II

1. Reflex action is a process governed by? (1)
   (a) Brain          (b) Spinal cord          (c) Hypothalamus          (d) Pituitary
2. Stomata plays an important role in: (1)
   (a) Respiration    (b) Transpiration   (c) Photosynthesis     (d) All of these
3. Adrenalin is a hormone produced by which gland? (1)
   (a) Thyroid          (b) Pituitary        (c) Adrenal gland      (d) Kidney
4. Cytokinin is a hormone which promotes? (1)
   (a) Growth          (b) Cell division  (c) Ripening             (d) Abscission
5. Diabetes is caused by hypo secretion of? (1)
   (a) Thyroxine      (b) Insulin           (c) GH                 (d) Adrenalin
6. Stomata open when the guard cells become? (1)
   (a) Flaccid         (b) Turgid            (c) Swell up            (d) Both b & c

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