

2018

Physical Science

Time – Three Hours Fifteen Minutes

(First fifteen minutes for reading the question paper only)

Full Marks – 90

(For Regular and Sightless Regular Candidates)

Full Marks – 100

(For External and sightless External Candidates)

Special credits will be given for answers which are brief and to the point.

Marks will be deducted for spelling mistakes, untidiness and bad handwriting

Only the External Candidates will answer Group -E

Figures in the margin indicate full marks for each question.

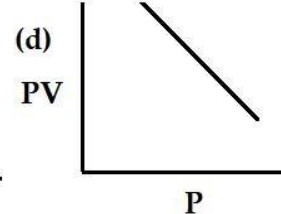
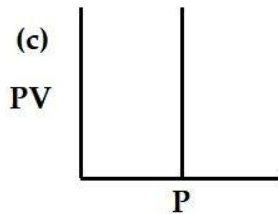
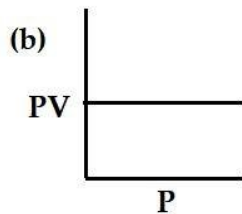
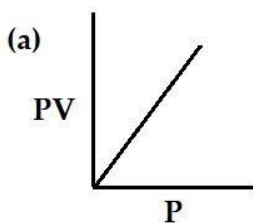
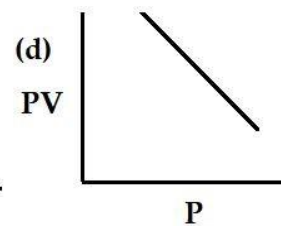
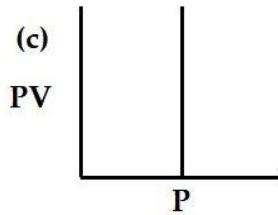
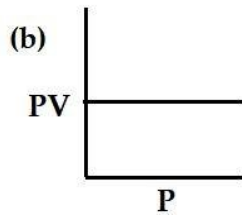
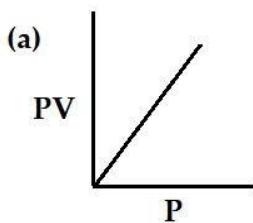
Group – A

1. Multiple choice questions. Four alternatives are given as answer for each of the following questions. Write the correct one. [1 x 15 = 15]

1.1 Which of the following greenhouse gases has a maximum contribution towards global warming?

- a. N₂O
- b. CH₄
- c. CO₂
- d. H₂O vapour

1.2 According to Boyle's law which is the PV – P graph?



1.3 If the vapour density of a carbon-containing gaseous substance is 13, which of the following can be its molecular formula?

- a. CO_2
- b. C_2H_4
- c. C_2H_6
- d. C_2H_2

1.4 The unit of coefficient of linear expansion of a solid is

- a. m
- b. m^{-1}
- c. $^\circ\text{C}^{-1}$
- d. $^\circ\text{C}$

1.5 An object is placed between the optical centre and focus of a thin convex lens. What is the nature of the image of the object?

- a. real and inverted
- b. virtual and inverted
- c. real and erect
- d. virtual and erect

1.6 When a ray of light is incident perpendicularly on a transparent glass slab, what will be its angle of deviation?

- a. 0°
- b. 180°
- c. 30°
- d. 90°

1.7 Which of the units given below is the SI unit of resistance?

- a. volt
- b. ampere
- c. coulomb
- d. ohm

1.8 In a domestic electric circuit the fuse wire is connected to Which of the following?

- a. earth line
- b. live line
- c. neutral line
- d. both live and neutral

1.9 β -ray emitted from a radioactive element is

- a. a stream of electrons
- b. a stream of protons
- c. a stream of neutrons
- d. electromagnetic wave

1.10 How many groups are there in the long periodic table?

- a. 7
- b. 8
- c. 9
- d. 18

1.11 In formation of which of the following compounds octet rule is not obeyed?

- a. NaCl
- b. LiH
- c. KCl
- d. CaO

1.12 Which of the following can conduct electricity?

- a. molten NaCl
- b. liquid HCl
- c. solid NaCl
- d. an aqueous solution of glucose

1.13 What will be the colour of the resulting solution when excess aqueous ammonia is added to an aqueous solution of copper sulphate?

- a. yellow
- b. green
- c. deep blue
- d. brown

1.14 In Which of the following alloys zinc is present?

- a. bell metal
- b. brass
- c. bronze
- d. duralumin

1.15 Which of the following is a saturated hydrocarbon?

- a. C₃H₆
- b. C₂H₄
- c. C₂H₂
- d. C₂H₆

Group -B

2. Answer the following questions (alternatives are to be noted):

2.1 Mention one use of biogas. [1]

OR

What is the role of NO in the decomposition of ozone in the ozone layer? [1]

2.2 Among charcoal, petrol and ethanol which one is a fossil fuel? [1]

2.3 Under constant pressure at what temperature in degree Celsius the volume of an ideal gas will be zero according to Charles' law? [1]

2.4 What is the unit of M in the equation? [1](symbols have usual meaning)

2.5 Whether the following statement is 'true' or 'false'? [1]

The real expansion of any liquid depends on the expansion of the vessel in which it is kept.

OR

Among iron, invar and popper which one has the least Coefficient of linear expansion? [1]

2.6 Between the angle of incidence and the angle of refraction which one is greater when light travels from a rarer to a denser medium? [1]

2.7 What type of mirror is used in the viewfinder of a motor car? [1]

2.8 How does the resistance of semiconductor change with the increase of temperature? [1]

2.9 Which type of energy is transformed to electrical energy in a dynamo? [1]

2.10 Arrange- rays in ascending order of their penetrating power. [1]

OR

Which kind of nuclear reaction is the source of the sun's energy? [1]

2.11 Match the right column with the left column: [1 x 4]

Left column

Right column

2.11.1 An alkali metal

F

2.11.2 An element whose anion accelerates rusting of iron.

(b) Fe

2.11.3 Extracted from hematite.

(c) K

2.11.4 Most electronegative elements.

(d) Cl

2.12 What type of chemical bond is present in CaO? [1]

(a) 2.13 What is used as a cathode to electroplate silver over a copper Spoon? [1]

OR

Give an example of a compound whose aqueous solution is a weak electrolyte. [1]

2.14 During electrolysis which electrode is called a cathode? [1]

2.15. State one use of liquid ammonia. [1]

OR

Write the formula of the precipitate formed when aqueous, ammonia solution is added to an aqueous solution of aluminium chloride. [1]

2.16 In the laboratory preparation of nitrogen, aqueous solution which compound is mixed with an aqueous solution of ammonium chloride and heated? [1]

2.17 Write the IUPAC name of $\text{CH}_3\text{CH}_2\text{CHO}$. [1]

OR

Write the structural formula of positional isomer of $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$. [1]

2.18 Mention one use of tetrafluoroethylene. [1]

Group – C

3. Answer the following questions (alternatives are to be noted) : [2 x 9 = 18]

3.1 What is methane hydrate?

3.2 The pressure of a fixed mass of a gas at a temperature of 0°C is doubled while the volume is halved. What will be the final temperature of the gas?

OR

Under constant pressure, a fixed mass of a gas is heated from 0°C to 546°C . What is the ratio of the final volume of the gas with its initial volume?

3.3 What is meant by the optical centre of a convex lens?

OR

Why does the earth's sky appear blue during the daytime?

3.4 State Lenz's law related to electromagnetic induction.

3.5 Write with an example how according to Lewis concept a covalent bond is formed.

OR

Why the bond in sodium chloride cannot be expressed as Na-Cl ?

3.6 Give one example each of a liquid and a solid covalent compound.

3.7 Write with balanced chemical equation what happens when H_2S gas is passed through an aqueous copper sulphate solution.

3.8 Write down cathode reaction when an aqueous solution of MSO_4 ($\text{M} = \text{metal}$) is electrolysed. Write with reason whether the reaction is oxidation or reduction.

OR

Give one use of each of copper and aluminium.

3.9 What is the condition of the substitution reaction of methane with chlorine? Write the balanced chemical equation of the first step of the reaction.

OR

Write with a balanced chemical equation what happens when ethanol reacts with metallic sodium.

