PHYSICAL SCIENCE NEW SYLLABUS

Time :	3 Hours 15 Min (First 15 minu	utes tes for reading tl	ne question pape	er only)	Full Marks :	90 for Regular Candidates 100 for External Candidates
			Gre	oup - A		
1.	MCQ type	question (A	all questions	are co	mpulsary):	$1\times15=15$
	Each of the	following qu	estions has	four alt	ernatives. Wri	ite the correct one.
1.1	Which one	of the follow	ing does not	deplete	e ozone layer	MCQ Model Answer:
	(a) NO	(b) N_2O	(c) CO ₂	(d) C	CFC	1.1.(c) CO ₂
1.2	Which of th	e following i	s equal to 29	0K?		
	(a) 30° C	(b) 17° C	(c) 0^{0} C	(d) 2	7°C	
1.3	The molecul	lar weight of	methane is 10	6, which	of the follow	ing is its vapour density?
	(a) 22.4	(b) 8	(c) 16	(d) 3	2	
1.4	Which of th unit)?	e following	has the highe	est therr	nal conductiv	vity (in cal.cm ⁻¹ s ⁻¹ K ⁻¹
	(a) Copper	(b) C	Gold (c) I	ron	(d) Diamono	d
1.5		ngle of incidenser medium		on is mi	nimum during	g refraction of light from
	(a) 60°	(b) 0^0	(c) 90°	(d) 4	5^{0}	
1.6	Which pair light?	of the follow	ring is the tw	o termi	nal colours in	pure spectrum of white
	(a) Red and	violet (b) Re	ed and green	(c) Vio	let and orang	e (d) Blue and indigo
1.7	Which one	of the follow	ing is the uni	it of ele	ctric charge?	MCQ Model Answer :
	(a) volt	(b) coulom	b (c) c	ohm	(d) watt	1.7.(b) coulomb

1.8		What will be the equivalent resistance where two resistances of 3 ohm and 6 ohm are connected in parallel combination?					l
	(a) 3 ohm	(b) 4 ohm	(c) 2 ohm	(d) 1 ohm			
1.9		ne following i γ are radioac		order of dec	reasing power	r of ionising of	
	(a) $\alpha > \beta > \gamma$	(b) γ	$> \beta > \alpha$	(c) $\alpha > \gamma >$	β (d) γ	$> \alpha > \beta$	
1.10	Which one	of the following	ing is not a t	ransition eler	ment?		
	(a) Fe	(b) Co	(c) Ca	(d) Cr			
1.11	Which one	Which one of the following is an ionic compound?					
	(a) HCl	(b) CH ₄	(c) MgCl ₂	(d) NH_3			
1.12	Which of th	Which of the following is a weak electrolyte?					
	(a) CuSO ₄	(b) KOH	(c) H ₂ SO ₄	(d) CH ₃ CC	ЮН		
1.13	Which of th	ne following	gases can be	prepared by	Kipp's appara	atus ?	
	(a) N ₂	(b) H_2S	(c) HCl	(d) NH_3			
1.14	Hematite is	the one of wh	nich of the fo	llowing meta	als?		
	(a) Copper	(b) Al	luminium	(c) Iron	(d) Zinc.		
1.15	Which of th	e following f	unctional gro	oups is prese	nt in ethyl alco	ohol?	
	(a) — CHO	(b) >	C=O (c) -	– СООН	(d) - OH		
			Cros	ір- В			
			<u> </u>	тр- Б			
2.	Answer the	following que	estions (Alte	rnatives are t	o be noted):	$1\times 21=21$	
2.1	In which lag	yer of atmosp	here do stor	m and rain o	ccur?		
			or				
	What are th plant?	e bacteria cal	led which do	ecompose bio	omass to meth	ane in biogas	

2.2	Fill up the blank:	
	In stratosphere temperature	with increase in altitude.

- 2.3 What is the temperature in ⁰C at which volume of a gas will be zero at constant pressure according to Charles' law?
- 2.4 A gas at fixed temperature is kept in a closed vessel. Some more amount of the same gas is added to the vessel without altering the temperature. What will be the change in pressure?
- 2.5 What is the SI unit of coefficient of linear expansion of a solid?

or

Write down the relation among the linear, surface and volume expansion coefficients of a solid.

- 2.6 What type of spherical mirror is used in the headlight of cars?
- 2.7 Where will the image be formed when an object is placed at the focus of a convex lens?
- 2.8 Define the resistance of a conductor according to Ohm's law.
- 2.9 What is the SI unit of resistivity?
- 2.10 From which part of an atom the radioactive rays emanate?

or

Name a positively changed radioactive particle.

2.11 Match the right column with the left:

	Left Column	Right Column		
2.11.1	The most electronegative element of group 17	i)	Zn	
2.11.2	An alkaline earth metal	ii)	Sn	
2.11.3	A metal which can be prepared by the carbon reduction of its oxide.	iii)	F	
2.11.4	Present in bronze	iv)	Mg	

- 2.12 Which type of electricity is used in electrolysis?
- 2.13 What is used as electrolyte in the electroplating of gold over silver?

٥r

Write whether the following statement is true or false:

During electrolysis electrolytes conduct electricity through electrons.

2.14 Write the formula of the precipitate when an aqueous solution of ammonia is added to the aqueous solution of ferric chloride?

or

What is liquor ammonia?

- 2.15 What change of colour is observed when a few drops of aqueous solution of sodium nitroprusside is added to an aqueous solution of hydrogen sulphide made alkaline with NaOH solution?
- 2.16 Write whether the following statement is true or false:

aqueous solution of glucose can conduct electricity.

2.17 Write the IUPAC name of the following compound:

2.18 Which gas is liberated when NaHCO₃ is added to acetic acid?

or

Write down the formula of the organic compound produced in the first step in the substitution reaction of methane with chlorine.

Group - C

- 3. Answer the following questions (Alternatives are to be noted): $2 \times 9 = 18$
- 3.1 Write two harmful effects of depletion of ozone layer on human health and environment.

The volume of a gas at 300K temperature and 760mmHg of pressure is 300cm³. What is the volume of the gas at STP?

or

Find out the volume of 2.2g of CO_2 at a temperature of 300K and 570 mmHg of pressure. (C=12, O = 16) (R= 0.082L atmos K⁻¹ mol⁻¹)

- 3.3 Write the laws of refraction of light
- 3.4 How does resistance depend on length and cross-section of a conductor?

or

Write down Fleming's left hand rule.

3.5 Draw Lewis - dot diagram of carbon dioxide.

or

Show with an example that an ionic compound can be formed even when its ions have no filled octet.

- 3.6 Compare two properties of ionic and covalent compounds.
- 3.7 Write the condition and balanced chemical equation of the reaction for preparation of ammonia gas in the laboratory.

or

Show that H₂S is a reducing agent with the help of a chemical reaction.

- 3.8 Write with example the difference between mineral and ore.
- 3.9 Write the names of monomors of PVC and teflon.

or

Write constitutional formulas of two orgamic compounds having the same molecular formula C_3H_6O .

Group -D

Answer the following questions (Alternatives are to be noted): 4. $3 \times 12 = 36$ 3 Establish the combined form of Charles' and Boyle's law. 4.1 4.2 How many gram of ferrous sulphide will be required to prepare 1.7 g of hydrogen sulphide gas by the reaction of ferrous sulphide with dilute sulfuric acid? (Fe = 56, S= 32, H=1)3 or Metallic zinc and carbon monoxide are produced when zinc oxide is heated with carbon. How many gram of carbon will be required to produce 31.785g of zinc and 14.000g of carbon monoxide from 40.685g of zinc oxide? How many mole of carbon monoxide is produced in the reaction? (C=12, O=16) 2 + 1 = 34.3 What is meant by coefficient of thermal conductivity of a substance? Establish the relation between CGS and SI units of it. 1 + 2 = 34.4 What is meant by focus of a lens? What is hypermetropia? Which lens is used for its remedy? 1 + 2 = 3Prove that $\delta = i_1 + i_2$ -A in case of refraction light through a prism. 4.5 3 (The symbols has usual meaning) prove that $\mu_r < \mu_v$ State Joule's law of heating effect of current. 3 4.6 When an electric lamp is connected to 220 V mains 1 ampere of current flows. 4.7 What will be the current when the lamp is connected to 110V mains?

Find the ratio of the resistances of two lamps of 220V- 60W and

of 110V - 60W.

3

4.8 What is radioactivity?
Write down two uses of radioactivity.

1 + 2=3

or

When a radioactive atom ernits an α - particle how are atomic number and mass number changed in the daughter atom?

By the emission of which radioactive ray from a radioactive atom, the atomic number remains unchanged? 2 + 1=3

- 4.9 What is meant by ionization energy of an element?

 Arrange Li, Na, and K in increasing order of their ionization energy. 2 + 1=3
- 4.10 Mention the following points in case of electrorefining of copper:
 - i) electrodes used and the electrolyte
 - ii) the chemical reaction occurring at the electrodes

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4.11 In the laboratory preparation of nitrogen, why instead of heating directly a concentrated aqueous solution of ammonium nitrite, a mixed aqueous concentrated solution of ammonium chloride and sodium nitrite mixed in equimolar proportion is heated? Answer with balanced chemical equations.

or

Write with condition and balanced chemical equation how urea is industrially prepared.

4.12 C₂H₆ is called a saturated hydrocarbon, but why is C₂H₄ called an unsaturated hydrocarbon?

or

How will you convert $HC \equiv CH \rightarrow Br_2CHCHBr_2$? 2 + 1=3Mention one use of CNG.

Group -E

(For external candidates only)

5. Answer any four of the following questions:

 $1 \times 4=4$

5.1 Equal number of helium and hydrogen atoms are kept in two similar jars at same temperature. What will be the ratio of their pressure?

- 5.2 What property of light is utilized to form an image by a lens?
- 5.3 What type of energy transfer takes place in a dynamo?
- 5.4 What is the non-metallic component present in stainless steel?
- 5.5 Write the name of the compound which is formed by the reaction of nitrogen with red-hot magnesium.
- 6. Answer any three of the following questions:

 $2 \times 3 = 6$

- 6.1 What is meant by renewable energy source?
 - Give an example.
- 6.2 Three resistors R_1 , R_2 , R_3 are connected in parallel combination with a cell. Find the relation between the currents I_1 , I_2 , I_3 flowing through them.
- 6.3 Give an explanation of diffusion of gases.
- 6.4 What is bio-degradable polymer? Given an example.