

FIITJEE PHASE TEST - 1

PHYSICS, CHEMISTRY & MATHEMATICS

CODE:

Time Allotted: 3 Hours

Maximum Marks: 255

- Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.
- You are not allowed to leave the Examination Hall before the end of the test.

INSTRUCTIONS

Caution: Question Paper CODE as given above MUST be correctly marked in the answer OMR sheet before attempting the paper. Wrong CODE or no CODE will give wrong results.

A. General Instructions

1. Attempt ALL the questions. Answers have to be marked on the OMR sheets.
2. This question paper contains Three Parts.
3. **SECTION-I** is Physics, **SECTION -II** is Chemistry and **SECTION -III** is Mathematics.
4. Each **Section** is further divided into **Two Parts: Part-A & B** in the OMR.
5. Rough spaces are provided for rough work inside the question paper. No additional sheets will be provided for rough work.
6. Blank Papers, clip boards, log tables, slide rule, calculator, cellular phones, pagers and electronic devices, in any form, are not allowed.

B. Filling of OMR Sheet

1. Ensure matching of OMR sheet with the Question paper before you start marking your answers on OMR sheet.
2. On the OMR sheet, darken the appropriate bubble with **Blue/Black Ball Point Pen** for each character of your Enrolment No. and write in ink your Name, Test Centre and other details at the designated places.
3. OMR sheet contains alphabets, numerals & special characters for marking answers.

C. Marking Scheme For All Two Parts.

- (i) **PART-A (01-07)** contains 7 Multiple Choice Questions which have **One or More Correct** answer. For each question in the group **Q. 01 – 07 of PART – A** you will be awarded
Full Marks: +4 If only the bubble(s) corresponding to all the correct options(s) is (are) darkened.
Partial Marks: +1 For darkening a bubble corresponding to **each correct option**, provided NO incorrect option is darkened.
Zero Marks: 0 If none of the bubbles is darkened.
Negative Marks: -1 In all other cases.
For example, if **(A), (C) and (D)** are all the correct options for a question, darkening all these three will result in **+4 marks**; darkening only **(A) and (D)** will result in **+2 marks**; and darkening **(A) and (B)** will result in **-1 mark**, as a wrong option is also darkened.
- (ii) **Part-A (08-14)** – Contains seven (07) multiple choice questions which have **ONLY ONE CORRECT** answer Each question carries **+3 marks** for correct answer and **-1 marks** for wrong answer
- (iii) **Part-A (15-18)** - This section contains Two paragraphs. Based on each table, there are Two multiple choice questions. Each question has **only one correct** answer and carries **+3 marks** for the correct answer. **There is no negative marking.**
- (iv) **Part-A (19-20)** – This section contains Two (02) List-Match Sets, each List-Match set has One (01) Multiple Choice Questions. Each List-Match set has two lists: List-I and List-II. FOUR options are given in each Multiple Choice Question based On List-I and List-II and **ONLY ONE** of these four options satisfies the condition asked in the Multiple Choice Question. Each question carries **+3 Marks** for correct combination chosen and **-1 mark** for wrong options chosen.
- (v) **Part-B (01-06)** contains six (06) Numerical based questions, the answer of which maybe positive or negative numbers or decimals (e.g. 6.25, 7.00, -0.33, -.30, 30.27, -127.30) and each question carries **+3 marks** for correct answer. **There is no negative marking.**

Name of the Candidate : _____

Batch : _____ Date of Examination : _____

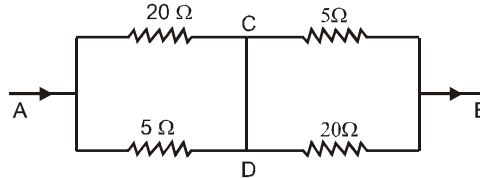
Enrolment Number : _____

BATCHES – Three Year CRP(2023)

SECTION – I (PHYSICS)**PART – A****Multiple Correct Choice Type**

This section contains 7 multiple choice questions. Each question has four choices (A), (B), (C) and (D) out of which ONE or MORE THAN ONE are correct.

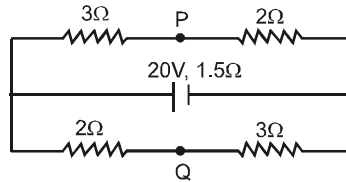
1. When some potential difference is maintained between A and B, current I enters the network at A and leaves at B :



- (A) the equivalent resistance between A and B is 8Ω
 (B) C and D are at the same potential
 (C) no current flows between C and D
 (D) current $(2I/5)$ flows from wire CD

1. **AB,**

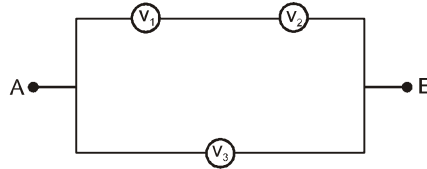
2. In the given circuit :



- (A) the current through the battery is 5.0 amp
 (B) P and Q are at the same potential
 (C) P is 2.5 V higher than Q
 (D) Q is 2.5 V higher than P

2. **AD,**

3. Three voltmeters, all having different resistance, are joined as shown in the figure. When some potential difference is applied across A and B, their readings are V_1, V_2, V_3 :

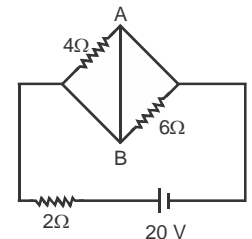


- (A) $V_1 = V_2$
 (B) $V_1 \neq V_2$
 (C) $V_1 + V_2 = V_3$
 (D) $V_1 + V_2 > V_3$

3. **BC,**

4. In the circuit shown in the figure :

- (A) power supplied by the battery is 200 watt
 (B) current flowing in the circuit is 5A
 (C) potential difference across 4Ω resistance is equal to the potential difference across 6Ω resistance
 (D) current in wire AB is zero



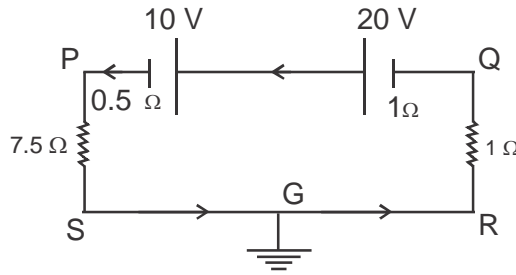
4. **AC,**

5. Two bulbs consume same power when operated at 200 V and 300 V respectively. When these bulbs are connected in series across a dc source of 500 V, then

- (A) Ratio of potential difference across them is $3/2$
 (B) Ratio of potential difference across them is $4/9$
 (C) Ratio of power consumed across them is $4/9$
 (D) Ratio of power consumed across them is $2/3$

5. **BC,**

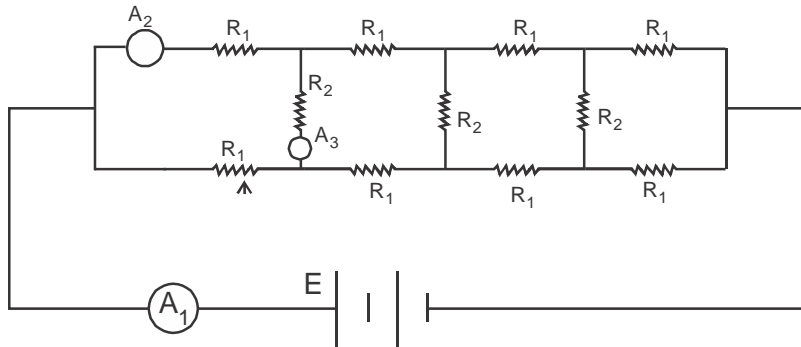
6. In the circuit shown :



- (A) the potential at P is -7.5 V
- (B) the potential at Q is -1 V
- (C) the potential at R is zero
- (D) the potential at S is zero

6. **BCD,**

7. In the given circuit, given $R_1 = 10\Omega$, $R_2 = 6\Omega$ and $E = 10\text{V}$. Then which of the following statements are correct ?



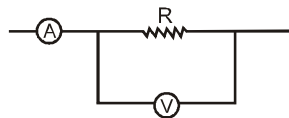
- (A) Effective resistance of the circuit is 20Ω
- (B) Reading of A_1 is $\frac{1}{2}$ amp
- (C) Reading of A_2 is $\frac{1}{4}$ amp
- (D) Reading of A_3 is $\frac{1}{8}$ amp

7. **ABC,**

Single Correct Choice Type

This section contains 7 Single choice questions. Each question has four choices (A), (B), (C) and (D) out of which ONLY ONE option is correct.

8. In the circuits shown below the ammeter A reads 4 amp. and the voltmeter V reads 20 volts. The value of the resistance R is :



- (A) slightly more than 5 ohms
- (B) slightly less than 5 ohms
- (C) exactly 5 ohms
- (D) none of these

8. **A,**

9. An electric bulb is rated 220V and 100W. When it is operated on 110V, the power consumed will be :

- (A) 100 W
- (B) 75 W
- (C) 50 W
- (D) 25W

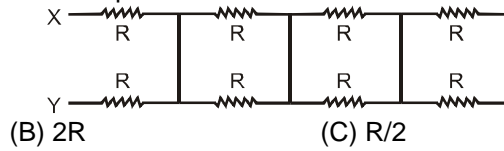
9. **D,**

10. The number of electron passing though a heater wire in one minute, if it carries a current of 8 ampere, will be :

- (A) 2×10^{20}
- (B) 2×10^{21}
- (C) 3×10^{20}
- (D) 3×10^{21}

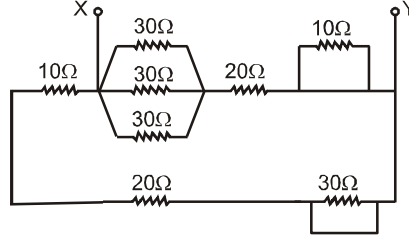
10. **D,**

11. The equivalent resistance between points X & Y



- (A) R (B) 2R (C) R/2 (D) 4 R
11. **B,**

12. The equivalent resistance between points X & Y :



- (A) 5Ω (B) 10Ω (C) 15Ω (D) 60Ω
12. **C,**

13. What length of the wire of specific resistance $48 \times 10^{-8} \Omega\text{-m}$ is needed to make a resistance of 4.2 Ω (diameter of wire = 0.4 mm)

- (A) 4.1 (B) 3.1 (C) 2.1 (D) 1.1 m
13. **D,**

14. Masses of 3 wires of same metal are in the ratio 1 : 2 : 3 and their lengths are in the ratio 3 : 2 : 1. The electrical resistances are in ratio :

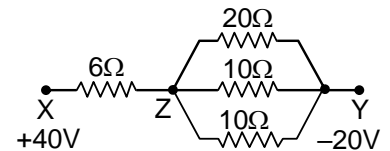
- (A) 1 : 4 : 9 (B) 9 : 4 : 1 (C) 1 : 2 : 3 (D) 27 : 6 : 1
14. **D,**

Comprehension Type

This section contains 2 Paragraph which has 4 Single choice questions each. Each question has four choices (A), (B), (C) and (D) out of which ONLY ONE option is correct.

Paragraph for question Nos. 15 to 16

In electric circuits many devices as resistances are connected in parallel and in series. When devices are in series the current through all is same. When devices are in parallel the potential drop across all is same. With this knowledge answer the following questions in the circuit given.



15. The potential of point Z is:
 (A) 20 V (B) 4 V (C) 36 V (D) 24 V

15. **B,**

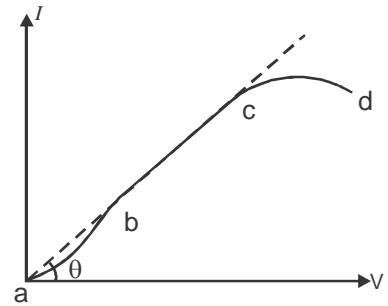
16. Current through 20Ω resistance is:
 (A) 6A (B) 1.2 A (C) 2.8 A (D) 3 A

16. **B,**

Paragraph for question Nos. 17 to 18

Voltage – current graph for a conductor is as shown.

17. In figure for calculation of V , $V = IR$ can be applied for the section. It can be inferred that ohm's law is valid for section.
 (A) a – b (B) b – c
 (C) c – d (D) All the above



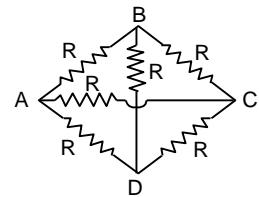
17. **B,**
18. If θ is 45° then what is the value of resistance of the conductor in the section b – c.
 (A) 1 (B) $\sqrt{3}$ (C) 0 (D) can't be determined
18. **A,**

PART - B

List Matching Type Questions

(19 - 20) contains 2 list Match sets (Each list – Match set one (01) Multiple Choice Question) which have only one correct answer. Each question carries + 3 marks for correct answer. 0 if no option is selected and – 1 mark for wrong answer.

19. Referring to the circuit in the figure. Match columns-I and II.



Column – A		Column - B	
(A)	The circuit is a balanced Wheatstone bridge with a resistance parallel to the bridge	(P)	Equivalent resistance between A and C
(B)	$R/2$	(Q)	Equivalent resistance between B and D
(C)	On removing the resistance between B and D equivalent resistance becomes $R/2$	(R)	Equivalent resistance between A and B
(D)	On removing the resistance between B and D, equivalent resistance becomes $5/8R$	(S)	Equivalent resistance between C and D
		(T)	None of these

- (A) A–p, q; B–p, q; C–p; D–r, s (B) A–s, p; B–p, t; C–p; D–r, s
 (C) A–r; B–s, t; C–r; D–r, s (D) A–q, s; B–s, t; C–p; D–q, s

19. **A,**

20. Match the column :

Column - A		Column - B	
(A)		(P)	$R_{eq} = 1\Omega, I = 12A$
(B)		(Q)	$\propto \text{Length}$
(C)	Resistance	(R)	$R_{eq} = 1\Omega, I = 6A$
(D)		(S)	$\propto \frac{1}{\text{Area}}$

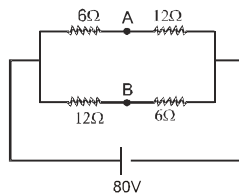
- (A) A-S; B-R ;C-S, Q; D-R (B) A-P; B-P ;C-S, Q; D-R
 (C) A-P; B-P ;C-R, Q; D-S (D) A-Q; B-Q ;C-R, Q; D-S

20. B,

PART – C
Numerical Based

This section contains 6 numerical based questions, the answer may be positive or negative or decimals (e.g 6.25, 7.00, -0.33, -0.30, 30.27, - 127.30) and each question carries + 3 marks for correct answer. There is not negative marking.

1. In the circuit shown, if a wire is connected between points A and B. The current flowing through that wire is $\frac{10}{k}$?

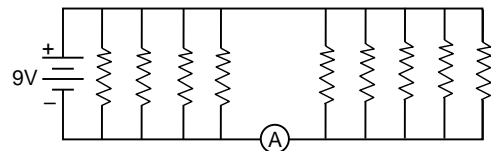


1. 3,

2. A cylinder of a material is 10cm long and has a cross-section area of 2cm^2 . If its resistance along the length be 20Ω , what will its resistivity value be in numbers?

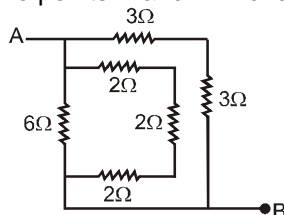
2. 4,

3. If each resistance in the figure is of 9Ω then find the reading of ammeter



3. 5,

4. Find equivalent resistance between two points A and B in circuit :



4. 2,

5. In a gas discharge tube 2.9×10^{18} positive ions move to the left per second, while 1.2×10^{18} e^- move to the right per second. The current in the tube is $0.11 \times N$ ampere. Find the value of N ?
5. 6,
6. Two bulbs of power 60 W, 220 V and 100 W, 220 V are connected in series with a 220 V battery then the ratio of the heat generated in bulb of 100 W to the heat generated in 60 W bulb is found to be $p \times 10^{-1}$. What is the value of p ?
6. 6,

SECTION – II (CHEMISTRY)

PART – A

Multiple Correct Choice Type

This section contains 7 multiple choice questions. Each question has four choices (A), (B), (C) and (D) out of which ONE or MORE THAN ONE are correct.

1. The species present in solutions when CO_2 is dissolved in water are
 (A) CO_2 , H_2CO_3 , HCO_3^- , CO_3^{2-} (B) H_2CO_3 , CO_3^{2-}
 (C) CO_3^{2-} , HCO_3^- (D) CO_2 , H_2CO_3
1. A,
2. Which of the following is/are redox reaction(s)?
 (A) $\text{BaO}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + \text{H}_2\text{O}_2$ (B) $2\text{BaO} + \text{O}_2 \rightarrow 2\text{BaO}_2$
 (C) $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$ (D) $\text{SO}_2 + 2\text{H}_2\text{S} \rightarrow 2\text{H}_2\text{O} + 3\text{S}$
2. BCD,
3. Which of the following compounds/ions can act as Bronsted acid as well as Bronsted base?
 (A) HCO_3^- (B) K_2CO_3 (C) H_2SO_4 (D) H_2PO_4^-
3. AD,
4. Complete the following statement by substituting x and y with correct options "Corrosion and rancidity are the result of 'x' reaction of iron articles and oils /fats respectively. Galvanization is done to prevent corrosion of iron articles and 'y' are used to prevent rancidity of oils or fats"

x	y
(A) Displacement	Oxidants
(B) Oxidation	Anti – oxidants
(C) Displacement	Anti – oxidants
(D) Oxidation	Nitrogen gas

4. BD,
5. 1 mole of $\text{Ba}(\text{OH})_2$ will exactly neutralize
 (A) 1M, 500 ml HCl (B) 98 g of H_2SO_4
 (C) 18.25% w/v, 400 ml of HCl (D) 63% w/v, 200 of HNO_3
5. BCD,
6. For the following redox reaction, which of the following statement is incorrect?
 $\text{ClO}_3^- \longrightarrow \text{Cl}^- + \text{ClO}_4^-$
 (A) ClO_3^- is gaining 5 electrons per ion
 (B) ClO_3^- is losing 2 electrons per ion
 (C) ClO_3^- is losing as well as gaining 2 electrons per ion
 (D) ClO_3^- is losing as well as gaining 5 electrons per ion
6. ACD,
7. Which of the following solutions will not have pH equal to 1?
 (A) 100mL of M/10 HCl + 100mL of M/10 NaOH
 (B) 55mL of M/10 HCl + 45mL of M/10 NaOH
 (C) 10mL of M/10 HCl + 90mL of M/10 NaOH
 (D) 75mL of M/5 HCl + 45mL of M/5 NaOH
7. ABCD,

Single Correct Choice Type

This section contains 7 Single choice questions. Each question has four choices (A), (B), (C) and (D) out of which ONLY ONE option is correct.

8. Balance the equation and identify a,b,c
 $a \text{Li(s)} + b\text{O}_2(\text{g}) \longrightarrow c\text{Li}_2\text{O(s)}$
 (A) 4,2,1 (B) 2,1,2 (C) 4,1,2 (D) 1,1,1
8. C,
9. White washing walls gives a shiny finish to wall, due to the formation of which of these compound?
 (A) Ca(OH)_2 (B) CaO (C) CaCO_3 (D) CO_2
9. C,
10. Which of the following substances is serving as a reducing agent in the following reaction?
 $14\text{H}^+ + \text{Cr}_2\text{O}_7^{2-} + 3\text{Ni} \longrightarrow 2\text{Cr}^{3+} + 7\text{H}_2\text{O} + 3\text{Ni}^{2+}$
 (A) H_2O (B) Ni (C) H^+ (D) $\text{Cr}_2\text{O}_7^{2-}$
10. B,
11. Change of $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ to $\text{Na}_2\text{CO}_3 \cdot \text{H}_2\text{O}$ on exposure to air is called
 (A) effervescence (B) efflorescence
 (C) deliquescence (D) hygroscopic
11. B,
12. pH of a solution is 5. If is changed to pH = 2 by adding acid. $[\text{H}^+]$ will increase
 (A) 1000 times (B) 2.5 times (C) 100 times (D) 5 times
12. A,
13. The pH of a solution is 5.0. If H^+ ion concentration is decreased 100 times. Then, the solution will be:
 (A) neutral (B) more acidic (C) basic (D) of same acidity
13. A,
14. If iron nails are kept in CuSO_4 solution for two hours, the colour of the solution will change into
 (A) pink (B) red (C) pale green (D) yellow
14. C,

Comprehension Type

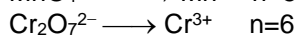
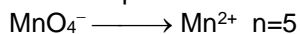
This section contains 2 Paragraph which has 4 Single choice questions each. Each question has four choices (A), (B), (C) and (D) out of which ONLY ONE option is correct.

Paragraph for Question 15 to 16

Read the paragraph carefully and answer the following questions:

n -factor of a reactant is the number of moles of electrons lost or gained per mole of reactant involved in a redox reaction:

For example:



15. What is the number of moles of electrons lost or gained per mole of reactant involved in redox reaction?
 $\text{MnO}_4^- \longrightarrow \text{MnO}_2$
 (A) 3 (B) 6 (C) 8 (D) None of these
15. A,
16. Find the number of H^+ ions involved in a balanced chemical reaction (acidic medium) given below:
 $\text{Cr}_2\text{O}_7^{2-} \longrightarrow \text{Cr}^{3+}$
 (A) 16 (B) 14 (C) 6 (D) 3
16. B,

Paragraph for Question 17 to 18

Read the paragraph carefully and answer the following questions:

Four students studied reactions of zinc and sodium carbonate with dilute hydrochloric acid and sodium hydroxide solution and presented their results as follows. The (✓) represents evolution of gas and (×) represent absence of any reaction.

	Zn	Na ₂ CO ₃
HCl	✓	✓
NaOH	✓	×

17. Which of the following chemical properties are shown by dilute hydrochloric acid?

- (i) It turns blue litmus red
 (ii) It turns red litmus blue
 (iii) It reacts with zinc and a gas is evolved
 (iv) It reacts with solid sodium carbonate to give brisk effervescence
 (A) (i) and (ii) only (B) (i) and (iii) only
 (C) (i), (iii) and (iv) only (D) (ii), (iii) and (iv) only

17. **C,**

18. Four drops of red litmus solution were added to each one of the following substances. Which one turns red litmus solution blue?

- (A) H₂SO₄ (B) distilled water
 (C) sodium hydroxide solution (D) hydrochloric acid

18. **C,**

PART – B

List Matching Type Questions

(19 - 20) contains 2 list Match sets (Each list – Match set one (01) Multiple Choice Question) which have only one correct answer. Each question carries + 3 marks for correct answer. 0 if no option is selected and – 1 mark for wrong answer.

19. Which of the following is correct

Column – I		Column - II	
(A)	HSO ₄ ⁻	(P)	Lewis acid
(B)	BF ₃	(Q)	Lewis base
(C)	NH ₃	(R)	Bronsted acid
(D)	OH ⁻	(S)	Bronsted base

- (A) A - S, Q, P; B - P; R - Q, S; D - Q, S (B) A - P, Q, Q; B - P; C - R, Q; D - Q, S
 (C) A - R, S, Q; B - P; C - Q, S; D - Q, S (D) A - S, R, Q; B - S; C - P, S; D - Q, S

19. **C,**

20. Which of the following is correctly matched:

Column – I		Column - II	
(A)	$\text{ZnCO}_3 \xrightarrow{\Delta} \text{ZnO} + \text{CO}_2$	(P)	Endothermic
(B)	$\text{Fe}_2\text{O}_3 + 3\text{C} \xrightarrow{\Delta} 2\text{Fe} + 3\text{CO}$	(Q)	Redox
(C)	$\text{NaOH} + \text{HCl} \longrightarrow \text{NaCl} + \text{H}_2\text{O}$	(R)	Thermal Decomposition
(D)	$\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O} \xrightarrow{\Delta} \text{Al}_2\text{O}_3 + 2\text{H}_2\text{O}$	(S)	Neutralisation

- (A) A - S; B - R; C - Q; D - S
 (B) A - PQ; B - PR; C - Q; D - S
 (C) A - P; B - R; C - Q; D - S
 (D) A - PR; B - PQ; C - S; D - P

20. **D**

PART – B
Numerical Based

This section contains 6 numerical based questions, the answer may be positive or negative or decimals (e. g 6.25, 7.00, –0.33, –.30, 30.27, – 127.30) and each question carries + 3 marks for correct answer. There is not negative marking.

1. Find the number of electrons taken up by nitrogen atom when a NO^+ ion is reduced to NH_2OH
1. **4,**
2. The pH of an aq. Solution is 5. The H^+ ion concentration in mol/L is 1×10^{-x} . Find value of x
2. **5,**
3. pH of basic solution must be greater than _____.
3. **7,**
4. $\text{SnCl}_2 + 2\text{HCl} + \text{I}_2 \longrightarrow \text{SnCl}_4 + 2\text{HI}$
In the above reaction, the number of electrons lost by SnCl_2 are
4. **2,**
5. Number of metal which can give H_2 gas with H_2SO_4 ,
K, Na, Cu, Sn, Pb, Au, Ag
5. **4,**
6. Oxidation number of O in BaO_2 is x and in OF_2 is y; then value of x+y is
6. **1,**

SECTION – III (MATHEMATICS)**PART – A****Multiple Correct Choice Type**

This section contains 7 multiple choice questions. Each question has four choices (A), (B), (C) and (D) out of which ONE or MORE THAN ONE are correct.

1. Let $g(x) = x^6 + ax^5 + bx^4 + cx^3 + dx^2 + ex + y$ be a polynomial such that $g(1) = 1, g(2) = 2, g(3) = 3, g(4) = 4, g(5) = 5$ and $g(6) = 6$. And if $g(7) = n$
 (A) sum of the digits of n is 16 (B) sum of the digits of n is 14
 (C) last digit of n is 7 (D) last digit of n is 9
1. AC,
2. If $(x^2 - 1)$ is a factor of $x^4 + ax^3 + 3x - b$ then
 (A) $a = 3, b = -1$ (B) $a = -3, b = 1$ (C) $a = 3, b = 1$ (D) $a = -3, b = -1$
2. B,
3. For an increasing A.P. a_1, a_2, \dots, a_n , if $a_1 + a_3 + a_5 = -12$ and $a_1 a_3 a_5 = 80$, then which of following is/are true ?
 (A) $a_1 = -10$ (B) $a_2 = -1$ (C) $a_3 = -4$ (D) $a_5 = +2$
3. ACD,
4. For what values of k the quadratic equation $12x^2 + 4kx + 3 = 0$ has equal zeroes.
 (A) 4 (B) -4
 (C) 3 (D) -3
4. CD
5. If S_n denotes the sum of first n terms of an Arithmetic progression and a_n denotes the n^{th} term of the same AP given $S_n = n^2 p$; $S_k = k^2 p$; where k, p ; where $k, p, n \in \mathbb{N}$ and $k \neq n$ then
 (A) $a_1 = p$ (B) common difference = $2p$
 (C) $s_p = p^3$ (D) $a_p = 2p^2 - p$
5. ABCD,
6. The numbers $x, \frac{1}{2}, \frac{1}{3}$ are in A.P., then x is equal to
 (A) 1 (B) $\frac{2}{3}$
 (C) $\frac{3}{2}$ (D) None of these
6. B
7. How many terms of the A.P. 63, 60, 57, must be take so that their sum is 693.
 (A) 21 (B) 22
 (C) 23 (D) 24
7. AB

Single Correct Choice Type

This section contains 7 Single choice questions. Each question has four choices (A), (B), (C) and (D) out of which ONLY ONE option is correct.

8. Suppose a, b, c are three distinct real numbers.
Let $P(x) = \frac{(x-b)(x-c)}{(a-b)(a-c)} + \frac{(x-c)(x-a)}{(b-c)(b-a)} + \frac{(x-a)(x-b)}{(c-a)(c-b)}$ when simplified, $P(x)$ becomes
(A) 1 (B) x
(C) $\frac{x^2 + (a+b+c)(ab+bc+ca)}{(a-b)(b-c)(c-a)}$ (D) 0
8. **A,**
9. Product of two positive integers is 15210 and their HCF is 39. How many such pairs are possible ?
(A) 1 (B) 2 (C) 3 (D) none of these
9. **B,**
10. How many values of a , the LCM of $a, 6^6$ and 8^8 is 12^{12} .
(A) 25 (B) 300 (C) Infinite (D) none of these
10. **A,**
11. $\frac{1}{q+r}, \frac{1}{r+p}, \frac{1}{p+q}$ are in A.P., then
(A) p, q, r are in A.P. (B) p^2, q^2, r^2 are in AP (C) $\frac{1}{p}, \frac{1}{q}, \frac{1}{r}$ are in A.P. (D) None of these
11. **B,**
12. If $x = 2 + 2^{2/3} + 2^{1/3}$ then the value of $x^3 - 6x^2 + 6x$ is :
(A) 2 (B) 3 (C) 1 (D) None of these
12. **A,**
13. Which of the following statements is false?
(A) A rational number may have a terminating decimal representation.
(B) Difference of two irrational number will be irrational.
(C) Every real number is either rational or irrational.
(D) Irrational numbers cannot be represented by points on the number line.
13. **D,**
14. If α and β are the zeros of the polynomial $f(x) = x^2 - p(x+1) - c$ such that $(\alpha+1)(\beta+1) = 0$, then the value of c is
(A) 0 (B) 1 (C) -1 (D) none of these
14. **B,**

Comprehension Type

This section contains 2 Paragraph which has 4 Single choice questions each. Each question has four choices (A), (B), (C) and (D) out of which ONLY ONE option is correct.

Paragraph for Question 15 to 16

If α and β are the zeros of the quadratic polynomial $p(y) = 5y^2 - 7y + 1$

15. Find the value of $\alpha^2 + \beta^2 =$
(A) $-\frac{39}{25}$ (B) $\frac{29}{35}$ (C) $\frac{59}{25}$ (D) none of these
15. **D,**
16. Find the value of $\alpha^3 + \beta^3 =$
(A) $\frac{238}{125}$ (B) $-\frac{238}{125}$ (C) $\frac{159}{125}$ (D) none of these

16. A,

Paragraph for Question 17 to 18

The given equations are linear equations in two variable

$$kx - y = 2$$

$$6x - 2y = 3$$

17. Find the value of k for which the system of equation gives a unique solution

- (A) -2 (B) 2 (C) -3 (D) all of these

17. D,

18. Find the value of k for which the system of equation gives many solutions

- (A) 3 (B) 4 (C) 2 (D) no value of k

18. D,

PART - B

List Matching Type Questions

(19 - 20) contains 2 list Match sets (Each list – Match set one (01) Multiple Choice Question) which have only one correct answer. Each question carries + 3 marks for correct answer. 0 if no option is selected and – 1 mark for wrong answer.

19. Match the column I & column II.

Column I		Column II	
(A)	Decimal representation of an irrational number is always	(P)	irrational number
(B)	$\left(\sqrt{2} - \frac{1}{3}\right)^2$ is	(Q)	rational number
(C)	The decimal representation of 4/9	(R)	Non-repeating, non-terminating
(D)	22/7 is	(S)	Non-terminating

(A) A-r; B-p, r; C-s; D-q, s

(B) A-p; B-p, r; C-q; D-q, s

(C) A-s; B-p, r; C-s; D-p, q

(D) A-q; B-p, r; C-r; D-q, s

19. A,

20. Match the column I & column II.

Column I		Column II	
(A)	A zero of $f(x) = x^2 - 5x + 6$	(P)	$x = 2$
(B)	$\frac{x+1}{y+2} + \frac{x+3}{y+4} = \frac{9}{8}$, value of x, y can be	(Q)	$x = 3$
(C)	$\frac{6}{x} + \frac{4}{y} = 3$, $\frac{9}{x} + \frac{8}{y} = 5$, value of x, y is	(R)	$y = 4$
(D)	A zero of $f(x) = x^2 + x - 2$	(S)	$x = -2$

(A) A-s,q; B-s, r; C-q,r; D-p (B) A-p,q; B-p, r; C-q,r; D-s

(C) A-q,s; B-r, q; C-q,r; D-r (D) A-q; B-s, r; C-p; D-q

20. B,

PART – C
Numerical Based

This section contains 6 numerical based questions, the answer may be positive or negative or decimals (e.g. 6.25, 7.00, -0.33, -30, 30.27, -127.30) and each question carries + 3 marks for correct answer. There is not negative marking.

1. The least value of x for which $\frac{1}{1+\sqrt{x}}$, $\frac{1}{1-x}$, $\frac{1}{1-\sqrt{x}}$ are in A.P is, $x \in \mathbb{N}$
1. 2,
2. If $\langle a_n \rangle$ is the n^{th} term of A.P. and $a_1 + a_4 + a_7 + \dots + a_{16} = 147$, then $(a_1 + a_6 + a_{11} + a_{16})/14$ equals to
2. 7,
3. Find the value of k if one root of the equation $5x^2 + 13x + k = 0$ is reciprocal of the other.
3. 5
4. The product of first 2013 consecutive natural numbers is divisible by $k!$ where k is a maximum number then sum of the digit of k is :
4. 6,
5. The total number of real roots of the equation $(x-1)^2 + (x-2)^2 + (x-3)^2 + \dots + (x-2013)^2 = 0$ is _____.
5. 0,
6. The sum of three numbers in A.P. is -3 and their product is 8. Then the least number is
6. 4,