

**Important Instructions:-**

1. Immediately fill in the particulars on this page of the Test with Black/Blue Ball Point .
2. The test is of **70** minutes duration.
3. The Test consists of **65** questions.
4. The maximum marks are **210**.
5. There are three parts in the question paper I, II, III consisting of Quick Answer Types ,Logical and Analytical Reasoning and Aptitude respectively
6. **PART I** carries question of **2** marks.
7. **PART II** carries question of **4** marks.
8. **PART III** carries question of **4** marks.
9. Quick Answer Type questions will be applicable for 10 minutes.
10. Candidates will be awarded marks as stated above in instruction No. 6, 7, and 8 for correct response of each question.
11. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.
12. There is only one correct response for each question. Filling up more than one response in any question will be treated as wrong response
13. For writing particulars/markings responses on Side-1 and Side-2 of the Answer Sheet use only Black Ball Point Pen provided in the examination hall.
14. No candidate is allowed to carry any textual material, printed or written, bits of papers, pager, mobile phone, any electronic device, etc. except the Admit Card inside the examination room/ hall.
15. Rough work is to be done on the space provided for this purpose in the Test Booklet only. This space is given at the bottom of each page.
16. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator on duty in the Room/Hall.
17. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.
18. Do not fold or make any stray mark on the Answer Sheet.
19. **25% negative marking for incorrect questions.**

Name of the Candidate (in Capital letters ) : \_\_\_\_\_

Roll Number : in figures \_\_\_\_\_

: in words \_\_\_\_\_

Name of Examination Centre (in Capital letters) : \_\_\_\_\_

Candidate's Signature

1. Invigilator's Signature : \_\_\_\_\_

2. Invigilator's Signature : \_\_\_\_\_

**PART I**  
**QUICK ANSWERS TYPE**

- If  $\sqrt{18225} = 135$ , then the value of  $(\sqrt{182.25} + \sqrt{1.8225} + \sqrt{0.018225} + \sqrt{0.00018225})$  is?  
(A) 1.49985  
(B) 14,9985  
(C) 149,985  
(D) 1499,85
- What should come in place of both the question marks in the equation  $\frac{?}{\sqrt{128}} = \frac{\sqrt{162}}{?}$   
(A) 12  
(B) 14  
(C) 144  
(D) 196
- A battery of 6V is connected in series with resistors of 0.1 ohm, 0.15 ohm, 0.2 ohm, 0.25 ohm and 6 ohm. How much current would flow through the 0.15 ohm resistor?  
(A) 0.895A  
(B) 2.22A  
(C) 1A  
(D) None of these
- The current of a stream at 1 kmph. A motor boat goes 35 km upstream and back to the starting point in 12 hours. The speed of the motor boat in still water is?  
(A) 8 kmph  
(B) 6 kmph  
(C) 7.5 kmph  
(D) 5.5 kmph
- The part of the eyes that first refracts light entering the eye from external objects?  
(A) Lens  
(B) Cornea  
(C) Iris  
(D) Pupil
- A number when divided by 296 leaves 75 as remainder when the same number is divided by 37, the remainder will be?  
(A) 1  
(B) 3  
(C) 5  
(D) 2
- Silver article turns black when kept in the open for a few days due to formation of  
(A)  $H_2S$   
(B) AgS  
(C)  $AgSO_4$   
(D)  $Ag_2S$
- An element X on exposure to moist air turns reddish-brown and a new compound Y is formed. The substance X and Y are?  
(A) X = Fe, Y =  $Fe_2O_3$   
(B) X = Ag, Y =  $Ag_2S$   
(C) X = Cu, Y = CuO  
(D) X = Al, Y =  $Al_2O_3$
- At a game of billiards, A can give B 15 points in 60 and A can give C to 20 points in 60. How many points can B give C in a game of 90?  
(A) 30 points  
(B) 20 points  
(C) 10 points  
(D) 12 points
- A right triangle with sides 3 cm, 4 cm and 5 cm is rotated the side of 3 cm to form a cone. The volume of the cone so formed is?  
(A) 12 pi cub.cm  
(B) 15 pi cub.cm  
(C) 16 pi cub.cm  
(D) 20 pi cub.cm

11. The diagonal of a cube is  $6\sqrt{3}$  cm. Find its surface area?  
 (A) 216 sq.cm  
 (B) 316 sq.cm  
 (C) 416 sq.cm  
 (D) 516 sq.cm
12. Three taps A,B and C can fill a tank in 12,15 and 20 hours respectively. If A is open all the time and B ,C are open for one hour each alternatively, the tank will be full in:  
 (A) 6 hrs  
 (B)  $20/3$  hrs  
 (C) 7 hrs  
 (D)  $15/2$  hrs
13. Two pipes can fill a tank in 20 and 24 minutes respectively and a waste pipe can empty 3 gallons per minute. All the three pipes working together can fill the tank in 15 minutes. The capacity of the tank is:  
 (A) 60 gallons  
 (B) 100 gallons  
 (C) 120 gallons  
 (D) 180 gallons
14. What is formed when ethanol reacts with ethanoic acid on warming in the presence of a few drops of concentrated sulphuric acid?  
 (A) Ester  
 (B) Ethene  
 (C) Sodium Ethoxide  
 (D) Ethane
15. The compound interest on Rs. 30000 at 7% per annum is Rs. 4347. The period is?  
 (A) 2 years  
 (B) 2.5 years  
 (C) 3 years  
 (D) 4 years
16. A substance that donates a pair of electrons to form coordinate covalent bond is called?  
 (A) Lewis acid  
 (B) Lewis base  
 (C) Bronsted-Lowry acid  
 (D) Bronsted-Lowry base
17. If an object travels at five feet per second, how many feet does it travel in one hour?  
 (A) 30  
 (B) 3000  
 (C) 18  
 (D) 1800
18. Jack takes 20 minutes to jog around the race course one time, and 25 minutes to jog around a second time. What is his average speed in miles per hour for the whole jog if the course is 3 miles long?  
 (A) 6  
 (B) 8  
 (C) 9  
 (D) 10
19. Carbohydrates in the plants are stored in the form of  
 (A) Glycogen  
 (B) Starch  
 (C) Glucose  
 (D) Maltose
20. In a regular week, there are 5 working days and for each day, the working hours are 8. A man gets Rs. 2.40 per hour for regular work and Rs. 3.20 per hours for overtime. If he earns Rs. 432 in 4 weeks, then how many hours does he work for ?  
 (A) 160  
 (B) 175  
 (C) 180  
 (D) 195

**PART II**  
**APTITUDE**

21. Which one is a possible progeny in F2 generation of pure bread tall plant with round seed and short plant with wrinkled seeds?

- (A) Tall plant with round seeds
- (B) Tall plant with wrinkled seeds
- (C) Short plant with round seed
- (D) All of the above

22. The total of 324 of 20 paise and 25 paise make a sum of Rs. 71. The number of 20 paise coins is:

- (A) 50
- (B) 100
- (C) 150
- (D) 200

23. Fruits are formed from

- (A) Stamen
- (B) Stigma
- (C) Ovary
- (D) Ovule

24. 36 men can complete a piece of work in 18 days. In how many days will 27 men complete the same work?

- (A) 24 days
- (B) 28 days
- (C) 34 days
- (D) 35 days

25. If 2 tables and 3 chairs cost Rs. 3500 and 3 tables and 2 chairs cost Rs. 4000, then how much does a table cost ?

- (A) 500
- (B) 1000
- (C) 1500
- (D) 2000

26. Identify the rule and find the missing number in place of the question mark?

9	?	16
64	10	36
144	20	256

- (A) 20
- (B) 40
- (C) 5
- (D) 0

27. I have a horse. Do you know what color it is? Allan said, "I guess it is not black". Brian said, "It is either brown, or gray". Charlie said "I know it is brown". I said, "At least one of you is right and at least one of you is wrong." What is the color of my horse if the color is one of the above?

- (A) Brown
- (B) Black
- (C) Gray
- (D) None

28. The last day of a century cannot be?

- (A) Monday
- (B) Wednesday
- (C) Tuesday
- (D) Friday

29. A trader mixes 26 kg of rice at Rs. 20 per kg with 30 kg of rice of other variety at Rs. 36 per kg and sells the mixture at Rs. 30 per kg. His profit percent is?

- (A) No profit, no loss
- (B) 5%
- (C) 8%
- (D) 10%

30. The product of two numbers is 2028 and their H.C.F. is 13. The number of such pairs is?
- (A) 1  
(B) 2  
(C) 3  
(D) 4
31. A man spend 35% of his income on food, 25% on children's education and 80% of the remaining on house rent. What percent of his income he is left?
- (A) 6%  
(B) 8%  
(C) 10%  
(D) 12%
32. Moon : Satellite :: Earth : ?
- (A) Sun  
(B) Planet  
(C) Solar System  
(D) Asteroid
33. AFHO : GBDJ :: CHFM : ?
- (A) GBIM  
(B) GBLD  
(C) GPLD  
(D) IDBH
34. A mixture contains alcohol and water in the ratio 4:3. If 5 liters of water is added to the mixture, the ratio becomes 4 : 5. Find the quantity of alcohol in the given mixture?
- (A) 10  
(B) 12  
(C) 15  
(D) 18
35. The average of five consecutive odd numbers is 61. What is the difference between the highest and lowest numbers?
- (A) 4  
(B) 8  
(C) 12  
(D) 16
36. A shopkeeper cheats to the extent of 10% while buying and selling, by using false weights. His total gain is?
- (A) 20%  
(B) 21%  
(C) 22%  
(D) 23%
38. If ZEBRA can be written as 2652181, How can COBRA be written?
- (A) 302181  
(B) 3152181  
(C) 31822151  
(D) 1182153
39. In a certain code number 13479 is written as AQFJL and 2568 is written as DMPN. How is 396824 written in that code
- (A) QLPMNF  
(B) QLPNMF  
(C) QLPNMJ  
(D) QLPNDF
39. 405 sweets were distributed equally among children in such a way that the number of sweets received by each child is 20% of the total number of children. How many sweets did each child receive?
- (A) 9  
(B) 10  
(C) 11  
(D) 12
40. A paralleloogram has sides 30m and 14m and one of its diagonals is 40m long. Then its area is?
- (A) 136  
(B) 236  
(C) 336  
(D) 436

**PART III**  
**SUBJECT BASED**  
**MATH**

A wooden cube of length 5 units is painted on all faces and then cut in 85 smaller cubes of varying sizes. The sides of each of the smaller cubes are some integer number of units. All bigger cubes are carved out of the corners of the original cube. Answer the following questions:

41. How many cubes have no side painted?  
(A) 15  
(B) 17  
(C) 20  
(D) 27
42. How many cubes have exactly 2 sides painted?  
(A) 24  
(B) 27  
(C) 30  
(D) 36
43. There are 96 apples and 112 oranges. These fruits are packed in boxes in such a way that each box contains fruits of the same variety, and every box contains an equal number of fruits. Find the minimum number of boxes in which all the fruits can be packed?  
(A) 12  
(B) 13  
(C) 14  
(D) 15
44. If the roots of the equation  $2x^2 + 7x + 4 = 0$  are in the ratio  $p:q$ , then find the value of  $\sqrt{\frac{p}{q}} + \sqrt{\frac{q}{p}}$ .  
(A)  $\pm \frac{7}{\sqrt{7}}$   
(B)  $\pm 7\sqrt{2}$   
(C)  $\pm \frac{7\sqrt{2}}{16}$   
(D)  $\pm \frac{7\sqrt{2}}{4}$
45. Find the sum and the product of the roots of the quadratic equation  $-x^2 - \frac{25}{3}x + 25 = 0$ .  
(A)  $\frac{25}{3}, 25$   
(B)  $-\frac{25}{3}, 25$   
(C)  $\frac{25}{3}, -25$   
(D)  $-\frac{25}{3}, -25$
46. If the ordered pair  $(\sin \theta, \cos \theta)$  satisfies the system of equations  $mx + ny + a + b = a - b$  and  $nx + my + 2b = 0$ , then find the value of  $\theta$  where  $0 \leq \theta \leq 90^\circ$ . ( $m \neq n$ )  
(A)  $30^\circ$   
(B)  $45^\circ$   
(C)  $50^\circ$   
(D) Cannot be determined

47. If the HCF of the polynomials  $(x - 3)(3x^2 + 10x + b)$  and  $(3x - 2)(x^2 - 2x + a)$  is  $(x - 3)(3x - 2)$ , then the relation between  $a$  and  $b$  is \_\_\_\_\_.

- (A)  $3a + 8b = 0$
- (B)  $8a - 3b = 0$
- (C)  $8a + 3b = 0$
- (D)  $a - 2b = 0$

48. A mother said to her son, the sum of our present ages is twice my age 12 years ago and nine years hence, the sum of our ages will be thrice my age 14 years ago'. What is her son's present age? (in years)

- (A) 8
- (B) 12
- (C) 15
- (D) 10

49. If the mean of  $x$  and  $\frac{1}{x}$  is  $M$ , then mean of  $x^2$  and  $\frac{1}{x^2}$  is  $KM^2 - 1$ , then 'K' is equal to?

- (A) 1
- (B) 3
- (C) 4
- (D) 2

50. If  $\alpha, \beta, \gamma$  are zeroes of cubic polynomial  $x^3 + 5x - 2$ , then the value of  $\alpha^3 + \beta^3 + \gamma^3$  is?

- (A) 5
- (B) 4
- (C) 6
- (D) 3

## BIOLOGY

51. The products of light reaction during photosynthesis include?

- (A) ATP and NADPH
- (B)  $O_2$  and  $NADP^+$
- (C)  $O_2$  and  $H_2O$
- (D)  $NADP^+$  and  $H_2O$

52. A woman heterozygous for colour blindness marries a colorblind man. What will be the chances of the birth of a colour blind daughter?

- (A) 0.5
- (B) 0.25
- (C) 0.0625
- (D) 1

53. Two bottles were half filled with water from Ganga ('P') and Kaveri ('Q') and kept under identical airtight conditions for 5 days. The oxygen was determined to be 2% in bottle ('P') and 10% in bottle ('Q'). What could be the cause of this difference?

- (A) Ganga is more polluted than Kaveri
- (B) Both the rivers are equally polluted
- (C) Kaveri is more polluted than Ganga
- (D) Kaveri has more minerals than Ganga

54. Which one of the following hormones is produced by the pancreas?

- (A) Prolactin
- (B) Glucagon
- (C) Luteinizing hormone
- (D) Epinephrine

55. If you exhale multiple times into a conical flask containing lime water through a single inlet fixed through a stop cork, lime water will?

- (A) Become cooler
- (B) Turn milky
- (C) Remain unchanged
- (D) Turn yellow

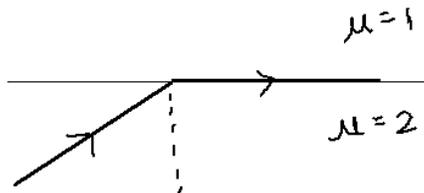
## CHEMISTRY

56. An organic liquid 'A' with acidified potassium dichromate gave product 'B' the compound 'B' on heating with methanol in presence of concentrated sulphuric acid formed compound 'C' which on subsequent treatment with sodium hydroxide formed two products 'D' and 'E'. The product 'D' is known to affect the optic nerve causing blindness. Intake of 'D' in very small quantities can cause death. What are compounds 'A', 'B', 'C', 'D' and 'E'?
- (A) A = Ethanol, B = Ethanoic acid, C = Methanol, D = Sodium acetate, E = Methyl ethanoate
- (B) A = Ethanol, B = Ethanoic acid, C = Methyl ethanoate, D = Methanol, E = Sodium acetate
- (C) A = Sodium acetate, B = Ethanoic acid, C = Methyl ethanoate, D = Methanol E = methanol
- (D) A = Ethanol, B = Ethanoic acid, C = Methyl ethanoate, D = Sodium acetate, E = methanol
57. The first ionisation enthalpies of Na, Mg, Al and Si are in the order:
- (A)  $\text{Na} < \text{Mg} > \text{Al} < \text{Si}$
- (B)  $\text{Na} > \text{Mg} > \text{Al} > \text{Si}$
- (C)  $\text{Na} < \text{Mg} < \text{Al} < \text{Si}$
- (D)  $\text{Na} > \text{Mg} > \text{Al} < \text{Si}$
58. Consider the elements A, B, C and D with atomic numbers 6,7,14 and 15, respectively. Which of the following statements are correct concerning these elements?
- i. D will lose electron more easily than C.
- ii. B will gain electron more easily than C.
- iii. The element with highest electronegativity is D.
- iv. The element with largest atomic size is C.
- (A) I and II
- (B) II and III
- (C) II and IV
- (D) III and IV
59. A hydrocarbon 'A' ( $\text{C}_3\text{H}_8$ ) on treatment with chlorine in presence of sunlight yielded compound 'B' as major product. Reaction of 'B' with aqueous KOH gave 'C' which on treatment with concentrated  $\text{H}_2\text{SO}_4$  yielded 'D', Hydrogenation of 'D' gave back 'A'. The sequence of reactions involved in above conversion is:
- (A) Substitution, Substitution Addition, Dehydration
- (B) Substitution, Substitution, Dehydration, Addition
- (C) Substitution, Dehydration, Addition, Addition
- (D) Addition, substitution, Dehydration, Substitution

60. An element X reacts with dilute  $\text{H}_2\text{SO}_4$  as well as with  $\text{NaOH}$  to produce salt and  $\text{H}_2(\text{g})$ . Hence, it may be concluded that? {M}
- X is an electropositive element.
  - oxide of X is basic in nature.
  - oxide of X is acidic in nature.
  - X is an electronegative element.
- (A) I,II,III  
 (B) IV,I,III  
 (C) III,IV,I  
 (D) II,III,IV

### PHYSICS

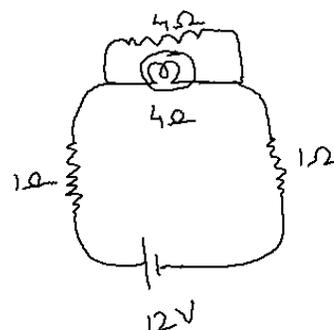
61. When a ray of light moves from medium of higher refractive to a lower refractive index, it bends away from the normal. More is the angle of incidence, more is the angle of refraction. When the angle of incidence becomes large enough, the angle of refraction becomes so huge that it bends back, or in fact, reflects back into the material. When a ray of light travelling from medium of refractive index 2 to vacuum is to be reflected back into the medium, from Snell's law, what is the minimum angle of incidence required? {



- (A)  $0^\circ$   
 (B)  $30^\circ$   
 (C)  $45^\circ$   
 (D)  $90^\circ$

62. What is the minimum number of identical prisms required to obtain back white light when a white beam of light is incident on the combination?
- (A) 1  
 (B) 2  
 (C) 3  
 (D) 4

63.



What is the power emitted in the bulb of resistance  $4\Omega$ ?

- (A) 9W  
 (B) 16W  
 (C) 24W  
 (D) 36W
64. The magnetic field inside a solenoid is same as that of?
- (A) Current carrying circular ring  
 (B) Current carrying straight wire  
 (C) Current carrying sheet  
 (D) Bar magnet
65. What should be the direction of magnetic field if an electron moving towards East is deflected upwards?
- (A) East  
 (B) West  
 (C) North  
 (D) South