FIITJEE INTERNAL TEST

Batch: NWCMUT426A1
PHASE TEST – 3
QP CODE: 100861

Time : 1:30 Hrs. Maximum Marks : 90

Scholastic Aptitude Test

Instructions

- The question paper consists of **90** multiple choice questions divided into four sections.
  Section – I contains **45** questions of **Mathematics.**
  Section – II contains **15** questions of **Physics.**
  Section – III contains **15** questions of **Chemistry.**
  Section – IV contains **15** questions of **Biology.**
- Each question carries **+1** marks.
- There is **No negative** marking.
- Attempt **All** questions.
- Use of Calculator is **NOT PERMITTED**.
- All symbols have their usual meanings, if not mentioned in the question.
- The Question Paper contains blank spaces for your rough work.
  No additional sheets will be provided for rough work.
- This booklet also contains **OMR** answer sheet.

Name of the Candidate **: ……..**

Enrollment Number **:……**

SECTION – I
MATHEMATICS

1. If $4^{44}+4^{44}+4^{44}+4^{44}=4^{x}$ then x is
   (A) 45 (B) 44
   (C) 176 (D) 11

2. If $\frac{2}{5}$ of 50% of x = 10 then find x
   (A) 100 (B) 50
   (C) 25 (D) 80

3. $0.12\overline{3}$ can be expressed in $\frac{P}{Q}$ as
   (A) $\frac{900}{111}$ (B) $\frac{111}{900}$
   (C) $\frac{123}{10}$ (D) $\frac{121}{900}$

4. Calculate the amount on Rs. 20000 at 5% per annum for 5 years under simple interest (in Rs.)
   (A) 5000 (B) 25000
   (C) 24000 (D) 20000

5. Find the value of x, if 80 : 60 = x : 12
   (A) 16 (B) 7
   (C) 24 (D) 50

6. If a : b = 4 : 5 and b : c = 2 : 3 then a : c =
   (A) 4 : 3 (B) 8 : 15
   (C) 8 : 9 (D) 5 : 3

7. The mean proportion of 27 and 3 is
   (A) 6 (B) 3
   (C) 9 (D) 27

8. If $\left(\frac{3}{7}\right)^{3x-7}=\left(\frac{7}{3}\right)^{7x-3}$, then x is equal to
   (A) 1 (B) 2
   (C) 4 (D) 3

Space For Rough Work

9. Which is the greatest among $(5)^{23}$, $(25)^{11}$, $(625)^{6}$ and $(3125)^{5}$?

(A) 5^{23} (B) $(25)^{11}$

(C) $(625)^{6}$ (D) $(3125)^{5}$

10. The two adjacent sides of a rectangle are $(5x^2 - 3y^2)$ and $(x^2 + 2xy)$. Find perimeter.

(A) $6x^2 - 3y^2 + 4xy$ (B) $12x^2 - 6y^2 + 4xy$

(C) $x^2 + y^2$ (D) $2x^2 + y^2 + 2xy$

11. $\dfrac{1}{3+\dfrac{8}{4+\dfrac{3}{5+\dfrac{1}{4}}}} = ?$

(A) $\frac{5}{21}$ (B) $\frac{4}{19}$

(C) $\frac{5}{19}$ (D) $\frac{4}{21}$

12. Degree of $8x^2 + 3xyz + 7$ is

(A) 2 (B) 3

(C) 4 (D) 1

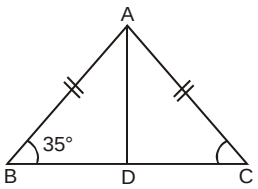
13. ABC is an isosceles triangle such that AB = AC and AD is the median to base BC. Then, $\angle BAC$ =

(A) 55°

(B) 70°

(C) 35°

(D) 110°



14. a : b = 4 : 9 and b : c = 3 : 5, find a : b : c.

(A) 4 : 9 : 15 (B) 4 : 9 : 10

(C) 4 : 9 : 25 (D) 4 : 9 : 20

15. The following marks were obtained by the students in a test:
81, 72, 90, 90, 86, 85, 92, 70, 71, 83, 89, 95, 85, 79, 62
The range of the marks is

(A) 9 (B) 17

(C) 27 (D) 33

Space For Rough Work

16. The equivalent fraction of $44\frac{4}{9}\%$ is

(A) $\frac{9}{11}$ (B) $\frac{4}{9}$

(C) $\frac{5}{9}$ (D) $\frac{5}{11}$

17. Write the reciprocal of $1\frac{2}{3}$.

(A) $\frac{2}{5}$ (B) $\frac{5}{3}$

(C) $\frac{1}{5}$ (D) $\frac{3}{5}$

18. The value of $\frac{3^0 \times 5^0 + 7^0 - 3^0}{6^0 - 2 \times 5^0 + 3 \times 3^0}$ is

(A) $\frac{1}{3}$ (B) $\frac{1}{4}$

(C) $\frac{1}{2}$ (D) 1

19. At a clearance sale, all goods are on sale at 45% discount. If I buy a skirt marked Rs. 600, how much would I need to pay?

(A) Rs. 330 (B) Rs. 220

(C) Rs. 210 (D) Rs. 510

20. Which of the following is recurring decimal?

(A) $\frac{1}{3}$ (B) $\frac{1}{2}$

(C) $\frac{1}{5}$ (D) $\frac{3}{2}$

21. If $x + \frac{1}{x} = 5$, then $x^2 + \frac{1}{x^2} = ?$

(A) 20 (B) 21

(C) 22 (D) 23

Space For Rough Work

22. The multiple inverse of $(a+2)+\frac{1}{(a-2)}$ is

(A) $\frac{a-2}{a^2-3}$ (B) $\frac{a+2}{a^2-3}$

(C) $\frac{a-2}{a^2+3}$ (D) $\frac{a+2}{a^2+3}$

23. Evaluate: $a^3b^2-ab^2+2$ when $a=-3, b=1$.

(A) 23 (B) 34

(C) –34 (D) –22

24. If sum of six consecutive odd numbers is 168, then find the largest of these numbers.

(A) 23 (B) 27

(C) 31 (D) 33

25. Simplify : $\left(\frac{256}{81}\right)^{\frac{5}{4}}$

(A) $\frac{1024}{243}$ (B) $\frac{512}{162}$

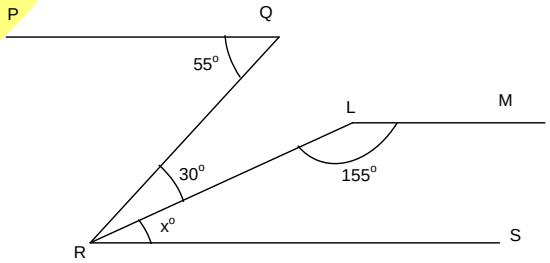
(C) $\frac{1024}{729}$ (D) $\frac{512}{729}$

26. If $\frac{a}{3}=\frac{b}{4}=\frac{c}{7}$, then the value of $\frac{a+b+c}{c}$ is

(A) 3 (B) $\sqrt{2}$

(C) 2 (D) 7

27. In the figure, $PQ \parallel LM \parallel RS$. Find the value of $\angle LRS$.



(A) 30^o (B) 25^o

(C) 35^o (D) 40^o

28. If $2^{3y-x}=16$ and $2^{2y+x}=2048$, then the value of y is

(A) 5 (B) 8

(C) 6 (D) 3

Space For Rough Work

29. Two supplementary angles differ by 48^o. Find the angles?
(A) $76^o, 104^o$ (B) $56^o, 124^o$
(C) $66^o, 114^o$ (D) $48^o, 132^o$

30. If $3x = 5y = 4z$ then $x : y : z$ is equals to:
(A) 9 : 12 : 16 (B) 20 : 12 : 15
(C) 15 : 10 : 9 (D) 8 : 5 : 3

31. Shyam deposited in a bank Rs. 7500 for 6 months at the rate of 8% interest compounded quarterly. Find the amount he received after 6 months.
(A) Rs. 7803 (B) Rs. 8803
(C) Rs. 6083 (D) Rs. 5083

32. What is the mean of first three 3 – digit numbers.
(A) 102 (B) 555
(C) 101 (D) 333

33. Find the value of $\frac{x^5}{125} + \frac{x^3}{25} - \frac{x^2}{5}$ at $x = 5$.
(A) 5 (B) 25
(C) 15 (D) 30

34. Value of $4\frac{1}{2} \times 4\frac{1}{3} - 8\frac{1}{3} \div 5\frac{2}{3}$ is
(A) $\frac{7}{17}$ (B) $1\frac{33}{34}$
(C) 8 (D) $18\frac{1}{34}$

35. After taking 3.547 out from 7.2 we get
(A) 3.653 (B) 3.453
(C) 3.773 (D) 2.983

36. Find the mean of data: $2x, 3 + x, -x + 9, 2x$
(A) $x + 1$ (B) $x + 2$
(C) $x + 3$ (D) $x + 4$

Space For Rough Work

37. The mean of 50 observations was 36. It was found later that an observation 48 was wrongly taken as 23. The corrected new mean is equal to
(A) 35.2 (B) 36.1
(C) 36.5 (D) 39.1

38. If $\sqrt{3^n} = 81$. Then, n is equal to
(A) 2 (B) 4
(C) 6 (D) 8

39. The present age of A is 4 years less than twice the present age of B. B's present age is 6 years more than twice his age 15 years ago. Find the difference of their ages.
(A) 30 years (B) 32 years
(C) 20 years (D) 22 years

40. $\left(\frac{1}{64}\right)^0 + (64)^{\frac{-1}{2}} + (32)^{\frac{4}{5}} - (32)^{\frac{-4}{5}}$ is equal to
(A) $16\frac{1}{8}$ (B) $17\frac{1}{8}$
(C) $17\frac{1}{16}$ (D) $-17\frac{1}{16}$

41. In a two – digit number, the tens digit is twice the units digit. If the sum of its digit is 9. Find the number.
(A) 63 (B) 84
(C) 72 (D) 36

42. $4^{3.5} : 2^5$ is the same as
(A) $4:1$ (B) $2:1$
(C) $7:5$ (D) $7:10$

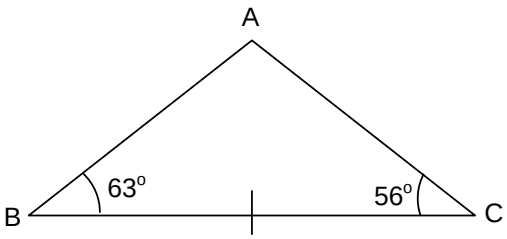
Space For Rough Work

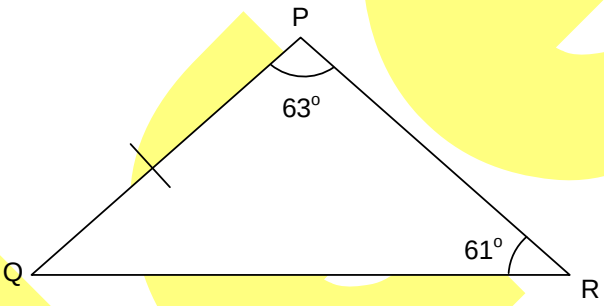
43. The denominator of a fraction is 2 more than its numerator. If 2 is added to both numerator and denominator, then we get $\frac{3}{5}$. The required fraction is _____

(A) $\frac{1}{3}$ (B) $\frac{5}{7}$

(C) $\frac{7}{9}$ (D) $\frac{9}{11}$

44. In ΔABC and ΔPQR, if BC= PQ, then name the two triangles which are congruent to each other.





(A) $\Delta BCA \cong \Delta PQR$ (B) $\Delta ACB \cong \Delta PQR$

(C) $\Delta BCA \cong \Delta RQP$ (D) $\Delta BCA \cong \Delta QPR$

45. If seven times a number is added to one – fifth of itself, then five – sixth of the sum is equal to 30. Find the number.

(A) 5 (B) 6

(C) 15 (D) 10

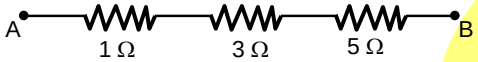
Space For Rough Work

SECTION – II
PHYSICS

1. The potential difference across a resistor of 20 Ω is 4 V. Find the current flowing through the resistor.
   (A) 0.2 A (B) 5 A
   (C) 80 A (D) None of these

2. The average human body temperature is 98.6°F. What is the equivalent temperature on the Celsius scale?
   (A) 22.8°C (B) 37°C
   (C) 51.2°C (D) 209.48°C

3. What is the equivalent resistance between the points A & B in the given circuit?



   (A) $\frac{15}{23}\Omega$ (B) $\frac{23}{15}\Omega$
   (C) 1 Ω (D) 9 Ω

4. Identify ohm's law equations;
   (A) $V = \frac{I}{R}$ (B) $V = IR$
   (C) $R = IV$ (D) None of these

5. If 50 C of charge flows through a point in an electric circuit in 10 s, what is the current passing through that point?
   (A) 0.2 A (B) 5 A
   (C) 60 A (D) 500 A

6. Heat transfer in gases takes place by the method:
   (A) Conduction (B) Convection
   (C) Radiation (D) None of these

7. Find the equivalent resistance of a circuit having two resistors each of 20 Ω, connected in parallel to each other.
   (A) 40 Ω (B) 20 Ω
   (C) 400 Ω (D) 10 Ω

8. The filament of an electric bulb is made of
   (A) Copper (B) Tungsten
   (C) Silver (D) Iron

Space For Rough Work

9. The blowing of wind is due to the
(A) Even heating of earth's surface by the sun.
(B) Uneven heating of earth's surface by the sun.
(C) Evaporation.
(D) Radiation.

10. Unit of electric charge is
(A) Coulomb (B) Ampere
(C) Volt (D) None of these

11. emf of a cell stands for
(A) electronic mass formula (B) electro-motive force
(C) electronic mass frequency (D) electro-magnetic formula

12. A car moving along a straight line at 20 m/s undergoes an acceleration of 1.5 m/s^2. After four seconds its speed will be
(A) 7 m/s (B) 13 m/s (C) 26 m/s (D) 14 m/s

13. On increasing the magnitude of electric current in a conductor, the strength of magnetic field
(A) increases (B) decreases
(C) remains same (D) depends on direction of electric current.

14. An electric kettle use _____ effect of electric current.
(A) heating (B) magnetic
(C) chemical (D) Doppler's

15. An ammeter is used to measure
(A) resistance (B) current
(C) voltage (D) none of these

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SECTION – III
CHEMISTRY

1. Which of the following is correct formula for Magnesium sulphate.
   (A) Mg_2SO_4 (B) $MgSO_4$
   (C) $Mg(SO_4)_2$ (D) $Mg(SO_4)_3$

2. Ions are formed by _____electrons
   (A) losing (B) gaining
   (C) either A or B (D) both A & B

3. Corrosion is an example of _____change.
   (A) physical (B) chemical
   (C) fast (D) reversible

4. Galvanization is an example of _____change.
   (A) physical (B) chemical
   (C) slow (D) none of these

5. Which statement is not correct?
   (A) Adding manure is good for crops
   (B) Growing the same type of crop on the same land is good for the soil
   (C) Mixed cropping is good for soil
   (D) None

6. Red soil is red in colour due to presence of
   (A) Humus (B) Nitrogen
   (C) Iron oxide (D) Clay

7. The acid present in ant sting is
   (A) formic acid (B) acetic acid
   (C) oxalic acid (D) sulphuric acid

8 Where do terracing help the most soil conservation?
   (A) hill regions (B) wet areas
   (C) deserts (D) plains

9. Read the following statements with reference to soil.
   (i) Weathering is a very fast process of soil formation,
   (ii) Percolation of water is faster in sandy soils.
   (iii) Loamy soil contains only sand and clay.
   (iv) Topsoil contains the maximum amount of humus.
   (v) Choose the correct statements from the above.
   (A) (ii) and (iv) (B) (i) and (iii)
   (C) (ii) and (iii) (D) (i) and (ii)

Space For Rough Work

10. Functions of soil are
(A) it is a medium for plant growth (B) it is a means of water storage
(C) it is a modifier of earth's atmosphere (D) all of the above

11. The soil which is formed from basaltic rock is:
(A) Khadar soil (B) Desert soil
(C) Laterite soil (D) Regar soil

12. Soil erosion can be prevented by:
(A) Afforestation
(B) Deforestation
(C) Over-grazing
(D) Destruction of embankments along the river banks

13. The amount of water that the soil can retain is called:
(A) Soil capacity (B) Field capacity
(C) Water capacity (D) Pore capacity

14. The mountain soil contains _____ in its lower part:
(A) Magnesium sulphate (B) Sodium chloride
(C) Calcium carbonate (D) Potassium sulphate

15. This type of soil dries out quickly after a rainstorm:
(A) Clay (B) Loam
(C) Sand (D) None of these

Space For Rough Work

SECTION – IV
BIOLOGY

1. Semilunar valves are found between
(A) left ventricle and aorta (B) right ventricle and pulmonary artery
(C) left ventricle and pulmonary artery (D) Both (A) and (B)

2. Bicuspid valves are present between
(A) left atria and aorta (B) right atria and pulmonary artery
(C) left atria and left ventricle (D) right atria and right ventricle

3. Which of the following is the functional unit of kidney?
(A) Hilum (B) Neurons
(C) Nephrons (D) Medulla

4. The arteries have thick elastic walls because
(A) rapid blood flows at high pressure (B) slow blood flows at low pressure
(C) rapid blood flows at low pressure (D) slow blood flows at high pressure

5. The urine from kidneys passes to the urinary bladder through
(A) Ureter (B) Urinary tubules
(C) Urethra (D) Fallopian tube

6. What is the male reproductive part of a plant called?
(A) Pores (B) Pistil
(C) Stamen (D) Fusion

7. In which organisms does reproduction through spore formation occur?
(A) Fern (B) Algae
(C) Plasmodium (D) Yeast

8. The tiny air sacs in the lungs where the exchange of gases takes place are called:
(A) Bronchi (B) Alveoli
(C) Bronchioles (D) Trachea

9. Which mineral is essential for healthy red blood cells and a deficiency might cause anemia?
(A) Iodine (B) Chromium
(C) Iron (D) Magnesium

10. Which of the following is not a part of the circulatory system?
(A) Heart (B) Lungs
(C) Blood (D) Blood vessels

11. Which of the following statement is/are true for sexual reproduction in plants?
(i) Plants are obtained from seeds
(ii) Two plants are always essential
(iii) Fertilization can occur only after pollination
(iv) Only insects are agents of pollination
Choose from the options given below:
(A) (i) and (iii) (B) (i) only
(C) (ii) and (iii) (D) (i) and (iv)

12. Pollen grain refers to the
(A) transfer of pollen from anther to ovary
(B) transfer of male gametes from anther to stigma
(C) transfer of pollen from anther to stigma
(D) transfer of pollen from anther to ovule

13. Which of the following parts of a plant take part in sexual reproduction?
(i) Flower (ii) Seed
(iii) Fruit (iv) Branch
Choose the correct answer from below.
(A) (i) and (iv) (B) (i), (ii) and (iii)
(C) (iii) and (iv) (D) (ii), (iii) and (iv)

14. Lily observed that a pond with clear water was covered up with a green algae within a week. By which method of reproduction did the algae spread so rapidly?
(A) Budding (B) Sexual reproduction
(C) Fragmentation (D) Pollination

15. Seeds of drumstick and maple are carried to long distances by wind because they possess
(A) winged seeds (B) large and hairy seeds
(C) long and ridged fruits (D) spiny seeds

Space For Rough Work

FIITJEE INTERNAL TEST

Batch: NWCMUT426A1
PHASE – 3
QP CODE: 100861

Scholastic Aptitude Test

Answers

SECTION – I
MATHEMATICS

1.	A	2.	B	3.	B	4.	B
5.	A	6.	B	7.	C	8.	A
9.	D	10.	B	11.	B	12.	B
13.	D	14.	A	15.	D	16.	B
17.	D	18.	C	19.	A	20.	A
21.	D	22.	A	23.	D	24.	D
25.	A	26.	C	27.	B	28.	D
29.	C	30.	B	31.	A	32.	C
33.	B	34.	D	35.	A	36.	C
37.	C	38.	D	39.	C	40.	C
41.	A	42.	A	43.	A	44.	A
45.	A						

SECTION – II
PHYSICS

1.	A	2.	B	3.	D	4.	B
5.	B	6.	B	7.	D	8.	B
9.	B	10.	A	11.	B	12.	C
13.	A	14.	A	15.	B		

SECTION – III
CHEMISTRY

1.	B	2.	D	3.	B	4.	A
5.	B	6.	C	7.	A	8.	A
9.	A	10.	D	11.	D	12.	A
13.	B	14.	C	15.	C		

SECTION – IV
BIOLOGY

1.	D	2.	C	3.	C	4.	A
5.	A	6.	C	7.	A	8.	B
9.	C	10.	B	11.	A	12.	C
13.	B	14.	C	15.	A		

Answers & Solutions

SECTION – I

MATHEMATICS

1. A

Sol. $4 \times 4^{44} = 4^x$

$4^{45} = 4^x$

$\therefore x = 45$

2. B

Sol. $\frac{2}{5}$ of 50% of x = 10

$\Rightarrow \frac{2}{5} \times \frac{50}{100} \times x = 10$

$\Rightarrow x = \frac{10 \times 100 \times 5}{2 \times 50} = 50$

3. B

Sol. x = 0.1233.....

$100x = 12.33....$

$1000x = 123.33.....$

$900x = 111$

$x = \frac{111}{900}$

4. B

Sol. P = Rs. 20000

R = 5% p.a.

T = 5 years

$\therefore SI = \frac{P \times R \times T}{100} = \frac{20000 \times 5 \times 5}{100}$

$\therefore A = P + SI = 20000 + 5000 = Rs.\ 25000$

5. A

Sol. $\frac{80}{60} = \frac{x}{12}$

$\Rightarrow x = \frac{80 \times 12}{60} = 16$

6. B

Sol. $a : b = 4 : 5 = 8 : 10$

$b : c = 2 : 3 = 10 : 15$

$\therefore a : b : c = 8 : 10 : 15$

$\therefore a : c = 8 : 15$

7. C

Sol. $\frac{27}{x} = \frac{x}{3}$ (where x is mean proportion)

$\Rightarrow x = 9$

8. A

Sol. $\left(\frac{3}{7}\right)^{3x-7} = \left(\frac{7}{3}\right)^{7x-3} = \left(\frac{3}{7}\right)^{3-7x}$

$\Rightarrow 3x-7=3-7x$
$\Rightarrow 10x=10$
$\Rightarrow x=1$

9. D

Sol. $5^{23}=5^{23}$

$(25)^{11}=\left(5^2\right)^{11}=5^{22}$

$(625)^6=\left(5^4\right)^6=5^{24}$

$(3125)^5=\left(5^5\right)^5=5^{25}$

Clearly $(3125)^5$ is greatest

10. B

Sol. Perimeter $=2(a+b)$

$=2\left[5x^2-3y^2+x^2+2xy\right]$

$=2\left[6x^2-3y^2+2xy\right]$

$=12x^2-6y^2+4xy$

11. B

Sol. $\dfrac{1}{3+\dfrac{8}{4+\dfrac{3}{\dfrac{21}{4}}}}=\dfrac{1}{3+\dfrac{8}{4+\dfrac{4}{7}}}=\dfrac{1}{3+\dfrac{8}{\dfrac{32}{7}}}$

$=\dfrac{1}{3+\dfrac{7}{4}}=\dfrac{1}{\dfrac{19}{4}}=\dfrac{4}{19}$

12. B

Sol. Clearly 3

13. D

Sol. By SAS

$\angle ABD = \angle ACD = 35°$

From ΔABC

$35° + 35° + \angle BAC = 180°$

$\therefore \angle BAC = 110°$

14. A

Sol. a : b = 4 : 9

b : c = 3 : 5 = 9 : 15

$\therefore$ a : b : c = 4 : 9 : 15

15. D

Sol. Range = 95 – 62 = 33

16. B

Sol. $44\dfrac{4}{9}\%=\dfrac{400}{900}=\dfrac{4}{9}$

17. D

Sol. $1\frac{2}{3}=\frac{5}{3}$

$\therefore$ reciprocal of $\frac{5}{3}$ is $\frac{3}{5}$

18. C

Sol. $\frac{1\times1+1-1}{1-2\times1+3\times1}=\frac{1}{1-2+3}=\frac{1}{2}$

19. A

Sol. M.P. = Rs. 600, Discount = 45%

Discount = 45% of Rs. 600

$=\left(\text{Rs}\frac{45}{100}\times600\right)=\text{Rs.}270$

S.P. = M.P. – Discount

S.P. = Rs. 600 – Rs. 270 = Rs. 330,

Thus, the amount I need to pay is Rs. 330.

20. A

Sol. $\frac{1}{3}=0.\bar{3}$

$\frac{1}{2}=0.5$

$\frac{1}{5}=0.2$

$\frac{3}{2}=1.5$

So $\frac{1}{3}$ is a recurring decimals.

21. D

Sol. $\left(x+\frac{1}{x}\right)^2=x^2+\frac{1}{x^2}+2$

$25=x^2+\frac{1}{x^2}+2$

$x^2+\frac{1}{x^2}=23$

22. A

Sol. $(a+2)+\frac{1}{(a-2)}=\frac{a^2-4+1}{a-2}=\frac{a^2-3}{a-2}$

Multiplicative inverse of $\frac{a^2-3}{a-2}$ is $\frac{a-2}{a^2-3}$

23. D

Sol. $a^3b^2-ab^2+2$

$(-3)^3\times(1)^2-(-3)\times(1)^2+2$

$-27+3+2=-22$

24. D

Sol. Let the odd number be $(2x-5),(2x-3),(2x-1),(2x+1),(2x+3)\&(2x+5)$

Then, $1(2x-5)+(2x-3)+(2x-1)+(2x+1)+(2x+3)+(2x+5)=168$

$\Rightarrow 12x=168 \Rightarrow x=14$

$\therefore$ Largest is $2x+5=28+5=33$

25. A

Sol. $\left(\frac{256}{81}\right)^{\frac{5}{4}}=\left(\frac{4^4}{3^4}\right)^{\frac{5}{4}}=\left\{\left(\frac{4}{3}\right)^4\right\}^{\frac{5}{4}}=\left(\frac{4}{3}\right)^5=\frac{1024}{243}$

26. C

Sol. $\frac{a}{3}=\frac{b}{4}=\frac{c}{7}=k$

$a=3k,\ b=4k,\ c=7k$

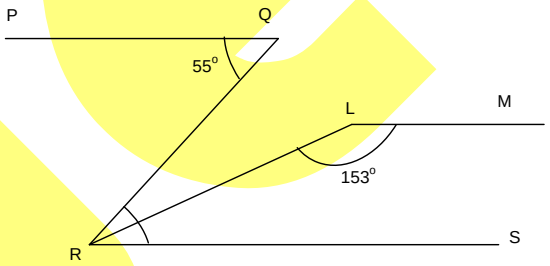
$\frac{a+b+c}{c}=\frac{3k+4k+7k}{7k}=\frac{14k}{7k}=2$

27. B

Sol. $\angle PQR=\angle QRS$

$55^o=\angle QRS \Rightarrow 55^o=\angle QRL+\angle LRS$

$55^o=30^o+\angle LRS \Rightarrow \angle LRS=25^o$



28. D

Sol. $2^{3y-x}=2^4$

On comparing

$3y-x=4$ .....(i)

$2^{2y+x}=2^{11}$

$\therefore 2y+x=11$ .....(ii)

$5y=15$

$\therefore y=3$

29. C

Sol. Given : Two supplementary angles differ by 48^o.

Consider a^o be one angle then its supplementary angle will be equal to $(180-a)^o$

According to the question,

$(180-a)-x=48$

$(180-48)=2a$

$132=2a$

$\frac{132}{2}=a$

Or $a=66^o$

Therefore, $180-a=114^o$

Hence, the two angles are 66^o and 114^o.

30. B

Sol. $3x=5y=4z$

Dividing by LCM of 3, 4, 5 i.e. 60.

$\Rightarrow \frac{3x}{60}=\frac{5y}{60}=\frac{4z}{60}$

$\Rightarrow \frac{x}{20}=\frac{y}{12}=\frac{z}{15}$

$\Rightarrow x:y:z=20:12:15$

31. A

Sol. Here, P = Rs. 7500, Rs= 8% per annum and n = 6 month = $\frac{6}{12}$ years $=\frac{1}{2}$ years.

Amount after 6 months

$=P\left(1+\frac{R}{400}\right)^{4n}$

$=\text{Rs.}7500\times\left(1+\frac{8}{400}\right)^{4\times\frac{1}{2}}$

$=\text{Rs.}7500\times\left(1+\frac{1}{50}\right)^{2}$

$=\text{Rs. }7500\times\left(\frac{51}{50}\right)^{2}$

$=\text{Rs. }7500\times\frac{51}{50}\times\frac{51}{50}$

= Rs. 7803

32. C

Sol. First three 3 – digit numbers are 100, 101, 102

Mean $=\frac{100+101+102}{3}=101$

33. B

Sol. $\frac{x^5}{125}+\frac{x^3}{25}-\frac{x^2}{5}$

$=\frac{5^5}{125}+\frac{5^3}{25}-\frac{5^2}{5}$

$=\frac{25\times25\times5}{125}+\frac{125}{25}-\frac{25}{5}$

$=\frac{625\times5}{125}+5-5$

$=25+5-5=25.$

34. D

Sol. $\frac{9}{2}\times\frac{13}{3}-\frac{25}{3}\div\frac{17}{3}$

$\Rightarrow\frac{9}{2}\times\frac{13}{3}-\frac{25}{3}\times\frac{3}{17}$

$\Rightarrow\frac{117}{6}-\frac{25}{17}=\frac{1989-150}{102}=\frac{1839}{102}=\frac{613}{34}$

$=18\frac{1}{34}$

35. A

Sol. $7.2 - 3.547 = ?$

$$\begin{array}{r} 7.200 \\ -\ 3.547 \\ \hline 3.653 \end{array}$$

36. C

Sol. $\text{Mean} = \dfrac{2x+3+x-x+9+2x}{4}$

$= \dfrac{4x+12}{4} \Rightarrow x+3$

37. C

Sol. Sum of all observations $= 50 \times 36 = 1800$

Correct sum = 1800 – 23 + 48 = 1825

Corrected new mean $= \dfrac{1825}{50} = 36.5$.

38. D

Sol. $\sqrt{3^n} = 81 \Rightarrow 3^{n/2} = 3^4 \Rightarrow \dfrac{n}{2} = 4 \Rightarrow n = 8$

39. C

Sol. Let the present age of B be x years.

$\Rightarrow$ Present age of A is $2x-4$ years.

$x = 2(x-15)+6$

$x = 2x-30+6$

$24 = x$

$\therefore$ A's present age $= 2 \times 24 - 4 = 48 - 4 = 44$ years

$\therefore$ Difference between their ages = 44 – 24 = 20 years

40. C

Sol. Given expression $= 1 + \left(8^2\right)^{\frac{1}{2}} + \left(2^5\right)^{\frac{4}{5}} - \left(2^5\right)^{-\frac{4}{5}}$

$= 1 + 8^{-1} + 2^4 - 2^{-4}$

$= 1 + \dfrac{1}{8} + 16 - \dfrac{1}{16} = \dfrac{16+2+256-1}{16}$

$= \dfrac{273}{16} = 17\dfrac{1}{16}$

41. A

Sol. Let the number be ab.

$a = 2b$ (given) $\rightarrow (1)$

$a + b = 9$ (given) $\rightarrow (2)$

$\Rightarrow$ From equation (1) and (2), we get $3b = 9$

$\Rightarrow b = 3$

$a = 6$

$\Rightarrow$ The number is 63.

42. A

Sol. $4^{3.5}:2^5=\left(2^2\right)^{3.5}:2^5=2^7:2^5$

$=\frac{2^7}{2^5}:1=2^{7-5}:1=2^2:1=4:1$

43. A

Sol. Let fraction be $\frac{x}{x+2}$

$\therefore \frac{x+2}{x+4}=\frac{3}{5}$

$\Rightarrow 5x+10=3x+12$

$\Rightarrow 5x-3x=12-10$

$\Rightarrow 2x=2$

$\Rightarrow x=1$

$\therefore$ Required fraction $=\frac{x}{x+2}=\frac{1}{1+2}=\frac{1}{3}$

44. A

Sol. In ΔBCA and ΔPQR

$\angle ABC=\angle RPQ=63^o$

BC = PQ (given)

and $\angle BAC=\angle PRQ$ (given)

$\therefore$ By ASA criteria [$\because$ In ΔPQR, $\angle Q=180^o-\left(63^o+61^o\right)=56^o$]

$\Delta BCA\cong\Delta PQR$

45. A

Sol. Let the number be x.

According to the problem,

$\frac{5}{6}\left(7x+\frac{x}{5}\right)=30$

$\Rightarrow \frac{5}{6}\left(\frac{35+x}{5}\right)=30$

$\Rightarrow 6x=30$

$x=5$

SECTION – II
PHYSICS

1. A

Sol. $I = \frac{V}{R} = \frac{4}{20} = 0.2\ A$

2. B

Sol. $\frac{98.6 - 32}{180} = \frac{C}{100} = 37°C$

3. D

Sol. $R_S = 1 + 3 + 5 = 9\ \Omega$

4. B

Sol. Ohm's law is V = IR

5. B

Sol. $I = \frac{Q}{t} = \frac{50}{10} = 5\,A$

6. B

Sol. In gases, heat transfer takes place by convection.

7. D

Sol. $R_P = \frac{20}{2} = 10\,\Omega$

8. B

Sol. Tungsten has very high melting point, so it is used to make filament of an electric bulb.

9. B

Sol. Due to uneven heating, blowing of wind happens.

10. A

Sol. Q = It = Coulomb or Ampere-second.

11. B

Sol. emf is electromotive force.

12. C

Sol. v = u + at
= 20 + 1.5 × 4 = 26 m/s

13. A

Sol. Magnetic field is proportional to current in conductor.

14. A

Sol. Electric kettle is based on heating effect of current.

15. B

Sol. Ammeter is used to measure current.

SECTION – III
CHEMISTRY

1. B
Sol. Magnesium sulphate is $MgSO_4$

2. D
Sol. Ions are formed by losing or gaining of electrons.

3. B
Sol. Corrosion is an example of chemical change.

4. A
Sol. Galvanization is an example of physical change.

5. B
Sol. Growing the same type of crop on the same land is not good for the soil.

6. C
Sol. Red soil is red in colour due to presence of Iron oxide.

7. A
Sol. The acid present in ant sting is formic acid.

8. A
Sol. A terrace is levelled section of hilly cultivated area. Owing to its unique structure it prevents the rapid surface run-off of water.

9. A
Sol. Statements (ii) and (Iv) are correct with reference to soil while (i) weathering is a slow process of soil formation and (iii) loamy soil consists of sand, clay and silt along with humus.

10. D
Sol. Soil is a medium for plant growth, it is a means of water storage & it is a modifier of earth's atmosphere.

11. D
Sol. The soil which is formed from basaltic rock is Regar soil.

12. A
Sol. Removal of vegetation also leads to exposure of soil layer leading to soil erosion.

13. B
Sol. Field capacity is the amount of soil moisture or water content held in soil

14. C
Sol. The mountain soil contains calcium carbonate in its lower part.

15. C
Sol. The soil which has less water content retaining property in their grains leading it to dry up easily is a Sandy Soil

SECTION – IV
BIOLOGY

1. D
Sol. Semilunar valves are found between left ventricle and aorta and right ventricle and pulmonary artery.

2. C
Sol. Bicuspid valves are present between left atria and left ventricle.

3. C
Sol. Nephrons is the functional unit of the kidney.

4. A
Sol. The arteries have thick elastic walls because rapid blood flows at high pressure.

5. A
Sol. The urine from kidneys passes to the urinary bladder through ureter.

6. C
Sol. Stamen is the male reproductive part of a plant.

7. A
Sol. Spore formation occur through fern.

8. B
Sol. The tiny air sacs in the lungs where the exchange of gases takes place are called alveoli.

9. C
Sol. Iron is essential for healthy red blood cells and a deficiency might cause anemia.

10. B
Sol. Lungs are not the part of the circulatory system.

11. A
Sol. The true statement for sexual reproduction in plants is:
- Plants are obtained from seeds
- Fertilization can occur only after pollination

12. C
Sol. Pollen grain refers to transfer of pollen from anther to stigma.

13. B
Sol. Flower, seed and fruit are the sexual reproduction parts of a plant.

14. C
Sol. Lily observed that a pond with clear water was covered up with a green algae within a week. The algae spread so rapidly through fragmentation.

15. A
Sol. Seeds of drumstick and maple are carried to long distances by wind because they possess winged seeds.