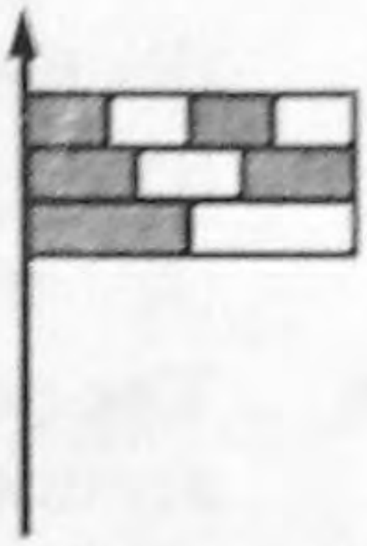
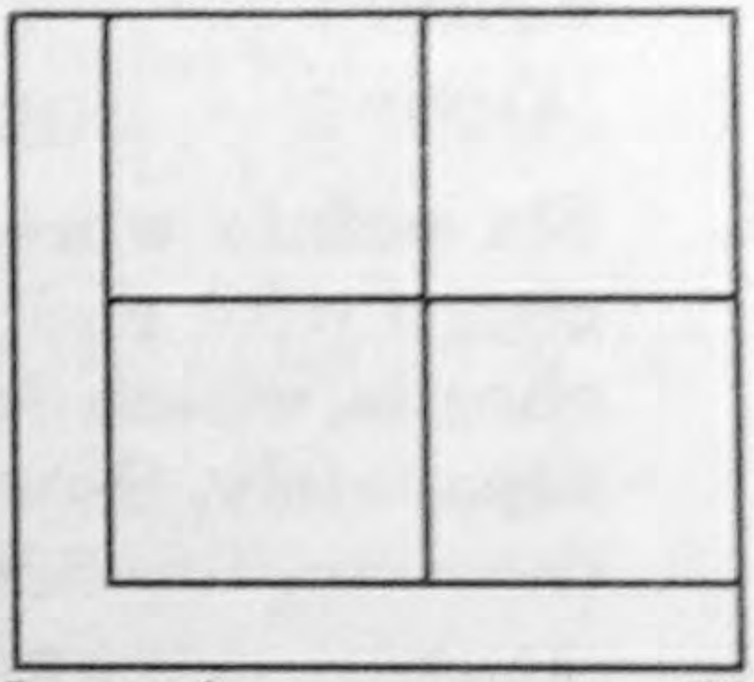
1. **A flag consists of three stripes of equal width, which are divided into two, three and four equal parts, respectively. What fraction of the flag's area is shaded ?**



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

(C) $\frac{4}{7}$ (D) $\frac{5}{9}$

2. **A square of area 125cm² was divided into five parts of equal areas – four squares and one L-shaped figure as shown in the figure. Find the length of the shortest side of the L-shaped figure.**



(A) $5(\sqrt{5}-2)$ cm

(B) $3(\sqrt{5}-1)$ cm

(C) $2(\sqrt{5}-2)$ cm

(D) 1 cm

3. **Numbers a,b,c,d and e form an arithmetic sequence. If b = 5.5 and e=10, then what is the value of 'a'?**

(A) 0.5 (B) 3 (C) 4 (D) 4.5

4. **If $4^x = 9$ and $9^y = 256$, then xy is equal to :**

(A) 48 (B) 36 (C) 10 (D) 4

5. **Let us consider a set of 16 different positive integers with their mean equal to 16. The greatest number that can be in this set is :**

(A) 256 (B) 136 (C) 32 (D) 24

6. **For which of the following numbers is the value of the expression $\frac{x^2}{x^3}$ the smallest ?**

(A) 100 (B) 1 (C) –1 (D) –2

7. **A uniform $3\times3\times3$ cube weighs 810 g. Three holes, each measuring $1\times1\times3$, have been drilled in the cube as shown. How much does the remainder of the cube weigh ?**

(A) 660 g

(B) 600 g

(C) 570 g

(D) 540 g

8. **The first student wrote the number 1 on the board, the second student wrote the number 2, and the third one and each of the following students wrote a number that was the quotient of the number written before the last one and the last number. What did the tenth student write?**

(A) 2^{34} (B) 1024 (C) 2^{-13} (D) 256

9. **Six points were chosen on a circle and every possible chord with end points in those points was drawn. Two chords, which do not have the common points are named separately. How many pairs of separate chords exist in the situation described above?**

(A) 26 (B) 28 (C) 30 (D) 34

10. **The slope of any line parallel to X–axis is :**

(A) 0 (B) 1 (C) –1 (D) not defined

11. **In the inequalities given below the value of the angle is expressed in radian measure. Which of the inequalities below is true ?**

(A) $\sin 1 < \sin 2 < \sin 3$ (B) $\sin 3 < \sin 2 < \sin 1$

(C) $\sin 1 < \sin 3 < \sin 2$ (D) $\sin 3 < \sin 1 < \sin 2$

12. **The average age of a family of 6 members is 22 years. If the age of the youngest member be 7 years, what was the average age of the family at the birth of the youngest member ?**

(A) 15 years (B) 18 years (C) 21 years (D) 22 years

13. **If the roots of the equation $x^2 - bx + c = 0$ differ by 2, then which of the following is true ?**

(A) $b^2 = 4c + 1$ (B) $c^2 = 4a + b$ (C) $b^2 = 4c + 4$ (D) $a^2c^2 = 4(a+c)$

14. The maximum value of $\left(\frac{1}{2}\right)^{x^2-3x+2}$ is :

(A) $\sqrt{2}$ (B) $\frac{1}{\sqrt{2}}$ (C) $\sqrt[4]{2}$ (D) $\sqrt[3]{2}$

15. What will be maximum sum of 57, 54, 51, ...?

(A) 550 (B) 570 (C) 630 (D) None of these

16. One number is chosen from numbers 1 to 200. Find the probability that it is divisible by 4 or 6 ?

(A) $\frac{9}{200}$ (B) $\frac{11}{200}$ (C) $\frac{91}{121}$ (D) $\frac{67}{200}$

17. The distance of the point (x, y) from Y–axis is :

(A) x (B) y (C) $|x|$ (D) $|y|$

18. If (x–k) is the HCF of $(3x^2 + 14x + 16)$ and $(6x^3 + 11x^2 - 4x - 4)$, then the value of "k" is :

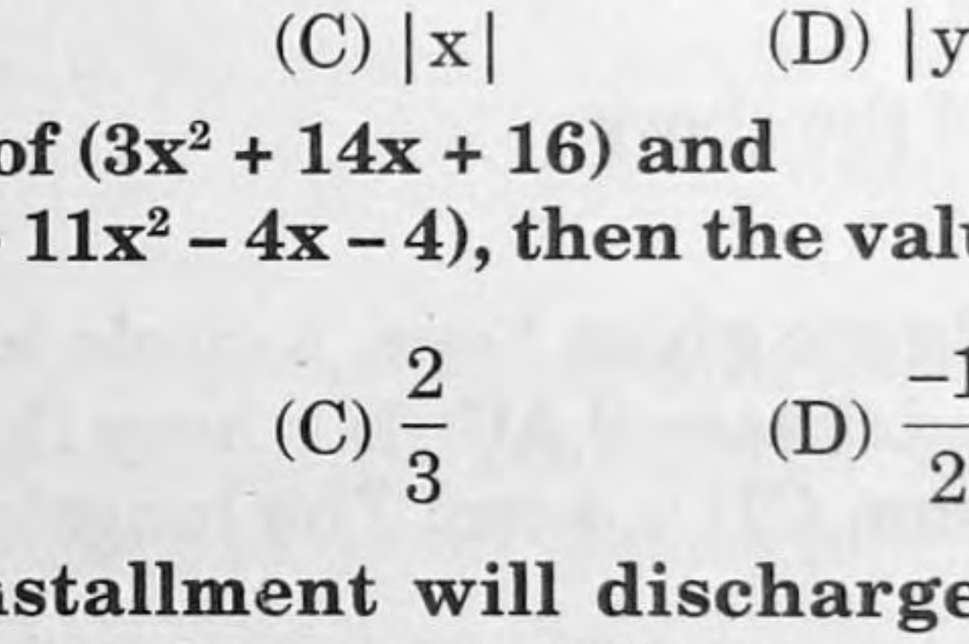
(A) –2 (B) 2 (C) $\frac{2}{3}$ (D) $\frac{-1}{2}$

19. What quarterly installment will discharge a debt of Rs. 11786 due one year hence at 10% per annum simple interest ?

(A) Rs. 2800 (B) Rs. 2840 (C) Rs. 2560 (D) Rs.1580

20. In the given figure if $\Delta ADE \sim \Delta ABC$, then BC =_____

(A) 4.5
(B) 3
(C) 3.6
(D) 2.4



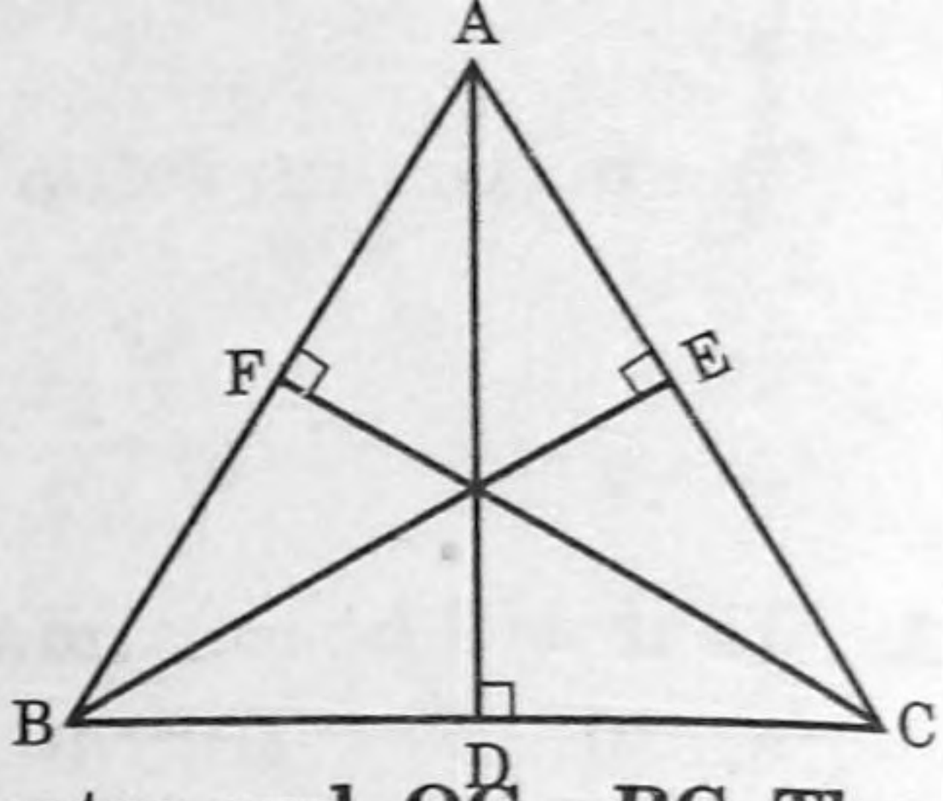
21. In the figure, AD $\perp$ BC, BE $\perp$ AC, CF $\perp$ AB, then $AF^2 + BD^2 + CE^2$ =_____

(A) $OA^2 + OB^2 + OC^2$

(B) $OD^2 + OE^2 + OF^2$

(C) $AB^2 + BC^2 + AC^2$

(D) $AE^2 + BF^2 + CD^2$



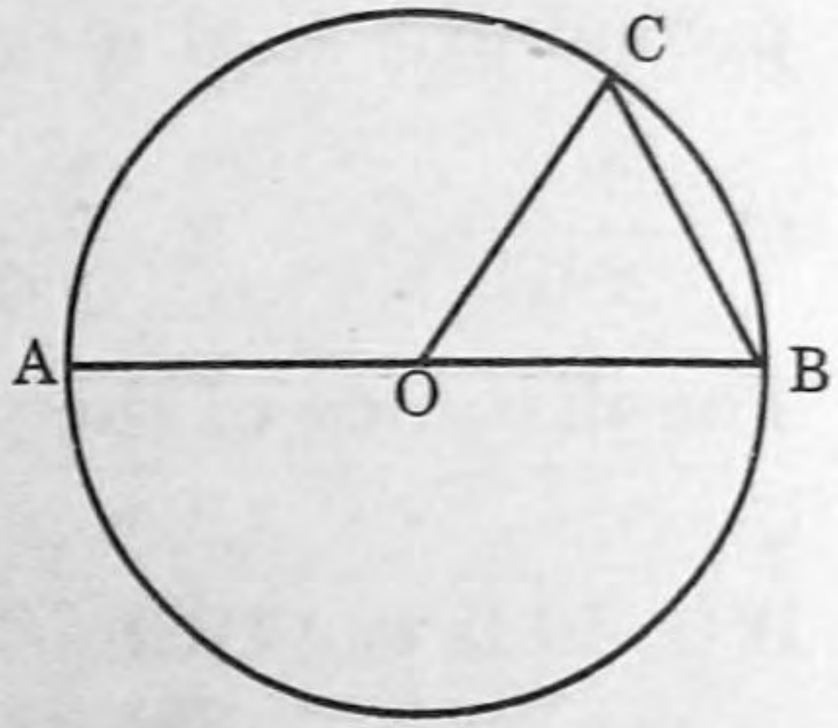
22. In the given figure, "O" is the centre and OC = BC. Then $\angle AOC$ = _____

(A) 120^0

(B) $2\angle C$

(C) $2\angle B$

(D) All of the above



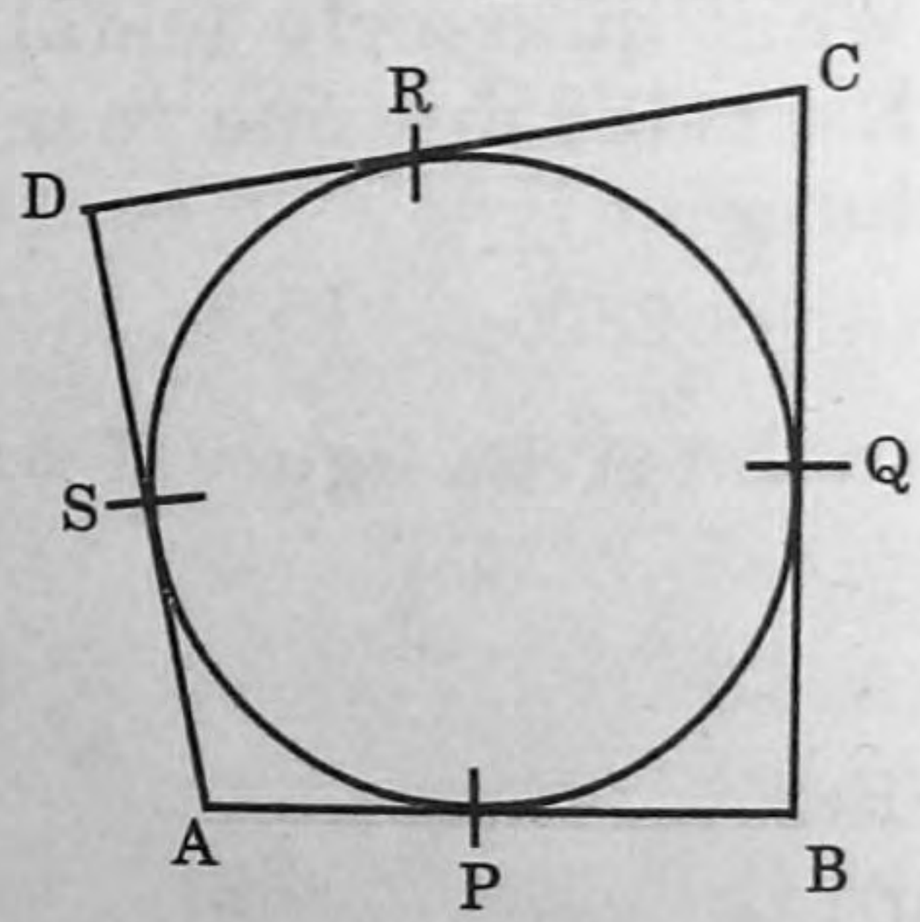
23. In the figure given here, a circle touches all the four sides of a quadrilateral ABCD whose three sides are AB = 6 cm, BC = 7 cm, CD = 4 cm. The length of AD = _____

(A) 10 cm

(B) 11 cm

(C) 13 cm

(D) 3 cm



24. $\sqrt{\frac{\sec\theta - 1}{\sec\theta + 1}} + \sqrt{\frac{\sec\theta + 1}{\sec\theta - 1}} =$ _____

(A) $2\,\text{cosec}\,\theta$

(B) $\frac{2\sin\theta}{\sqrt{\sec\theta}}$

(C) $2\cos\theta$

(D) None of these

25. The angle of elevation of a cloud from a point 60 m above a lake is 30^0 and the angle of depression of its image in lake is 60^0. The height of the cloud is :

(A) 120 m (B) 100 m (C) 80 m (D) 40 m

26. What is the approximate mean orbital velocity of the Earth?

(A) 20 km/s (B) 30 km/s (C) 40 km/s (D) 50 km/s

27. Which of the following is NOT correct regarding refraction of light ?

A) Whenever light decreases its speed upon leaving a medium, it deviates towards the normal.

(B) The critical angle of water depends only on the density of water and not of other media.

(C) A piece of diamond will sparkle less when inside water.

(D) Total internal reflection is not possible when light travels from water to kerosene.

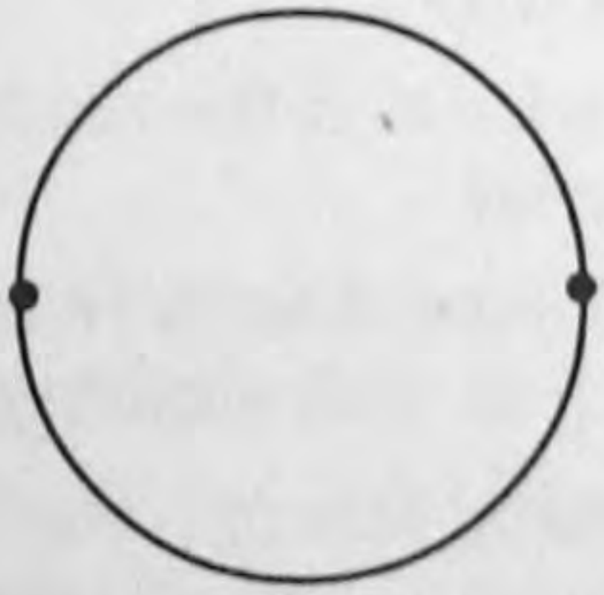
28. A wire of resistance 100 Ω is taken and bent to form a circular loop. What will be the resistance between two diametrically opposite points on the loop?

(A) 25 Ω

(B) 75 Ω

(C) 125 Ω

(D) 150 Ω



29. Most of the energy released during nuclear fission is in the form of :

(A) electrical energy (B) chemical energy

(C) radiation energy (D) heat energy

30. A tube light draws 10 W when connected to a 12-V supply. How will its resistance change when it is connected to a 6-V supply ?

(A) It remains the same (B) It doubles

(C) It becomes one-fourth (D) It quadruples

31. Which of the following is a logical conclusion of the belief that light is a wave motion?

(A) Light is used in photoelectric emission.

(B) Light does not require a material medium to travel.

(C) Light causes two shadows umbra and penumbra.

(D) Light of different colours are due to different wavelengths.

32. A rheostat is a resistor of :

(A) fixed resistance (B) high resistance

(C) low resistance (D) variable resistance

33. The difference between the moving mass and the rest mass of a bullet travelling with a speed of 200 m/s is 5×10^{-12} g. With how much energy is it moving ?

(A) 20,000 J (B) 2.5 MeV

(C) 450 J (D) 9.5×10^{20} eV

34. When a charged particle enters a uniform magnetic field, its kinetic energy :

(A) increases (B) decreases

(C) becomes zero (D) remains constant

35. Which of the following is correct regarding domestic electric circuits ?

(A) The live wire and the neutral wire are maintained close to zero potential

(B) The earth wire and the metallic body of the appliance is maintained at zero potential

(C) After passing through the live and neutral wires, current flows through the appliance and then to the ground

(D) Switches are connected to the live and the earth wires

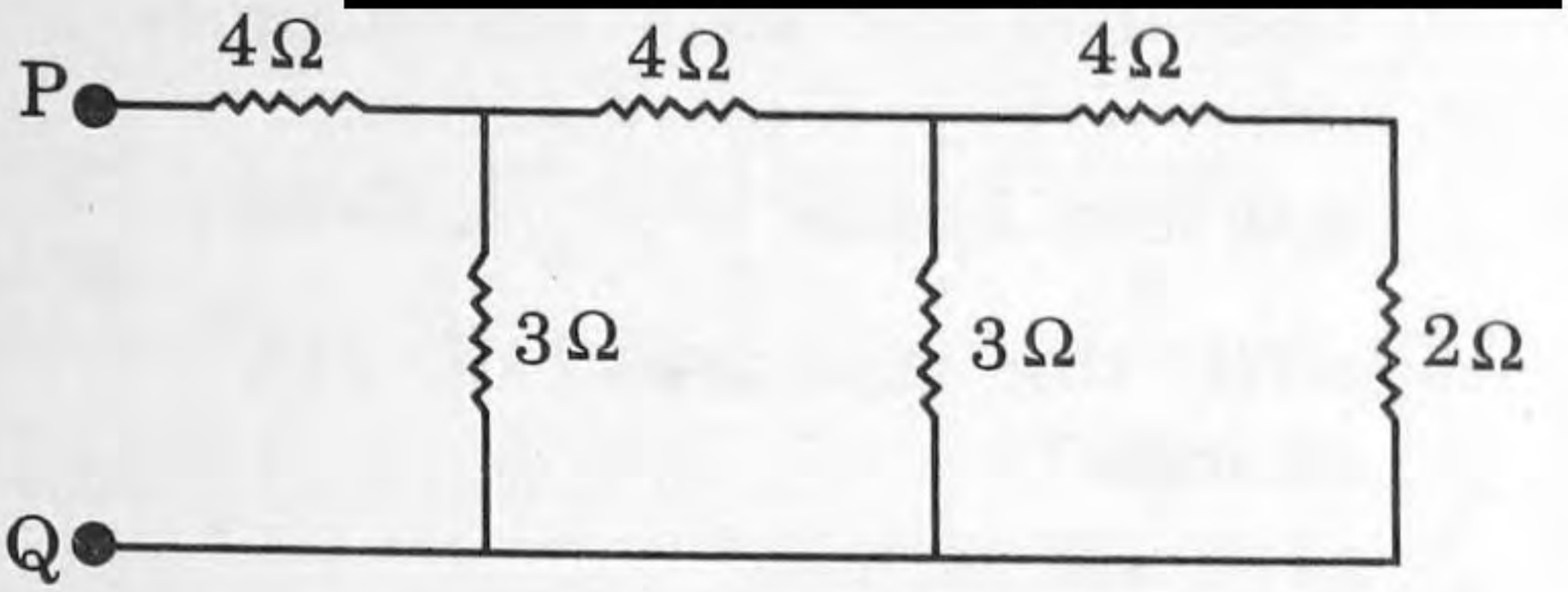
36. An object is placed 30 cm from a convex lens. A real image is formed at a distance of 15 cm from the lens. What is the focal length of the lens ?

(A) 5 cm (B) 7.5 cm

(C) 10 cm (D) 12.5 cm

37. What will be the equivalent resistance between the points P and Q in the network shown here ?

(A) 4 Ω
(B) 6 Ω
(C) 24 Ω
(D) 32 Ω



38. Which of the following is used as fuel in racing cars instead of petrol?

(A) Steam
(B) LPG
(C) Ethanol
(D) Nitrogen

39. When N^{14} is bombarded by an α–particle a proton is emitted. The new element formed is :

(A) ${}_{8}O^{17}$ (B) ${}_{9}N^{19}$ (C) ${}_{6}C^{12}$ (D) ${}_{7}O^{14}$

40. A painter wants to use blue colour but does not have it. What should she do ?

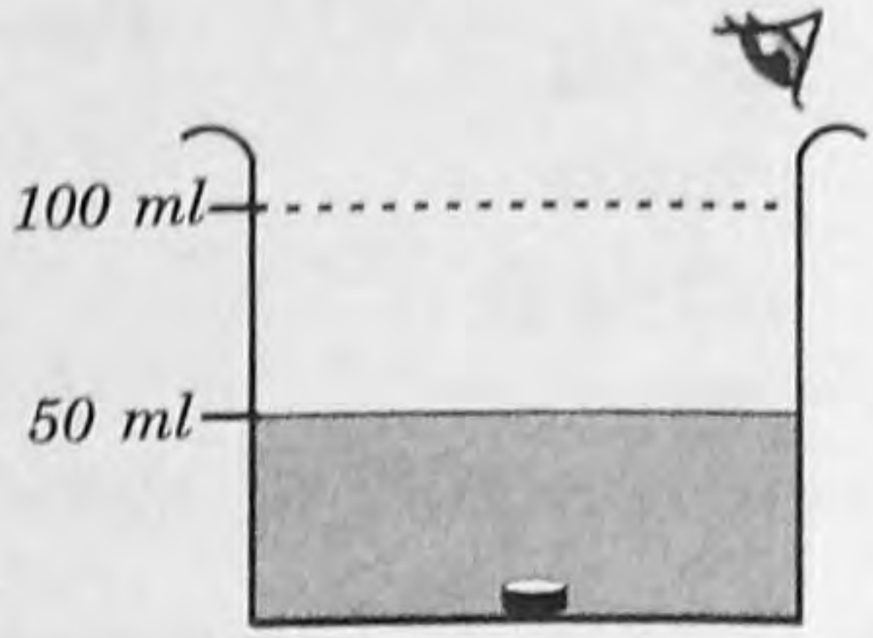
(A) Mix yellow and cyan
(B) Mix magenta and cyan
(C) Mix magenta and white
(D) Mix red and green

41. A 220 V, 100 W bulb is connected to a 110 V source. What will be the power consumed by it ?

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

42. A coin appears to be raised when placed at the bottom of a vessel with 50 ml of water $\left(\mu = \frac{4}{3}\right)$. The vessel is filled

upto the 100 ml mark with another liquid $\left(\mu = \frac{5}{4}\right)$. How will the apparent depth change ?



(A) It will increase

(B) It will decrease

(C) It will become zero

(D) It will be equal to real depth

43. Which of the following is NOT true regarding biogas ?

(A) Carbon dioxide is a major constituent besides methane.

(B) It is renewable and can be used to generate electricity.

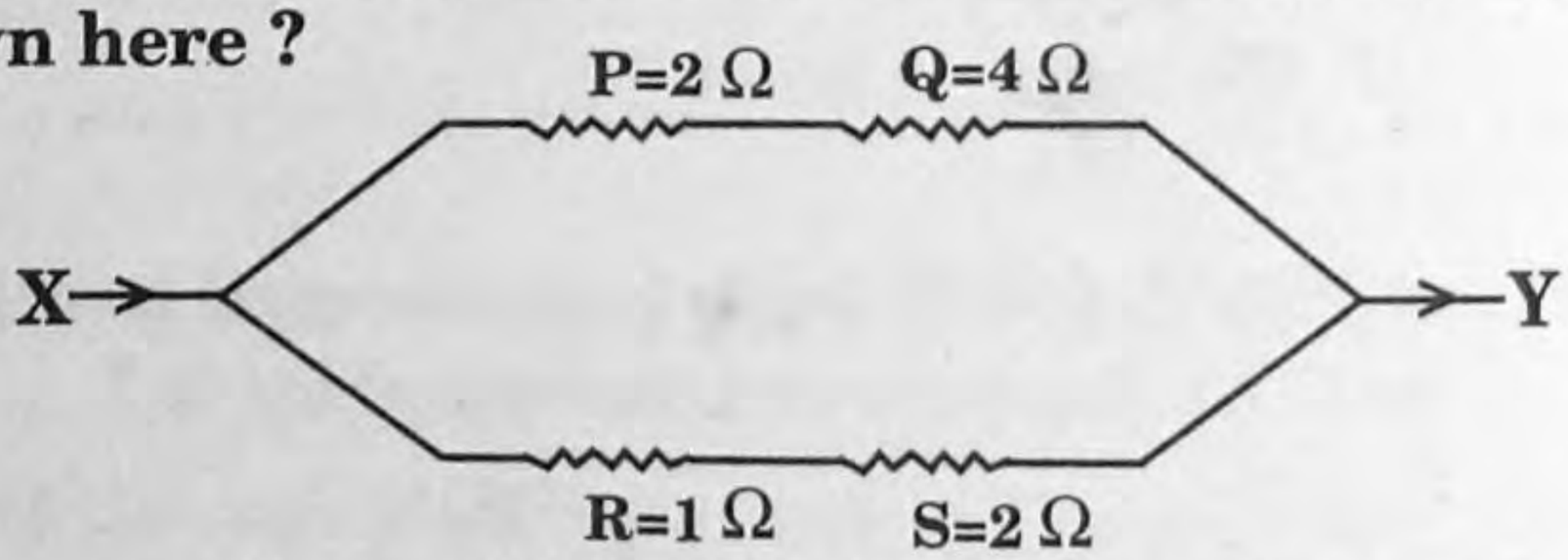
(C) It burns without smoke and pollution.

(D) The ash it leaves on burning can be used as a manure.

44. The minimum distance between the object and its real image formed by a convex lens is :

(A) f (B) 2f (C) 4f (D) 6f

45. Which of the four resistances will generate the greatest amount of heat when current flows from X to Y in the network shown here ?



(A) P = 2 Ω

(B) Q = 4 Ω

(C) R = 1 Ω

(D) S = 2 Ω

46. In the nuclear reaction $_{92}U^{238} \rightarrow {}_{Z}Th^{A}$ + α-particle, the values of A and Z are respectively :

(A) 234, 90 (B) 234, 94 (C) 238, 90 (D) 238, 94

47. Venus looks brighter than other stars because :

(A) it is closer to the sun (B) it is closer to the earth

(C) it does not have an atmosphere (D) it is hotter than other stars

48. The current passing through a wire into the filament of a bulb makes it glow, but the wire does not glow, because:

(A) the wire has less resistance than the filament.

(B) the wire has more resistance than the filament.

(C) less current flows in the wire than in the filament.

(D) more current flows in the wire than in the filament.

49. A radioactive element has $\frac{1}{32}$ of its original mass left after a lapse of 60 days. Its half life is :

(A) 12 days (B) 24 days (C) 32 days (D) 60 days

50. A convex mirror of focal length 'f' forms an image that is $\frac{1}{n^{th}}$ the size of the object. How far is the object from the mirror ?

(A) $\frac{f}{n-1}$ (B) (n–1) f (C) $\left(\frac{n-1}{n}\right)f$ (D) nf–1

CLASS: X CHEMISTRY

51. The equilibrium constant for the formation of hydrogen iodide according to the given equation is K .

$$H_2 + I_2 \rightleftharpoons 2HI$$

Find the equilibrium constant in terms of K for the reaction : $HI \rightleftharpoons \frac{1}{2}H_2 + \frac{1}{2}I_2$.

(A) $K^{1/2}$ (B) K^2 (C) $K^{-1/2}$ (D) K^{-2}

52. Which of the following is the most acidic?

(A) Milk (B) Wine (C) Blood (D) Lime water

53. Statement I : ***Equilibrium can only be attained in a closed vessel***

Statement II : ***Decrease in temperature increases the rate of reaction.***

Choose the correct option based on the above statements.

(A) I is true, II is true (B) I is true, II is false

(C) I is false, II is true (D) I is false, II is false

54. Which of the given reactions is different from others in terms of catalyst ?

(A) $N_2(g) + 3H_2(g) \xrightarrow{Fe} 2NH_3(g)$

(B) $2SO_2(g) + O_2(g) \xrightarrow{NO} 2SO_3(g)$

(C) $2H_2O_2 \xrightarrow{Glycerine} 2H_2O + O_2$

(D) $CO + 2H_2 \xrightarrow{ZnO/Cr_2O_3} CH_3OH$

55. Which of the following is a strong electrolyte on the basis of its behavior in aqueous solution ?

(A) NH_4Cl (B) NaOH

(C) HCN (D) CH_3COOH

56. The pH of a solution is 2. When the pH changes to 6, then the H^+ ion concentration :

(A) increases 4 times (B) decreases 4 times

(C) increases to 10^4 times (D) decreases to 10^4 times

57. Which glass is also known as Borosilicate glass ?

(A) Hard glass (B) Pyrex glass

(C) Crook's glass (D) Safety glass

58. Which of the following is also known as 'Thomas Slag' ?

(A) MnO_2 (B) CaO

(C) $Ca_3(PO_4)_2$ (D) $Mn_3(PO_4)_2$

59. Study the given reaction :

$$CH_3 - C - CH_3 \xrightarrow{NaBH_4} CH_3 - CH - CH_3$$

In this reaction propanone is :

(A) oxidised (B) reduced

(C) both A & B (D) neutralised

60. Which of the following is the functional group of ketone?

(A) – OH (B) $\geq$ CO (C) – COOH (D) – CHO

61. Study the reaction given below.

$$CH_3COONa + NaOH \xrightarrow{X} Na_2CO_3 + Y$$

Here X & Y are respectively:

(A) $Ca(OH)_2$ and CH_4 (B) $Ca(OH)_2$ and C_2H_6

(C) CaO and CH_4 (D) CaO and C_2H_6

62. What is the non polar part of soaps made of ?

(A) Hydrocarbons (B) Carboxylate

(C) Sulphate (D) Sulphonate

63. Which of the following is the monomer of natural rubber ?

(A) Neoprene (B) Isoprene

(C) Chloroethene (D) Chloroprene

64. Which acid is formed when oleum is diluted?

(A) Oxalic acid (B) Adipic acid

(C) Nitric acid (D) Sulphuric acid

65. Beaching property of sulphur dioxide is due to its _____ nature and it is _____.

(A) oxidising, permanent (B) oxidising, temporary

(C) reducing, permanent (D) reducing, temporary

66. Hydrogen reacts with carbon monoxide at 700 K in the presence of the catalyst :

(A) Ni/Pt (B) Fe/Mo

(C) ZnO/Cr_2O_3 (D) C_2H_5OH

67. Which of the following contains chromium ?

(A) Tungsten steel (B) Stainless steel

(C) Silicon steel (D) Nickel steel

68. During electrolysis of aluminium oxide the product at the cathode undergoes :

(A) reduction (B) oxidation

(C) both A & B (D) no reaction takes place

69. Which of the following is used in the purification of metals?

(A) Calcination (B) Roasting

(C) Magnetisation (D) Cupellation

70. Displacement reaction cannot take place in which of the following ?

(A) $CuSO_4 + Fe$ (B) $ZnSO_4 + Pb$

(C) $FeSO_4 + Zn$ (D) $AgNO_3 + Cu$

CLASS: X BIOLOGY

71. When a chlorophyll molecule absorbs light, it gets excited and emits :

(A) oxygen (B) water (C) electrons (D) protons

72. The tiny openings present on older roots for exchange of gases are :

(A) stomata (B) lenticels (C) guard cells (D) epidermal cells

73. Which of the following is a reason for abnormal & permanent enlargement of the alveoli ?

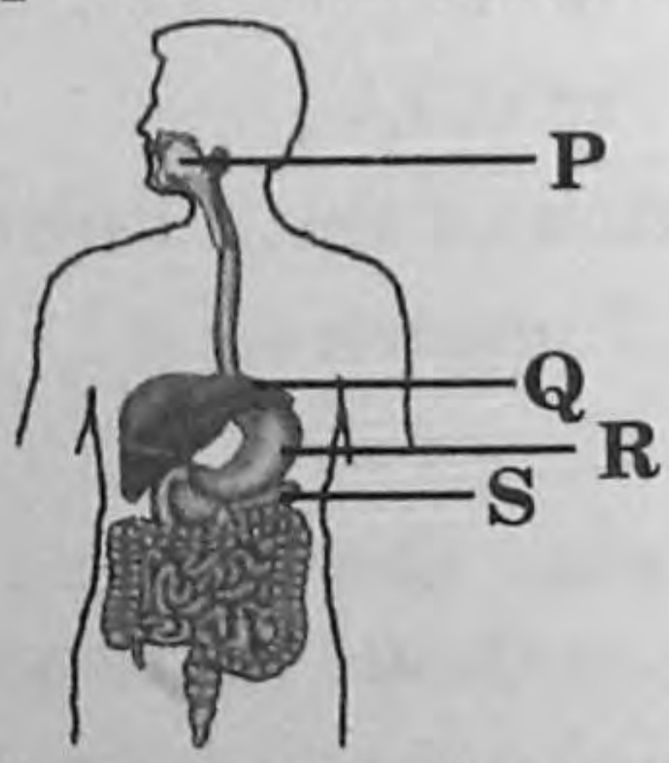
(A) Liquor consumption (B) Smoking

(C) Drug addition (D) Heavy exercise

74. Affinity of carbon monoxide for haemoglobin as compared to oxygen is :

(A) 2 times (B) 20 times (C) 200 times (D) 2000 times

75. In the given diagram, trypsin is present in which part of the system ?



(A) P

(B) Q

(C) R

(D) S

76. Which machine takes the place of specialised muscle cells that initiate the heart beat ?

(A) Electrocardiogram (B) Dialysis machine

(C) Stethoscope (D) Pacemaker

77. Transport of nutrients from leaves to other parts of the plant is termed as :

(A) transportation (B) transduction
(C) translocation (D) transpiration

78. The function of haemoglobin is to carry :

(A) O_2 (B) CO_2 (C) CO (D) Both (A) & (B)

79. Deoxygenated blood flows to the lungs through pulmonary artery from the :

(A) left ventricle (B) right auricle
(C) left auricle (D) right ventricle

80. Prasad was injured in an accident and required immediate bloodtransfusion. In his blood, Antigen 'A' and Antigen 'B' are present on red blood cells, but Antibody 'A' and Antibody 'B' are absent in plasma. The blood group that is suitable to Prasad is :

(A) A (B) B (C) A,B, AB, O (D) AB

81. Which of the following is NOT a ductless gland ?

(A) Thyroid (B) Adrenal (C) Pituitary (D) Pancreas

82. Stimulation of milk did not happen after child birth in a woman. This is due to the deficiency of which hormone ?

(A) Thyroxin (B) Estrogen
(C) Vasopressin (D) Prolactin

83. The part of the brain which is concerned with balance is:

(A) Cerebrum (B) Cerebellum (C) Medulla oblongata (D) Pons

84. Which of the following is NOT a method of vegetative propagation?

(A) Cutting (B) Layering (C) Grafting (D) Budding

85. The gestation period in human beings is about :

(A) 200 days (B) 250 days (C) 280 days (D) 300 days

86. Homologous organs have :

(A) same morphology, different function
(B) same morphology and function
(C) no common ancestral origin
(D) different morphology and function but common origin

87. **Which type of respiration takes place in our muscles during vigorous muscular activity ?**

(A) Aerobic (B) Anaerobic (C) Fermentation (D) Cutaneous

88. **Match the following and select the correct answer.**

a. Flatworms	***i. Nephridia***
b. Earthworm	***ii. Contractile vacuole***
c. Human beings	***iii. Flame cells***
d. Amoeba	***iv. Kidneys***

(A) a - iv, b - i, c - ii, d - iii (B) a - iii, b - ii, c - iv, d - i

(C) a - iii, b - i, c - iv, d - ii (D) a - ii, b - i, c - iv, d - iii

89. **The digestion of proteins begins in the :**

(A) buccal cavity (B) oesophagus (C) stomach (D) duodenum

90. **Which of the following provides the correct sequence of events in origin of new species according to Darwinism ?**

1. Natural selection

2. Survival of the fittest

3. Struggle for existence

(A) 1, 2, 3 (B) 2 ,3,1

(C) 3, 1, 2 (D) 3, 2, 1

CLASS: X GENERAL QUESTIONS

91. **Which of the following is opposite in meaning to the word 'insipid'?**

(A) Exciting (B) Tasteless (C) Dull (D) Strong

92. **Find the number that logically completes the series given here.**

2, 3, 5, 9, 17, ?

(A) 19 (B) 21 (C) 27 (D) 33

93. **A graduate of IIM, this man joined an oil based public sector company in India. He was killed in November, 2005, by the 'oil mafia' near Kanpur. Who was he ?**

(A) Ranjan Shah (B) S.Manjunath

(C) Girish Sharma (D) P.Bhushan

94. A 'Pugilist' :

(A) dances (B) fights (C) writes (D) travels

95. Which was the first successfully transplanted organ in the human body ?

(A) Heart (B) Liver (C) Kidney (D) Brain

96. The famous architect Edwin Lutyens designed which building that is now on Raisina Hill, New Delhi?

(A) Parliament House (B) Lotus Temple

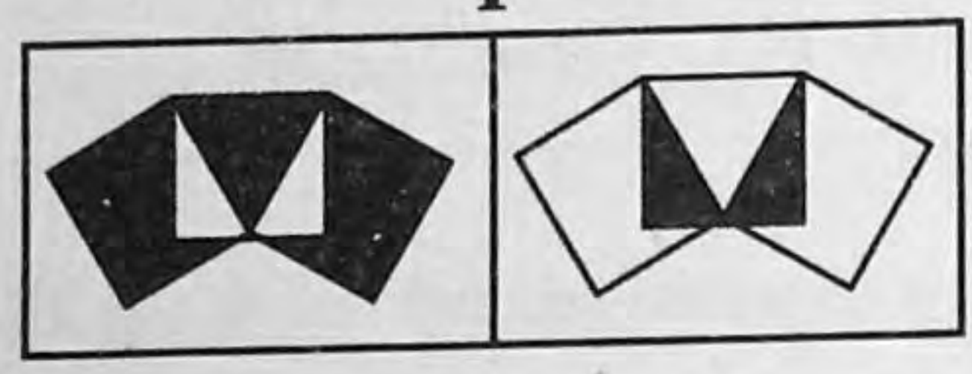
(C) Red Fort (D) Rashtrapati Bhawan

97. Before the creation of Bangladesh, it was a part of :

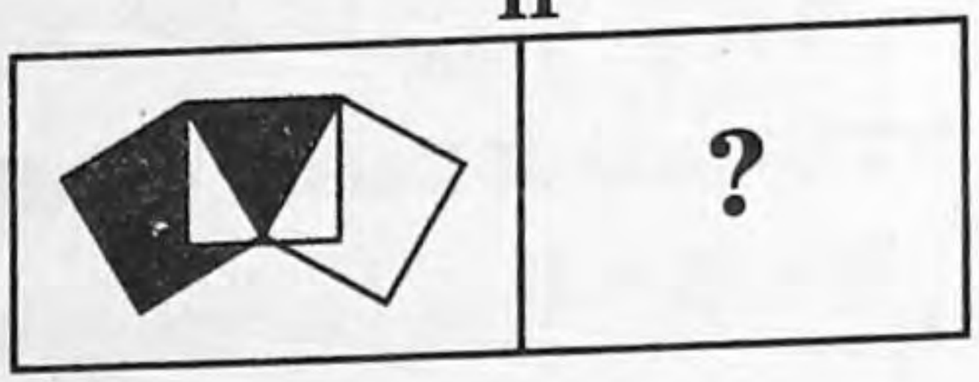
(A) China (B) Pakistan (C) USSR (D) Burma

98. Study the relation between the figures in set I and find the missing figure in set II?

I



II



(A) 

(B) 

(C) 

(D) 

99. What is the full form of HTTP, commonly used in website addresses ?

(A) Home Transfer Test Procedure

(B) Hyper Text Transfer Protocol

(C) Hyper Threading Text Program

(D) High Testing Text Program

100. With whom did the famous santoor player Pt. Shiv Kumar Sharma partner to give music for many Hindi films?

(A) Pt. Hari Prasad Chaurasia

(B) Ustad Aamir Khan

(C) A.R. Rehman

(D) Ustad Zakir Hussain