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**STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING**  
**STATE LEVEL NATIONAL TALENT SEARCH EXAMINATION – 2016**

**Class – X**  
**Part – I**

**SCHOLASTIC APTITUDE TEST (SAT)**

**Time : 90 Minutes**

**Maximum Marks : 100**

**INSTRUCTIONS TO CANDIDATES :**

Read the following instructions before you answer the questions. Answers are to be given in a SEPARATE OMR ANSWER SHEET provided inside this booklet. Break the seal and start answering the questions once asked to do so.

- Please write your ROLL NUMBER very clearly (only one digit in one block) as given in your Admission Card.
- There are 100 questions in this test. The questions are arranged in the following order :
  - Questions 1 to 40 belong to Science Subjects.
  - Questions 41 to 60 are on Mathematics Subjects.
  - Questions 61 to 100 are on Social Science.
- Select the most suitable answer for each question and completely darken the circle corresponding to the correct alternative as shown below.

<b>Correct Method</b>	<b>Wrong Method</b>
<input type="radio"/> ① <input type="radio"/> ② <input checked="" type="radio"/> ③ <input type="radio"/> ④	<input type="radio"/> ① <input checked="" type="radio"/> ② <input checked="" type="radio"/> ③ <input checked="" type="radio"/> ④

- All questions carry ONE MARK each.
- There is no negative mark. Every correct answer will be awarded one mark.
- Do not write your name on any part of the question booklet or on the answer sheet.

**പരീക്ഷാർത്ഥികൾക്കുള്ള നിർദ്ദേശങ്ങൾ :**

ചോദ്യങ്ങൾക്ക് ഉത്തരം എഴുതാൻ തുടങ്ങുന്നതിന് മുമ്പ് താഴെ കൊടുത്തിരിക്കുന്ന നിർദ്ദേശങ്ങൾ സദ്രഭാം വായിക്കുക. ഉത്തരം നൽകേണ്ടത് ഒരു പ്രത്യേക ഉത്തരക്കടലാസിൽ ആണ്. നിർദ്ദേശത്തിനു ശേഷം മാത്രമേ സീൽ തുറക്കുവാനും, ഉത്തരം എഴുതുവാനും പാടുള്ളൂ.

- നിങ്ങളുടെ റോൾ നമ്പർ (ഒരു കള്ളിയിൽ ഒരു അക്കം മാത്രം) വ്യക്തമായി നിങ്ങളുടെ പ്രവേശന പത്രത്തിൽ രേഖിപ്പിക്കുന്നതു പോലെ എഴുതുക.
- ഈ പരീക്ഷാപുസ്തകത്തിൽ 100 ചോദ്യങ്ങളുണ്ട്. ചോദ്യങ്ങൾ താഴെ കൊടുത്തിരിക്കുന്ന പ്രകാരം ക്രമപ്പെടുത്തിയിരിക്കുന്നു.
  - 1 മുതൽ 40 വരെയുള്ള ചോദ്യങ്ങൾ ശാസ്ത്രത്തിൽ നിന്ന്.
  - 41 മുതൽ 60 വരെയുള്ള ചോദ്യങ്ങൾ ഗണിതത്തിൽ നിന്ന്.
  - 61 മുതൽ 100 വരെയുള്ള ചോദ്യങ്ങൾ സാമൂഹ്യ ശാസ്ത്രത്തിൽ നിന്ന്.
- ഓരോ ചോദ്യത്തിനും ഉചിതമായ ഉത്തരം തിരഞ്ഞെടുത്ത് ശരിയായ ഉത്തരത്തെ സൂചിപ്പിക്കുന്ന വൃത്തം മാത്രം താഴെ കൊടുത്തിരിക്കുന്ന വിധത്തിൽ പൂർണ്ണമായി കറുപ്പിക്കുക.

<b>ശരിയായ രീതി</b>	<b>തെറ്റായ രീതി</b>
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- എല്ലാ ചോദ്യങ്ങൾക്കും ഒരു മാർക്ക് വീതം.
- ന്യൂന മാർക്ക് ഇല്ല. ഓരോ ശരി ഉത്തരത്തിനും ഒരു മാർക്ക് വീതം ലഭിക്കും.
- നിങ്ങളുടെ പേര് ചോദ്യ പുസ്തകത്തിന്റെയോ ഉത്തരക്കടലാസിന്റെയോ ഒരു ഭാഗത്തും എഴുതുവാൻ പാടില്ല.

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**State Level National Talent Search Examination – 2016**  
**Scholastic Aptitude Test**

1. The enzymes commonly called 'Genetic Scissors' are  
(1) Ligases (2) Lipases (3) Restriction endonucleases (4) Proteases

**Answer (3)**

**Solution**

The enzymes commonly called genetic scissor's are

2. Chooses the group that contains fungi only  
(1) Euglena, lichen (2) Yeast, mushroom (3) Anabaena, Amoeba (4) Paramecium, mycoplasma

**Answer (2)**

**Solution**

Choose the group that contains fungi only

3. Climbers grow towards and around a support is an example of  
(1) Hydrotropism (2) Haptotropism (3) Geotropism (4) Phototropism

**Answer (2)**

**Solution**

Climbers grow towards and around a support is an example of

4. Select the correct statement regarding the arrangement of amino acids in beta ( $\beta$ ) chain of haemoglobin

- (1) Same in man and rat (2) Same in man and chimpanzee  
(3) Different in man and chimpanzee (4) same in man and gorilla

**Answer (3)**

**Solution**

Select the correct statement regarding the arrangement of amino acid in beta chain of hemoglobin

5. The gas responsible for ozone depletion is  
(1) Nitrogen and argon (2) Carbon dioxide (3) Carbon monoxide (4) Chlorofluorocarbons

**Answer (4)**

**Solution**

The gas responsible for  $O_3$  depletion

6. Chromosomes are composed of  
(1) DNA and protein (2) RNA and lipids (3) Ribosomes and lipids (4) DNA and lipids

**Answer (1)**

**Solution**

Chromosomes are composed of

7. Choose the immune response of basophil  
(1) Engulfs and destroys the bacteria  
(2) Produces chemical substances that destroy foreign bodies  
(3) Dilates the blood vessels  
(4) Produces chemical substances needed for inflammatory response

**Answer (1)**

**Solution**

Choose the immune response of basophil

8. Decreases in the production of dopamine causes  
(1) Parkinson's (2) Meningitis (3) Alzheimer's (4) Epilepsy

**Answer (1)**

**Solution**

Decrease in the production of dopamine causes

9. The excretory organ in cockroach is  
(1) Kidney (2) Malpighian tubules (3) Contractile vacuoles (4) Nephridia

**Answer (2)**

**Solution**

Excretory organ in cockroach is

10. The three R's to save the environment represent

- (1) Repeat, Reduce, Resale  
(3) Recycle, Reuse, Repeat

- (2) Reuse, Reduce, Resale  
(4) Reduce, Recycle, Reuse

**Answer (4)**

**Solution**

The three R's to save environment represent

11. Gland are modified from of

- (1) Epithelial tissue (2) Cardiac tissue (3) Muscular tissue (4) Connective tissue

**Answer (1)**

**Solution**

Glands are modified from of

12. Movement of water molecules from a region of its higher concentration to a region of its lower concentration through a semi permeable membrane is called

- (1) Plasmolysis (2) Endocytosis (3) Osmosis (4) Diffusion

**Answer (3)**

**Solution**

Movement of water molecules from a region of its higher none to a region of its lower conc. through a semi permeable membrard is called

13. Which of the following statement is correct about tendons?

- (1) Connect bones to bones (2) Connect bones to muscles  
(3) Smoothen bound surfaces (4) Fibrous tissue with high flexibility

**Answer (2)**

**Solution**

Which of the following statement is correct about tendons?

14. Select the process that occurs in dark reaction

- (1) Light energy is converted into chemical energy (2) Water splits into hydrogen and oxygen  
(3) Hydrogen is added to carbon dioxide (4) Oxygen is evolved

**Answer (3)**

**Solution**

Select the process that occurs in dark reaction

15. Which of the following statements DO NOT match which the postulates of Bohr's mode of atom?

- (a) Electrons are revolving around the nucleus in specified paths called orbits/shells  
(b) Each shell is associated with definite amount of energy  
(c) Electron, while revolving through a particular shell can increases or decreases its energy  
(d) Energy of the shells decreases as their distance form nucleus increases

Select the correct alternative

- (1) C and (d) (2) (b) and (c) (3) (a) and (c) (4) (b) and (d)

**Answer (1)**

**Solution**

The energy of electron in a particular cell is quantized

Energy of shells  $1/\text{Distance b/w nucleus \& shell}$

16. Which of the following statements are NOT CORRECT?

- (1) Isobars are atoms of same elements (2) Isotopes are atoms of different elements  
(3) Isotones are atoms of same elements (4) Isotones are atoms of different elements

**Answer (3)**

**Solution**

Eg: Isobars -  $_{18}^{40}Ar$   $_{20}^{40}Ca$

Isotopes -  $_1^1H$   $_1^2H$

Isotones -  $_{6}^{13}C$   $_{7}^{14}N$

17. Which of the following represents the sequence in which the given compounds are arranged in the increasing order of the electronegative difference of their component elements?  $CH_4$ ,  $NaCl$ ,  $CO$ ,  $Na_2O$ ,  $MgCl_2$

- (1)  $CH_4 < MgCl_2 < CO < NaCl < Na_2O$       (2)  $Na_2O < CO < MgCl_2 < NaCl < CH_4$   
 (3)  $MgCl_2 < Na_2O < CO < CH_4 < NaCl$       (4)  $CH_4 < CO < MgCl_2 < NaCl < Na_2O$

**Answer (4)**

**Solution**

e.n:  $O > Cl > C > H > Mg > Na$   
 3.5 3 2.5 2.1

18. Water is a compound with relatively low molecular mass ( $18g\ mol^{-1}$ ). But it exists as a liquid at room temperature. This is because

- (1) Water molecules have angular geometry  
 (2) Electronegative difference between hydrogen and oxygen is less  
 (3) Water hydrogen and oxygen is less  
 (4) Water is a universal solvent

**Answer (3)**

Conceptual

19. Which of the following represents pairs of metalloids?

- (a) Si & Sb                      (b) Pb & Sb                      (c) Ru & Rh                      (d) Ge & As  
 (1) (b) and (d)                  (2) (a) and (c)                  (3) (b) and (c)                  (4) (a) and (d)

**Answer (4)**

**Solution**

Metalloids: Si                      As                      Tc  
 Ge                      Sb                      Po

20. Which of the following reactions requires the highest temperature to occur?

- (1)  $N_2 + O_2 \rightarrow 2NO$                       (2)  $2NO + O_2 \rightarrow 2NO_2$   
 (3)  $NH_4NO_2 \rightarrow N_2 + 2H_2O$               (4)  $4NO_2 + 2H_2O + O_2 \rightarrow 4HNO_3$

**Answer (1)**

**Solution**

Conceptual

21. The total number of electrons in 1kg glucose ( $C_6H_{12}O_6$ ) is [Molecular mass of glucose is 180 u]

- (1)  $6.022 \times 10^{23}$                       (2)  $1.8 \times 10^5$                       (3)  $3.346 \times 10^{21}$                       (4)  $3.2 \times 10^{26}$

**Answer (4)**

**Solution**

$$\text{Glucose} = \frac{1000}{180}$$

$$\text{Molecules} = \frac{1000}{180} \times na$$

$$\text{No of electrons} = \frac{1000}{180} \times na \times 96 = 3.2 \times 10^{26}$$

22. Which of the following are NOT CORRECT for a gaseous reversible reaction when pressure is increased?

- (a) Distance between gaseous molecules decreases  
 (b) Number of molecules per unit volume decreases  
 (c) Reaction proceeds in the direction in which there is increase in number of moles  
 (d) Reaction proceeds in the direction in which there is decrease in number of moles

Select the correct alternative

- (1) (a) and (d)                      (2) (b) and (d)                      (3) (a) and (c)                      (4) (b) and (c)

**Answer (4)**

**Solution**

It is explained based on Le Chatelier's principle conceptual

23. In which of the following solutions iron gets oxidized?  
 (a) Silver nitrate (b) Zinc sulphate (c) Magnesium sulphate (d) Copper sulphate  
 (1) (b) and (d) (2) (a) and (c) (3) (b) and (c) (4) (a) and (d)

**Answer (4)**

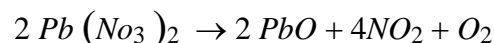
**Solution**

Electron chemical series:  $Li > Na > K > Mg > Al > Zn > Fe > Sn > Pb > M > Cu > Hg > Ag > Au$

24. When the reaction  $Pb(NO_3)_2 \rightarrow 2PbO + NO_2 + O_2$  is balanced the coefficients of the reactants and products in the balanced reaction will be  
 (2) 4, 2, 1, 2 (3) 2, 2, 4, 1 (4) 4, 2, 2, 2, 1

**Answer (2)**

**Solution**



25. What is the volume of  $N_2$  gas formed at STP when 63g of  $(NH_4)_2 Cr_2 O_7$  is thermally decomposed according to the equation given below? (Atomic mass of Cr = 52, H = 1, N = 14, O = 16)  $(NH_4)_2 Cr_2 O_7 \rightarrow N_2 + 4H_2 O + Cr_2 O_3$   
 (1) 5.6L (2) 11.2L (3) 22.4L (4) 44.8L

**Answer (1)**

**Solution**



$$m = \frac{63}{252} = 0.25$$

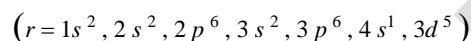
1 mole of  $N_2$  at STP = 22.4

0.25 mole of  $N_2$  at STP = 5.6

26. What is the number of s – electrons present in a chromium atom? (Atomic number of Cr = 24)  
 (1) 7 (2) 1 (3) 8 (4) 5

**Answer (1)**

**Solution**

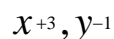


27. The two elements X and Y have 5 and 7 valence electrons respectively. What will be the most probable formula of the compound formed between them?  
 (1)  $X_7Y_5$  (2)  $X_5Y_7$  (3)  $X_3Y$  (4)  $XY_3$

**Answer (4)**

**Solution**

	No of valence electrons	Valency
X	5	+ 3
Y	7	- 1



28. The average acceleration of a body during a time interval 't' is given by the slope of its  
 (1) Velocity – speed graph (2) Velocity – time graph  
 (3) Speed – time graph (4) Velocity – displacement graph

**Answer (2)**

Conceptual

29. An object moving at a constant speed in a circular path experiences a force which is  
 (1) In the direction of motion  
 (2) Outwards and at  $45^\circ$  to the direction of motion  
 (3) Inwards and at right angles to the direction of motion  
 (4) Opposite to the direction of motion

**Answer (3)**

**Solution**

Inwards and at right angles to the direction of motion

30. A vehicle will acceleration as long as  
 (1) Air resistance is greater than the thrust  
 (2) Air resistance is greater than the inertia  
 (3) Thrust is greater than the sum of air resistance and friction  
 (4) Friction is greater than the thrust

**Answer (3)**

Conceptual

Thrust is greater than sum of air resistance and friction

31. Which of the following statement is correct? The force acting on an object is equivalent to  
 (1) Its change in momentum  
 (2) The impulse it receives per second  
 (3) The energy it gains per second  
 (4) Its acceleration per meter

**Answer (2)**

Conceptual

The impulse it receives per second

32. Work done by the force of gravity on a satellite of 500kg at a height of 36000km is  
 (1) 0 J  
 (2)  $10^{31}$  J  
 (3)  $10^{21}$  J  
 (4)  $10^{9.8}$  J

**Answer (1)**

Conceptual

Satellite is in circular orbit. So displacement is perpendicular to force

33. Up thrust of water acting on a wooden cube of side 10cm immersed completely in water is (density of water =  $1000 \text{ kgm}^{-3}$  and  $g = 10 \text{ ms}^{-2}$ )

- (1) 5N  
 (2) 10N  
 (3) 3N  
 (4) 2N

**Answer (2)**

Conceptual

$$\text{Up thrust (or) Buoyant force} = V \rho_f g$$

$$= (10 \text{ cm})^3 (1000 \text{ kg/m}^3) (10 \text{ m/s}^2)$$

$$= 10 \text{ N}$$

34. Energy transferred to a stone of weight 10N, falling freely from the top of a tower of 250m height is about  
 (1) 25000J  
 (2) 250000J  
 (3) 2500J  
 (4) 250J

**Answer (3)**

Conceptual

Weight =  $mg = 10\text{N}$

Height (H) = 250m

Potential energy  $U = mgH = (10) (250)$   
 $= 2500\text{J}$

35. The factor on which the speed of sound through air doesn't depend is  
 (1) Humidity  
 (2) Density  
 (3) Temperature  
 (4) Frequency of sound

**Answer (4)**

Conceptual

Frequency of sound

36. The waves that required a material medium for their propagation are called  
 (1) Matter waves  
 (2) Electromagnetic waves  
 (3) Carrier waves  
 (4) Mechanical waves

**Answer (4)**

Conceptual

Mechanical waves

37. How much heat does a 40W bulb generate in 1 hour?  
 (1) 144000J  
 (2) 144J  
 (3) 1.44J  
 (4) 14J

**Answer (1)**

Conceptual

Power = 40W

Time = 1 hour = 3600sec

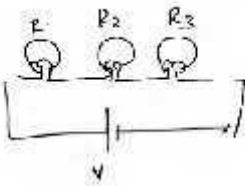
Energy =  $40(3600)$   
 $= 144000\text{J}$

38. Three bulbs are rated 40W, 60W and 100W. Which bulb will glow brightly if they are connected in series across a 220V source?

- (1) 40W                      (2) 60W                      (3) 100W                      (4) All will glow equally bright

**Answer (1)**

Conceptual



Rated power

$$P_1 = 40W, R_1 = \frac{V^2}{40}$$

$$P_2 = 60W, R_2 = \frac{V^2}{60}$$

$$P_3 = 100W, R_3 = \frac{V^2}{100}$$

Voltage is divided in the ratio of resistance

$$P_1 : P_2 : P_3 = i^2 R_1 : i^2 R_2 : i^2 R_3$$

Power generated =  $R_1 : R_2 : R_3$

$$= \frac{1}{40} : \frac{1}{60} : \frac{1}{100} = 15:10:6$$

∴ Bulb of 40w glows brighter

39. A device which uses the phenomenon of mutual induction is

- (1) AC generator                      (2) DC generator                      (3) Induction coil                      (4) Transformer

**Answer (4)**

Conceptual

Transformer

40. Indian Regional Navigation Satellite System (IRNSS) has a group of \_\_\_\_\_ satellites

- (1) 3                      (2) 5                      (3) 7                      (4) 9

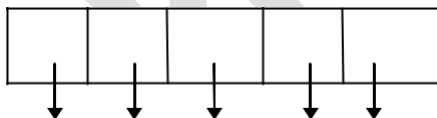
**Answer (3)**

41. Using the digits 1, 2, 3, 4, 5 without repetition, 120 five – digit numbers can be made. How many five – digit numbers can be made using the digits 0, 1, 2, 3, 4 without repetition?

- (1) 120                      (2) 100                      (3) 96                      (4) 24

**Answer (3)**

**Solution**



$$4 \times 4 \times 3 \times 2 \times 1 = 96$$

Zero can't come at 1<sup>st</sup> place, so 4 choices

42. In the arithmetic sequence  $\frac{3}{4}, 1\frac{1}{2}, 2\frac{1}{4}, \dots$  at which position does a perfect square appear first?

- (1) 192                      (2) 108                      (3) 48                      (4) 12

**Answer (2)**

**Solution**

$$\frac{3}{4}, \frac{6}{4}, \frac{9}{4}, \frac{12}{4}, \frac{15}{4}, \dots \quad 12^{\text{th}} \text{ term}$$

43. How much more is the sum of the first 40 terms of the arithmetic sequence 11, 21, 31 ... then the sum of the first 40 terms of the arithmetic sequence 12, 23, 34...?

(1) 1600

(2) 820

(3) 780

(4) 40

**Answer (2)**

**Solution**

$$S_{40} = \frac{40}{2} (2 \times 11 + 39 \times 10)$$

$$S_{40} = \frac{40}{2} (2 \times 12 + 39 \times 11)$$

$$S_{40} - S_{40} = \frac{40}{2} (2 \times 1 + 39 \times 1) = 820$$

44. The difference of the squares of two natural numbers is 101. What is the sum of their squares?

(1) 5000

(2) 5100

(3) 5101

(4) 5102

**Answer (3)**

**Solution**

$$a^2 - b^2 = (a - b)(a + b) = 101 \times 1$$

$$a + b = 101$$

$$a - b = 1$$

$$\Rightarrow a = 51, b = 50$$

45. Each three – digit numbers is written in a paper slip and put in a box. If one slip is drawn form it, what is the probability of its being a multiple of 9 which ends in 5?

(1)  $\frac{1}{9}$

(2)  $\frac{1}{18}$

(3)  $\frac{1}{90}$

(4)  $\frac{1}{100}$

**Answer (3)**

**Solution**

Multiple of ends in s mean add multiple of 45

$$a = 135, d = 90; an = 945$$

$$945 = 135 + (n - 1)d; d = 90$$

$$\Rightarrow n = 10$$

$$\therefore \text{Probability} = \frac{10-1}{900} = \frac{1}{90}$$

46. What number added to the polynomial  $3x^2 + 5x$  gives the square of a first degree polynomial?

(1)  $\frac{25}{12}$

(2)  $\frac{25}{24}$

(3)  $\frac{25}{36}$

(4)  $\frac{25}{48}$

**Answer (1)**

**Solution**

$$3 \left( x^2 + \frac{5x}{3} \right) = 3 \left( x^2 + \frac{5x}{3} + \frac{25}{36} \right) - 3x \frac{25}{36}$$

$$\therefore \text{Ans} = \frac{25}{12}$$

47. In the polynomial  $p(x) = x^2 - 10x + 2$  what number should be taken as x to get the least possible number at p(x)?

(1) 10

(2) 5

(3) 0

(4) - 5

**Answer (2)**

**Solution**

$$x^2 - 10x + 2 = x^2 - 10x + 25 - 23 = (x - 5)^2 - 23 \text{ Minimum at } x = 5$$



48. If all real numbers are taken as  $x$ , what is the smallest number got as  $|x - 1| + |x - 2| + |x - 4|$ ?  
(1) 1                                  (2) 2                                  (3) 3                                  (4) 4

**Answer (2)**

**Solution**

$|x - 1| + |x - 2| + |x - 4|$  is minimum at  $x = 2$   
 $\therefore$  Smallest value = 3

49. The areas of two squares are in the ratio  $a : b$  and their perimeters are in the ratio  $b : 8a$ . What is the ratio of their sides?

- (1) 1 : 8                                  (2) 1 : 4                                  (3) 1 : 2                                  (4)  $1\sqrt{2}$

**Answer (3)**

**Solution**

$$\frac{A_1}{A_2} = \frac{a}{b} \quad \& \quad \frac{P_1}{P_2} = \frac{b}{8a}$$

$$\Rightarrow \frac{a_1^2}{a_2^2} = \frac{a}{b}$$

$$\Rightarrow \frac{a_1}{a_2} = \sqrt{\frac{a}{b}}$$

$$\Rightarrow \frac{a_1}{a_2} = \frac{1}{4}$$

50. The sum of a number and its reciprocal is 4. What is their difference?

- (1)  $\sqrt{2}$                                   (2)  $\sqrt{3}$                                   (3)  $2\sqrt{2}$                                   (4)  $2\sqrt{3}$

**Answer (4)**

**Solution**

$$x + \frac{1}{x} = 4$$

$$x - \frac{1}{x} = \sqrt{\left(x + \frac{1}{x}\right)^2 - 4}$$

51. Which of the polygons given below cannot be drawn by joining the numbers on a clock?

- (1) Equilateral triangle          (2) Square                                  (3) Regular pentagon          (4) Regular hexagon

**Answer (2)**

**Solution**

12 is divisible by 2, 3, & 6 but not by 5 regular pentagon

52. The angles of a cyclic quadrilateral are in one of the ratios given below. Which is it?

- (1) 1:2:3:4                                  (2) 2:1:3:4                                  (3) 1:3:2:4                                  (4) 1:4:3:2

**Answer (2)**

**Solution**

If ratio of angle are  $a : b : C : d$  then  $a+c$  must equal to  $b+d$  so 2: 1: 3: 4

53. The angles of a 15-sided polygon are in arithmetic sequence. Which of those given below is an angle of this polygon?

- (1)  $128^\circ$                                   (2)  $130^\circ$                                   (3)  $132^\circ$                                   (4)  $156^\circ$

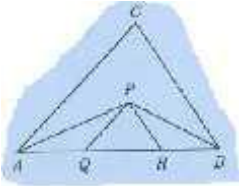
**Answer (4)**

**Solution**

$$\frac{15}{2}(2a + 14d) = 180 \times 13$$

$$\Rightarrow a + 7d = 156$$

54. The bisectors of  $\angle A$  and  $\angle B$  of the triangle ABC meet at P and PQ, PR are parallel to AC and BC



The perimeter of triangle PQR is 30 centimeters. What is the length of AB?

(1) 20

(2) 25

(3) 30

(4) 45

**Answer (3)**

**Solution**

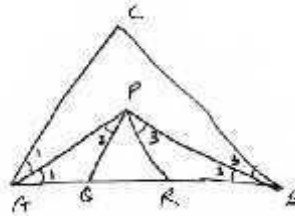
$$PQ \parallel AC$$

$$\Rightarrow \angle 1 = \angle 2$$

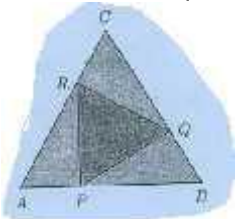
$$\Rightarrow PQ = AQ$$

Similarly,  $PR = BR$

$$\therefore AB = 30$$



55. ABC is an equilateral triangle and the points P, Q, R divided to sides AB, BC, CA in the ratio 1: 2



If the area of triangle PQR is 60 square centimeters, what is the area of triangle ABC?

(1) 180

(2) 150

(3) 120

(4) 90

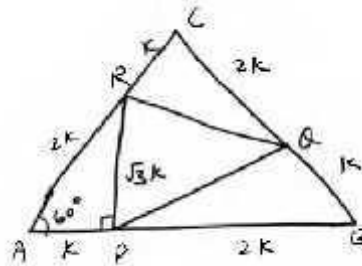
**Answer (1)**

**Solution**

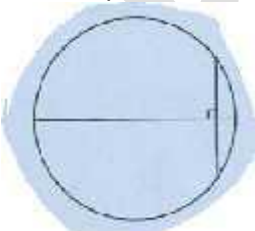
$$\frac{\text{ar } \Delta ABC}{\text{ar } \Delta PQR} = \left( \frac{AC}{PR} \right)^2$$

$$= \left( \frac{3K}{\sqrt{3}K} \right)^2 = 3$$

$$\therefore \text{ar } \Delta ABC = 180$$



56. In the picture, a diameter of the circle and a chord perpendicular to it are drawn



The length of the chord is 24 centimeters and it cuts the diameter in the ratio 9: 1. What is the diameter in centimeters?

(1) 20

(2) 30

(3) 40

(4) 60

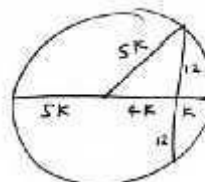
**Answer (3)**

**Solution**

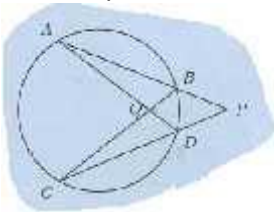
$$3k = 12$$

$$\Rightarrow k = 4$$

$$\Rightarrow \therefore d = 10k = 40$$



57. In the picture, chords AB and CD of the circle are extended to meet at P and the chords AD and BC intersect at Q



The central angle of the smaller arc AC is  $120^\circ$  and the central angle of the smaller arc BC is  $30^\circ$  what are  $\angle APC$  and  $\angle AQC$  ?

- (1)  $15^\circ, 60^\circ$  (2)  $45^\circ, 75^\circ$  (3)  $40^\circ, 80^\circ$  (4)  $50^\circ, 80^\circ$

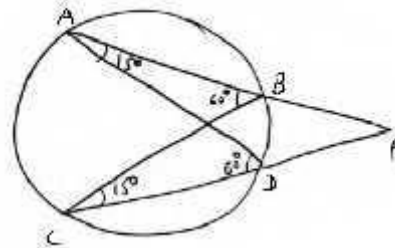
**Answer (2)**

**Solution**

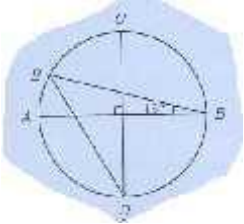
Angle made by AC at circumference

$$\frac{120^\circ}{2} = 60^\circ$$

$\therefore 45^\circ$  and  $75^\circ$



58. In the picture, AB and CD are diameters of the circle and E is a point on the circle



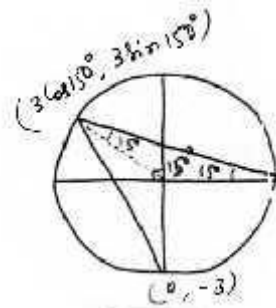
The diameter of the circle is 6 centimeters. What is the length of DE?

- (1)  $2\sqrt{3}$  (2)  $3\sqrt{3}$  (3)  $4\sqrt{3}$  (4)  $6\sqrt{3}$

**Answer (2)**

**Solution**

DE = distance between  $(0, -3)$  and  $\left(\frac{-3\sqrt{3}}{2}, \frac{3}{2}\right)$



59. An exterior angle of a regular polygon is  $36^\circ$  and one of its longest diagonals is 10 centimeters what is its perimeter?

- (1)  $100 \sin 18^\circ$  (2)  $100 \sin 36^\circ$  (3)  $100 \sin 54^\circ$  (4)  $100 \sin 72^\circ$

**Answer (2)**

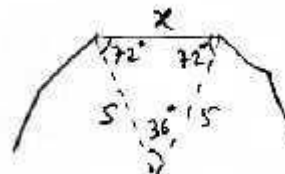
**Solution**

$$\frac{360^\circ}{n} = 36^\circ$$

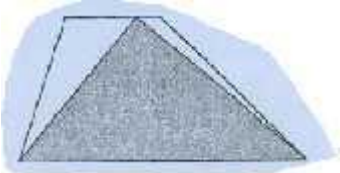
$$\Rightarrow n = 10$$

$$\frac{x}{\sin 36^\circ} = \frac{x}{\sin 72^\circ}$$

$$\Rightarrow x = \frac{5}{2 \cos 36^\circ} = \frac{5}{2} \sin 54^\circ$$



60. In the trapezium shown below, the longer of the parallel sides is three times the shorter



If a point is marked within the trapezium, what is the probability that it would be within the shaded triangle?

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

(2)  $\frac{2}{3}$

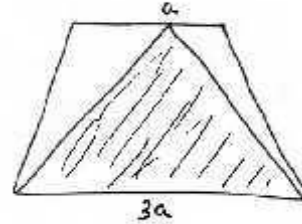
(3)  $\frac{3}{4}$

(4)  $\frac{4}{5}$

**Answer (3)**

**Solution**

$$\frac{\frac{1}{2} \times h \times 3a}{\frac{1}{2} \times h \times (3a + a)} = \frac{3}{4}$$



61. The practice of land grants in India was started by

(1) Cholas

(2) Pandyas

(3) Satavahanas

(4) Gupatas

**Answer (4)**

62. Rearrange chronologically

(a) Fall of Bastille

(3) National Assembly

(1) a b c d

(2) c a b d

(3) b c a d

(4) d a b c

(2) Oath of Tennis court

(d) Execution of Louis X VI

**Answer (3)**

63. Which among the following is the holy book of Buddhism?

(1) Purvas

(2) Angas

(3) Tripitakas

(4) Zend Avesta

**Answer (3)**

64. Which among the following is not correctly matched

(1) Mrichkatikam – Sudraka

(3) Devichandraguptam – Bharavi

(2) Svapnavasavadatta – Bhasa

(4) Dasakumaracharita – Dandi

**Answer (3)**

65. Who among the following was the God of 'Marutam' as recorded in old Tamil literature?

(1) Cheyon

(2) Mayon

(3) Kottavai

(4) Ventan

**Answer (4)**

66. Which is the correct chronological order of the following events?

(a) Quit India Movement

(c) Jallianwala Bagh Tragedy

(1) a b d c

(2) b c a d

(3) c b a d

(4) d c b a

(b) Salt Satyagraha

(d) Naval Mutiny

**Answer (3)**

67. The term 'tithe' stands for

(1) Tax levied by the Church

(2) Tax levied by the state

(3) Tax levied by the feudal lord (4) Tax on animal

**Answer (1)**

68. Mahadandanayaka under the Gupat rule was taking care of  
(1) Revenue (2) Police (3) Judiciary (4) Army

**Answer (3)**

69. Terms 'Zat' and 'Sawar' are related to  
(1) Iqta system (2) Jagirdari system (3) Ryotwari system (4) Mansabdari system

**Answer (4)**

70. 'The Fat Man' was  
(1) An atom bomb (2) A ship (3) A code name of the Gestapo (4) Name of an autobiography

**Answer (1)**

71. Which among the following is connected with the idea of 'Village Autonomy'?  
(1) Shivaji (2) Krishna Deva Raya (3) Chola administration (4) Sultanate of Delhi

**Answer (3)**

72. The film 'Grand Illusion' tells the story of  
(1) The French Revolution (2) The Russian Revolution  
(3) The First World War (4) the Second World War

**Answer (3)**

73. Which among the flowing water ways is considered as National water Way 1?  
(1) The Brahmaputra river between Sadiya and Dhubri  
(2) The West coast canal in Kerala  
(3) The Ganga river between Allahabad and Haldia  
(4) Buckingham canal of Andhra Pradesh

**Answer (3)**

74. The industries which supply their products as raw materials for other industries are called as  
(1) Consumer good industries (2) Basic industries  
(3) Footloose industries (4) Agro – bases industries

**Answer (2)**

75. The finest iron ore with more than 70% iron content is  
(1) Hematite (2) Magnetite (3) Limonite (4) Siderite

**Answer (2)**

76. Manikaran in Himachal Pradesh is known for  
(1) Geo – thermal energy project (2) Thermal power project  
(3) Nuclear energy project (4) Hydro power project

**Answer (1)**

77. Jhumming refers to  
(1) Primitive subsistence farming (2) Commercial farming  
(3) Intensive subsistence farming (4) Dairy farming

**Answer (1)**

78. Identify the terms used to denote the following and choose the correct order from those given  
(i) Species which are in the danger of extinction  
(ii) Species with a small population  
(iii) Species which are found only in some particular areas usually isolated by Geographical barriers  
(iv) Species which are not found after searches in known or likely areas where they may occur  
(1) (i) Rare species (ii) Endangered species (iii) Extinct species (iv) Endemic species  
(2) (i) Endangered species (ii) Rare species (iii) Endemic species (iv) Extinct species  
(3) (i) Endemic species (ii) Extinct species (iii) Endangered species (iv) Rare species  
(4) (i) Extinct species (ii) Endangered species (iii) Endemic species (iv) Rare species

**Answer (2)**

79. Which among the following are considered as international resource?  
(1) Forests (2) Wildlife  
(3) Oceanic resources beyond 200km from the coast of each country (4) All oceanic resources

**Answer (3)**

80. Identify the country which is large then India, in land area, but smaller then Brazil  
(1) Canada (2) USA (3) Australia (4) China

**Answer (3)**

81. In the Northern Plains 'Kankar' formations are common among  
(1) Khadar (2) Bhangar (3) Bhabhar (4) Tarai

**Answer (2)**

82. Match the following and choose the correct combination

- |                      |              |
|----------------------|--------------|
| (a) Malabar Coast    | (i) Paradip  |
| (b) North Circar     | (ii) Chennai |
| (c) Coromandal Coast | (iii) Kochi  |
| (d) Konkan Coast     | (iv) Mumbai  |
- (1) A – i B – ii C – iv D – iii (2) A – i B – ii C – iii D – iv  
(3) A – iv B – iii C – ii D – i (4) A – iii B – i C – ii D – iv

**Answer (4)**

83. One among the following features is not related to river Godavari. Dignify it  
(1) 1500 km in length (2) Originates from mahabaleswar  
(3) Know as Dakshin Ganga (4) the largest peninsular river

**Answer (1)**

84. 'Loo' is a phenomenon in India during  
(1) Hot weather season (2) Cold weather season  
(3) South west monsoon season (4) North east monsoon season

**Answer (1)**

85. Fiscal deficit may lead to  
(a) Increased debt (b) Interest payments obligation  
(c) Current account deficit (d) Capital formation alone  
(1) a, b and c are correct (2) c and d are correct (3) b and c are correct (4) only d is correct

**Answer (2)**

86. Mudra Yojana provides financial assistance to  
(1) Exports only (2) Big industrialists only  
(3) Micro and small entrepreneurs (4) Scientific experiment

**Answer (3)**

87. Stand – up India scheme is promoted by  
(1) SIDBI (2) NABARD (3) SBI (4) RBI

**Answer (1)**

88. Second generation economic reforms means  
(1) Commodity market reforms (2) Reforms introduced in 1991  
(3) Financial sector reforms (4) Reforms in factor and input markets

**Answer (2)**

89. Goods and Service Tax (GST) consists of  
(a) Central GST (b) State GST (c) Interstate GST  
(1) a only (2) b only (3) c only (4) both a and b

**Answer (4)**

90. W.T.O is a  
(1) Multilateral trade negotiation system  
(2) Bilateral trade negotiation system  
(3) Forum for trade agreements between LDCs  
(4) Forum for trade agreements between developed countries

**Answer (1)**

91. Reverse Repo rate is  
(1) Rate at which commercial banks lend to Central Bank  
(2) Rate at which central banks lend to commercial banks  
(3) Rate at which governments lands to NBFIs  
(4) Rate at which governments land to farmers

**Answer (1)**

92. Personal income is estimated by  
(1) Dividing national income by population  
(2) Adding all factor incomes  
(3) Adding all factor incomes and transfer payments  
(4) Adding all factor incomes minus transfer payments

**Answer (3)**

93. The system of power sharing by different groups is known as  
(1) Social Government (2) Community government  
(3) Local Self Government (4) Coalition Government

**Answer (2)**

94. The Article to the Indian Constitution which deals with the Panchayats  
(1) 246 (2) 245 (3) 244 (4) 243

**Answer (4)**

95. The state in which 'Kittiko – Hachchiko' Movement was started?  
(1) Andhra Pradesh (2) Karnataka (3) Telengana (4) Maharashtra

**Answer (2)**

96. Identify the secular states  
(1) Sri Lanka and India (2) Pakistan and Ireland (3) India and Nepal (4) Britain and Afghanistan

**Answer (3)**

97. Which of following is not a feature of Bureaucracy?  
(1) Permanently appointed (2) Appointed on the basis of qualification  
(3) Politically not neutral (4) Skilled in their work

**Answer (3)**

98. Few subjects in the Union List, State List and Concurrent List are given below. Identify the concurrent subjects  
(a) Currency (b) Education (c) Foreign Affairs (d) Forest  
(1) b and d (2) a and d (3) a and c (4) b and

**Answer (1)**

99. Apartheid means  
(1) Religious discrimination (2) Communal discrimination  
(3) Caste discrimination (4) Racial discrimination

**Answer (4)**

100. Which part of the Constitution of India contains Fundamental Duties?  
(1) Part – II (2) Part – III (3) Part – IV (4) Part – IV A

**Answer (2)**