UNWAL PACIFIC
Foundation | IIT-JEE | Medical | Repeater

NTSE Stage-2 (SAT)

General Instructions

1. **All questions carry one mark each.**
2. **THERE IS NO NEGATIVE MARKING.**
3. Since all questions are compulsory, do not try to read through the whole question paper before beginning to answer it.
4. Begin with the first question and keep trying one question after another.
5. If you do not know the answer to any question, do not spend much time on it and pass on to next one. If time permits, you can come back to the questions which you have left in the first instance and try them again.
6. Since the time allotted to this question paper is very limited, you should make the best use of it by not spending too much time on any question.
7. REMEMBER YOU HAVE TO MARK ANSWERS ON A SEPARATE OMR SHEET PROVIDED.
8. Answer to each question is to be indicated by DARKENING the circle having the number of the correct alternative in OMR sheet from among the ones given for the corresponding question in the booklet.
9. After the examination, you should hand over the OMR sheet to the Invigilator of the room.
10. The candidate need not return this Question paper booklet and can take it after completion of the examination. No candidate should leave the examination hall before the end of the examination.

Name of the Candidate (In CAPITALS) : _____

Roll Number : _____

OMR Bar Code Number : _____

Candidate's Signature : _____ **Invigilator's Signature** _____

SAT PAPER

1. A taxonomist during his voyage found a solitary marine animal with spines on skin made of calcium carbonate. However, its coelom was made of pouches pinched off from endoderm. Assign the specimen to the most appropriate Phylum.

(1) Chordata **(2)** Nematoda **(3)** Coelenterata **(4)** Echinodermata

2. An individual with genotype AaBbCcddEe is crossed with another individual with genotype AabbCcDdEe. Assuming mendelian pattern of inheritance, predict the proportion of aabbccddee among the progeny of this cross?

(1) 1 / 32 **(2)** 1 / 64 **(3)** 1 / 128 **(4)** 1 / 256

3. Which one of the four methods of propagation is likely to lead to maximum variation in DNA sequence through generations?

(1) Budding in Hydra **(2)** Binary fission in Amoeba

(3) Reproduction in human beings **(4)** Vegetative propagation of sugarcane

4. A case of bio-magnification was being studied. A laboratory received equal quantities of three samples M, N and O. The levels of pesticides found in these samples are as follows M-1 mg, N-0.2 mg, O-3 mg The samples M, N and O respectively could be:

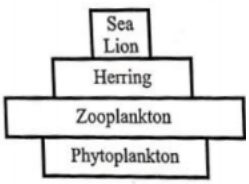
(1) Grass, grasshoppers and adipose tissue of birds

(2) Grasshoppers, grass and adipose tissue of birds

(3) Grass, adipose tissue of birds and grasshoppers

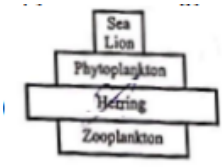
(4) Adipose tissue of birds, grasshoppers and grass

5. Illustration of a pyramid of number of an aquatic ecosystem is given.



The pyramid of energy for the same ecosystem would be:

(1)



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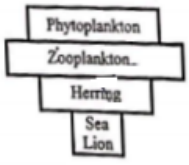
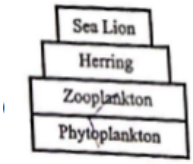


(3) 

(4) 

6. Which of the following traits would an evolutionary biologist consider to understand the divergent evolution process?

(1) Hind limb of sheep, flipper of whale and wing of a bat

(2) Flipper of shark, flipper of penguin and flipper of dolphin.

(3) Bat wing, bird wing and wing of a butterfly.

(4) Human arm, seal forelimb and wing of bird.

7. In adjacent agricultural lands of nearly equal dimensions, two farmers A and B had cultivated crops of their choice and observed standard practices. A pathogen attacked the crops and destroyed it in the land belonging to farmer A, as a result of which he suffered complete loss. Although the pathogen attached the adjacent land belonging to farmer B, he was able to earn some money by selling the yield. The possible explanation for the above is

(1) Farmer A must have cultivated only one crop whereas Farmer B must have cultivated two crops.

(2) Farmers A and B must have cultivated the same crop with a fence between the two agriculatural lands.

(3) Farmer A over irrigated the crop due to which it attracted the pathogen.

(4) Farmer B removed weeds from the cultivated land.

8. A biology teacher placed a hen's egg in three different solutions:

Solution A: Pure water,

Solution B: saturated salt solution,

Soultion C: Hydrochloric acid

The sequence of treatments and the ensuing probable effect on the egg are listed below:

I. $A \rightarrow B \rightarrow C \rightarrow$ Remains unchanged

II. $B \rightarrow C \rightarrow A \rightarrow$ Swells

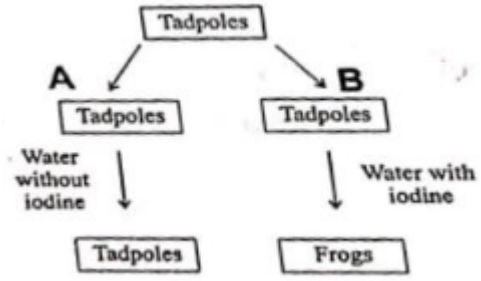
III. $C \rightarrow A \rightarrow B \rightarrow$ Shrinks

IV. B $C \rightarrow A \rightarrow C \rightarrow$ Loses salts

Based on the above sequence to treatment which one of the option will be correct?

(1) I and II **(2)** I and IV **(3)** II and III **(4)** III and IV

9. Observe the flow chart below,



Which of the following best explains the observed results?

(1) Iodine helps to produce thyroxine **(2)** Iodine inhibits thyroid gland activity

(3) Absence of iodine leads to starvation **(4)** Iodine promotes cell growth and division

10. An experiment conducted in the laboratory is tabulated below,

Test tube-A	**Test tube-B**	**Test tube-C**
Saliva + Iodine ↓ incubation	Starch + Saliva ↓ incubation	Starch + Saliva ↓ Enzyme inhibitor + incubation + Iodine

What would be the colour observed in test tubes A, B and C at the end of the experiment?

(1) A-Yellow, B-No color, C-Blue black **(2)** A-No colour, B-Blue black, C-Yellow

(3) A-Blue black, B-Yellow, C-No color **(4)** A-No color, B-Yellow, C-Blue black

11. The presence of a specific molecule (called markers) in an organelle can be used to identify the presence of that organelle. A researcher has three test tubes with organelles A, B and C, each of which shows the presence of one markers as shown below:

Organelle	**Marker**	**Function of the marker**
A	Cytochome oxidase	Involved in ATP synthesis
B	Ribosomal RNA	Part of ribosome
C	Acid hydrolyase	Degrades different molecules

Based on the information given in the table, identify the organelle A, B and C.

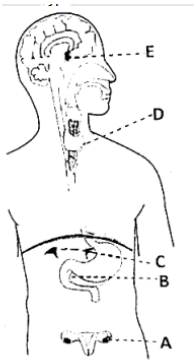
(1) A: Plastids; B:Rough Endoplasmic Reticulum (RER); C:Lysosomes

(2) A: Mitochondria; B: RER; C:Lysosomes

(3) A: Mitochondria; B:Smooth Endoplasmic Reticulum (SER); C:Golgi apparatus

(4) A: Plastids; B:SER; C:Golgi Apparatus

12. Positions of endocrine glands are labeled A-E in the given diagram. Match the symbols of glands in Column I with the type of hormone it secrets given in column 2



Column I	Column II
A	I.Progesterone
B	II. Insulin
C	III. Parathyroid hormone
D	IV. Melatonin
E	V.Follice stimulating hormone
	VI. Thyroxine
	VII. Aldosterone

Choose the correct combination from the following:

(1) A-I, B-II, C-VII, D-III, E-V **(2)** A-I, B-IV, C-II, D-III, E-VI

(3) A-V, B-II, C-IV, D-III, E-VII **(4)** A-V, B-IV, C-VII, D-III, E-II

13. Virulent forms of the bacterium Staphylococcus aureus is a human pathogen, some strains of which cause "flesh-eating disease" . Earlier the antibiotic Penicillin was used to control this pathogen. After some years Penicillin was ineffective. Hence, a powerful antibiotic-Methicillin was used in treatments. Subsequently, Methicillin also became ineffective and the strains showed resistance to multiple antibiotics also called "multi-drug resistance". Which one of the following statements regarding development of multi-drug resistance is correct?

(1) Antibiotics led to mutation in the DNA of bacterium thus creating drug resistant strains.

(2) Antibiotics helped in the selection for bacterium with mutations in the DNA conferring drug resistance which were already present in the population

(3) Even without the use of antibiotics the drug resistant strains would have evolved at the rate as observed in the above situation

(4) Presence of antibiotics induces changes in the metabolism of the bacterium leading to drug resistance.

14. 1.80 g of glucose $(C_6H_{12}O_6)$ was dissolved in 36 g of water. The number of oxygen atoms in solution are:

(1) 6.68×10^{23} **(2)** 12.40×10^{22} **(3)** 6.68×10^{22} **(4)** 12.40×10^{23}

15. Consider the following statements:

I. F, Cl, N and O are electronegative elements

II. Electrons in the atoms given in statement I are in K and L shell only

III. Tendency of forming cations decreases in second period of periodic table upto F

Correct statement (s) is/are

(1) I only **(2)** I and II only **(3)** I and III only **(4)** I, II and III

16. Let T = Temperature, H = Humidity; and v = Wind speed

Which of the following are the best suited conditions for drying up of clothes?

(1) $T=40°C, H=10\%, \text{v}=45 m/s$ **(2)** $T=28°C, H=20\%, \text{v}=35 m/s$

(3) $T=20°C, H=30\%, \text{v}=25 m/s$ **(4)** $T=15°C, H=40\%, \text{v}=15 m/s$

17. 100 mL of solutions containing 0.1 mole of NaOH per litre was mixed with 100 mL solution containing 0.02 mole of H_2SO_4 per litre. The amount of NaOH in the mixture in grams will be

(1) 0.12 **(2)** 0.24 **(3)** 2.4 **(4)** 0.36

18. On oxidation with alkaline $KMnO_4$ followed by acidification of the reaction mixture, which one of the following alcohols would produce an acid having three structural isomers?

(1) Propanol **(2)** Butanol **(3)** Pentanol **(4)** Hexanol

19. Atomic number of an element X is Element Z has two isotopes Z_1 and Z_2 with 16 and 18 neutrons, respectively. The average atomic mass of a sample of the element z is 32.1 u. Which one of the following percentages of Z_1 and Z_2 in the sample is correct?

	Z_1	Z_2
(1)	95%	5%
(2)	94%	6%
(3)	93%	7%
(4)	92%	8%

20. Detergents are also called surface active agents (surfactants). These have two distinct parts: one hydrophilic spherical part and another hydrophobic long tail made of carbons chain. Two experiments

"A" and 'B' were carried out. In experiment 'A', surfactant was added in a beaker containing water. In experiment 'B', surfactant was added in a beaker containing hexane.

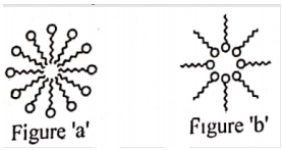
Following are possible results in these experiments:

I. In experiment 'A' (see figure 'a') micelle is formed, where hydrophobic part is inside the micelle and hydrophilic part is outside the micelle.

II. In experiment 'B' (see figure 'b') micelle of reverse type is formed where hydrophilic part is inside the micelle and hydrophobic part is outside the micelle.

III. Micelle of reverse type is formed in experiment 'A'.

IV. Micelles are large enough to scatter light in 'A'.



Correct observations are

(1) I, II and III only **(2)** I, II and IV only

(3) I, III and IV only **(4)** II, III and IV only

21. Reaction of organic compound 'A' with 'B' in acidic condition gives compound 'C'. Compound 'B' reacts with alkaline $KMnO_4$ solution and gives compound 'A'. Compound 'C' gives compound 'B' as one of the product when reacted with sodium hydroxide solution. Which of the following statement is/are correct

I. 'A' is CH_3COOH II. 'B' is CH_3CH_2OH

III. 'C' is $CH_3COOCH_2CH_3$ IV. 'A' is sweet smelling substance

(1) I and II only **(2)** I, II and III only

(3) I, III and IV only **(4)** III and IV only

22. Equal volumes of solutions containing 1 mole of an acid and 1 mole of a base respectively are mixed. Which of these mixture will give pH more than 7?

(1) Soliudm hydroxide + Acetic acid

(2) Potassium hydroxide + Sulphuric acid

(3) Ammonium hydroxide + Sulphuric acid

(4) Sodium hydroxide + Hydrochloric acid

23. A part of the modern periodic table is shown below in which elements have been represented by English letters of the alphabets.

Group → Period ↓	1	2	13	14	15	16	17
1	A						

2	B			H		J	K
3	C	E					
4	D	F					M
5	N						

On the basis of the above periodic table, which one of the following statement is incorrect?

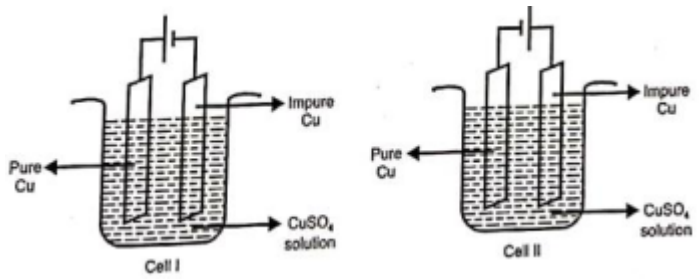
(1) M will have -1 valency

(2) C will form an ionic compound with K

(3) H will form a covalent compound with A

(4) B is small in size as compared to D and K

24. Consider the electrochemical cells (I and II) shown in the following figures and select the correct statement about these cells



(1) Cell I produces purer copper than cell II.

(2) In both cells, insoluble impurities settle down

(3) Copper from cathode will deposit on anode in cell I.

(4) Copper from anode will deposit on cathode in cell II.

25. Read the following table:

Metal	Reaction with		
	$ZnSO_4$ solution	$FeSO_4$ solution	$CuSO_4$ solution
X	No reaction	No reaction	No reaction
Y	No reaction	No reaction	Displacement reaction
Z	Displacement reaction	Displacement reaction	Displacement reaction

Based on the above table consider the following statements

I. Reaction of Y with $CuSO_4$ solution produces Cu metal

II. Z is the most reactive element and X is the lest reactive.

III. Y is more reactive than X and less reactive than Z.

IV. Metal Y produces Zn on reaction with $ZnSO_4$ solution

Which of the following options gives the correct statements?

(1) I, II and III only **(2)** I, III and IV only

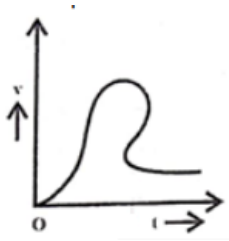
(3) II and III only **(4)** III and IV only

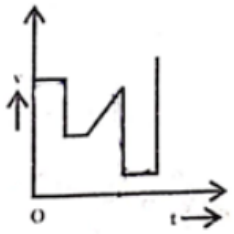
26. If excess of CO_2 is passed through the suspension of a compound 'Y' is formed. Substances 'X' and 'Y' dissolve in H_2SO_4 giving white compound 'Z' which is insoluble in water. Identify the compounds 'X', 'Y' and 'Z'

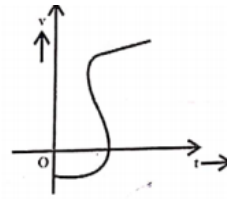
(1) $CaSO_4, CaCO_3$, gypsum **(2)** $CaSO_4, CaHCO_3$, lime

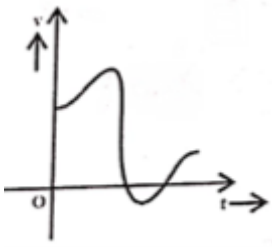
(3) $CaCO_3, CaHCO_3, CaSO_4$ **(4)** $CaHCO_3, CaCO_3, CaSO_4$

27. Figures given below show velocity –curves for a moving object. Identify the one which may be realized in practice.

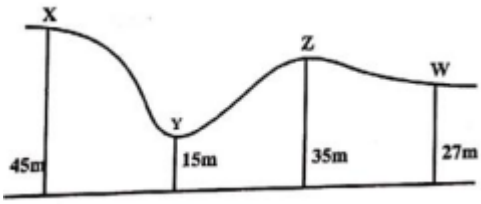
(1) 

(2) 

(3) 

(4) 

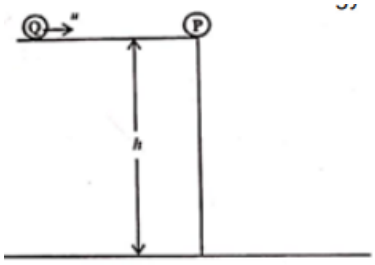
28. Two balls A and B are releases towards point W from point X and point Z respectively, on a perfectly smooth track as shown in the figure. The balls move along the track without losing contact. What will be the ratio of their speeds (v_A / v_B) at point W?



(1) 1 **(2)** 1 / 2 **(3)** 2 / 3 **(4)** 3 / 2

29. A marble P of mass 'm' lies at rest on the edge of a perfectly horizontal surface of a table of height 'h', as shown in the figure. A second identical marble Q having same mass moving at a speed 'u' strikes it perfectly elastically. The speed acquired by marble P after the collisions is:

[In an elastic collision, momentum as well as kinetic energy are conserved]



(1) 0 **(2)** $\frac{1}{2}u$ **(3)** U **(4)** 2u

30. A block floats with its fraction η_g inside water when immersed in a beaker containing water and kept on the earth. The beaker along with the block is shifted to the surface of the moon. If η_M is the fraction of the block now immersed in water, which of the following relations is correct?

(1) $\eta_M = \frac{1}{6}\eta_E$ **(2)** $\eta_M = 6\eta_E$ **(3)** $\eta_M = \eta_E$ **(4)** $\eta_M = \frac{1}{\sqrt{6}}\eta_E$

31. The weight of an object on a planet is 0.25 times of its weight on earth. A pendulum clock that ticks once every second on earth is taken to the planet. On that planet the clock would tick once in every

(1) 1.0 s **(2)** 2.0 s **(3)** 3.0 s **(4)** 4.0 s

32. A ball is thrown vertically upwards at a speed u and returns back to the thrower. There are two instants at which the ball has equal kinetic and potential energies. The difference between these two instants is:

(1) $\frac{1}{\sqrt{2}}\left(\frac{u}{g}\right)$ **(2)** $\frac{u}{g}$ **(3)** $\sqrt{2}\left(\frac{u}{g}\right)$ **(4)** $2\left(\frac{u}{g}\right)$

33. The potential energy stored in a spring when compressed by a length 'x' is $\frac{1}{2}kx^2$ and the force required to compress it is 'kx'; 'k' is a constant of the spring known as spring constant. The spring is placed on a floor upright and a stone of mass 10 kg falls and hits the spring with a speed 10 m/s. The spring is compressed by 5 cm. Assuming that there is no loss of energy, what is the value of 'k'?

[Given: acceleration due to gravity is $10\,m/s^2$]

(1) $2.0\times10^{-2}\,N/m$ **(2)** $8.0\times10^{4}\,N/m$

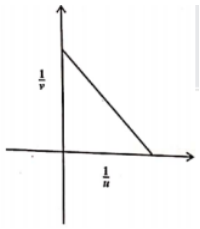
(3) $4.0\times10^{5}\,N/m$ **(4)** $2.0\times10^{6}\,N/m$

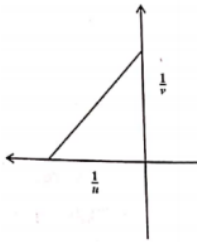
34. A girl drops a ball from a height $h = 20\,m$. It strikes the ground elastically and returns to her hand. An echo of the thud of the ball striking the ground is produced from a nearby cliff.

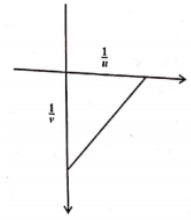
The echo is heard at exactly the same moment when the ball returns to the girl's hand. (Take $g = 10\,m/s^2$ and $v_{sound} = 350\,m/s$). The distance of the cliff from the girl is close to

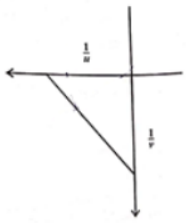
(1) 350 m **(2)** $350\sqrt{2}\,m$ **(3)** 700 m **(4)** 3500 m

35. Four graphs between $\frac{1}{u}$ and $\frac{1}{v}$ are given spherical mirrors. Which one of them suitably represents a convex mirror, as per the new Cartesian sign convention?

(1) 

(2) 

(3) 

(4) 

36. An object is placed at point A in front of a convex lens of focal length *f*. Its real, inverted and magnified image is formed behind the lens. When the object is brought closer to the lens and placed at a point B, a virtual and erect image, but with exactly the same magnification (in magnitude) as before is formed in front of the convex lens. Let F be the focus of the lens in front of it. Which of the following relations is correct?

(1) $AF = FB$ **(2)** $AB = f$ **(3)** $AF - BF = f$ **(4)** $AB = 2f$

37. Nethra, who is a back-bencher, discovers one day in the class that she is unable to discern the details on the blackboard very well. When she visits an optician, he prescribes glasses for her.

Which of the following statement(s) is/are false?

I. She suffers from myopia where the far point is nearer than the blackboard.

II. A concave lens with a suitable power can help correct her vision

III. Her eye is defective and is forming images in front of the retina.

IV. A concave lens or a convex lens may be used to correct her vision

(1) Only I **(2)** I, II and III **(3)** I, II and IV **(4)** Only IV

38. Consider three resistors of resistance R_1, R_2 and R_3 such that $R_1 < R_2 < R_3$. Two of them are connected in parallel, and then connected in series with the third. Which one of the following configurations yields and highest current when connected to the same battery?

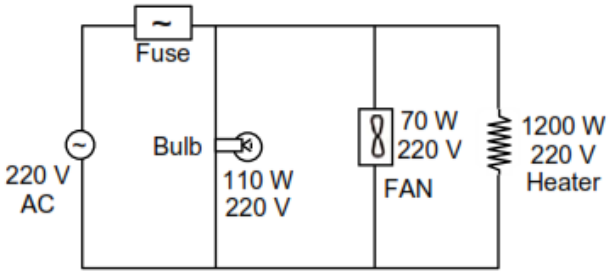
(1) R_1 and R_2 in parallel, with R_3 in series

(2) R_1 and R_3 in parallel, with R_2 in series

(3) R_2 and R_3 in parallel, with R_1 in series

(4) It will depend on the precise values of R_1 , R_2 and R_3

39. Figure shows three electrical appliances connect to a 220 V ac mains. What is the amperage (current rating) of the fuse that should be used in the circuit?



(1) 1.0 A **(2)** 2.0 A **(3)** 5.0 A **(4)** 10.0 A

40. A positively charged plate and a negatively charged plate are kept parallel to each other at a distance of 10 cm. An electron is released near the negative plate. Looking from the negative plate towards the positive plate, the magnetic field produced by the moving electron will be:

(1) clockwise **(2)** anti-clockwise

(3) positive to negative plate **(4)** negative to positive plate

41. If $x = \dfrac{\sqrt{5}-\sqrt{2}}{2\sqrt{3+\sqrt{5}}-\sqrt{2}}$, then the value of $\dfrac{x\sqrt{10}+\sqrt{2}}{x\sqrt{10}+2\sqrt{5}}$ is

(1) $\dfrac{15+\sqrt{10}}{41}$ **(2)** $\dfrac{15-\sqrt{10}}{41}$

(3) $\dfrac{15+\sqrt{10}}{43}$ **(4)** $\dfrac{15-\sqrt{10}}{47}$

42. On dividing a natural number x by 11, the remainder is 3, and on dividing x by 17, the remainder is 9. If the number x lies between 300 and 400, then the remainder on dividing x by 21 is

(1) 9 but not 11 **(2)** 11 but not 9

(3) both 9 and 11 **(4)** neither 9 nor 1

43. If $(ax+b)(x^5+1)-(5x+1)$ is divisible by x^3+1, then the value of $2a+3b$ is

(1) 5 **(2)** 10 **(3)** 12 **(4)** 13

44. Suppose the graphs of $15x+20y=-2$ and $x-y=-2$ intersect at a point P . If the graph of $2x+3y=k^2$ passes through P, then k is

(1) an integer **(2)** a positive integer

(3) a negative integer **(4)** not an integer but rational

45. The sum of the squares of the third and the thirteenth terms of an A.P. is 5, and the product of the fourth the twelfth terms is R. Then, the product of the third and thirteenth terms of the AP is

(1) $\frac{80+50R}{41}$ **(2)** $\frac{80+50R}{82}$ **(3)** $\frac{100R-45}{82}$ **(4)** $\frac{100R-45}{41}$

46. If α and β are the roots of the quadratic equation $2x^2-5x-6=0$ and $P_{n+1}=\alpha^n-\beta^n$ then the value of $\frac{P_9-3P_7}{4P_8}$

(1) 3 / 8 **(2)** 5 / 8 **(3)** 7 / 8 **(4)** 9 / 8

47. A number is picked up at random from the numbers from 1 to 1000. The probability that it is of the form m^n (where $m>1, n>1$) is

(1) $\frac{1}{20}$ **(2)** $\frac{1}{25}$ **(3)** $\frac{1}{30}$ **(4)** $\frac{1}{39}$

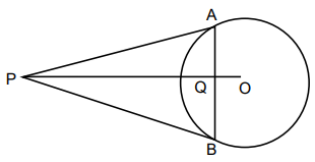
48. Let $A(-5,5), B(4,-5)$ and $C(4,5)$ be the vertices of the triangle ABC. If a circle passes through the vertices of ΔABC then the area (in sq. units) lying inside the circle but outside the ΔABC is

(1) $\frac{181}{2}\pi-45$ **(2)** $\frac{181}{2}\pi-40$ **(3)** $\frac{181}{4}\pi-45$ **(4)** $\frac{181}{4}\pi-40$

49. The coordinates of points A, B and C are $(7,4),(3,1)$ and $(0,k)$, respectively. Then, the value of k, such that $AC+BC$ is minimum is

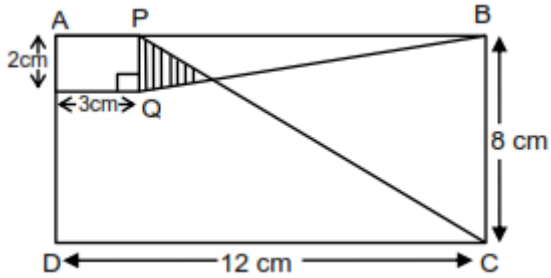
(1) $\frac{-5}{4}$ **(2)** $\frac{19}{10}$ **(3)** $\frac{5}{4}$ **(4)** $\frac{9}{10}$

50. Two tangents PA and PB are drawn to a circle with centre O from an external point P. The chord AB intersect the line segment PO at Q. Then, the square of the radius of the circle is



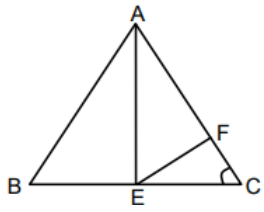
(1) $OQ \times QP$ **(2)** $OQ \times OP$ **(3)** $PQ \times AB$ **(4)** $PA \times PB$

51. In the given figure . ABCD is a rectangle. Then, the area of the shaded region is



(1) 1.2 sq. units **(2)** 1.4 sq. units **(3)** 1.6 sq. units **(4)** 1.8 sq. units

52. In the given figure, ABC is an isosceles triangle with $AB = AC$. If $AE = AF$ and $\angle BAE = 40°$, then the measure of the angle FEC is



(1) 15° **(2)** 20° **(3)** 40° **(4)** 60°

53. In an equilateral ΔABC, side BC is produced to D and $DF \perp AB$ such that DF is intersecting AC at E. If $BC = 2CD$ and $AF = 6cm$, then the length (in cm) of BF is

(1) 9 **(2)** 12 **(3)** 15 **(4)** 18

54. Water is flowing at the rate of 10 cm/minute through a pipe of diameter 10 cm into an empty bucket, which is in the form of frustum of a cone of height 30 cm with radii of its lower and upper ends as 10 cm and 20 cm respectively. Then, the time in which the level of water in the bucket will rise 15 cm, is

(1) $\frac{\sqrt{17}}{10}$ minutes **(2)** $\frac{\sqrt{19}}{5}$ minutes **(3)** $\frac{\sqrt{17}}{5}$ minutes **(4)** $\frac{\sqrt{19}}{10}$ minutes

55. The largest possible area of ΔABC with $AB = 5cm$ and the sum of other two sides as 7 cm is

(1) $5\sqrt{6}\,cm^2$ **(2)** $\frac{5}{2}\sqrt{6}\,cm^2$ **(3)** $\frac{5}{2}\sqrt{3}\,cm^2$ **(4)** $5\sqrt{3}\,cm^2$

56. If $u = \cos\theta\left(\sin\theta + \sqrt{\sin^2\theta + \sin^2\alpha}\right)$ then $|u|$ is less than or equal to

(1) $\sqrt{1+\sin^2\alpha}$ **(2)** $\sqrt{1+\cos^2\alpha}$ **(3)** $\sqrt{2+\sin^2\alpha}$ **(4)** $\sqrt{2+\cos^2\alpha}$

57. Two straight roads OA and OB intersect at O. A tower is situated in the interior of the angle formed by them and subtends an angle of 45° and 30° at the points A and B respectively , where the road are nearest to it. If OA $= a$ and $OB = b$, then the height of the tower is

(1) $\sqrt{\frac{a^2-b^2}{2}}$ **(2)** $\sqrt{\frac{b^2-a^2}{2}}$ **(3)** $\sqrt{\frac{3\left(b^2-a^2\right)}{2}}$ **(4)** $\sqrt{\frac{3\left(a^2-b\right)^2}{2}}$

58. ABCD is a square of side 8 cm, P is the mid-point of AD and is joined with vertex B. A perpendicular is drawn from the vertex C on BP, which intersects BP at point E. The area of the triangle BEC is

(1) $\frac{64}{5}cm^2$ **(2)** $\frac{64}{\sqrt{5}}cm^2$ **(3)** $\frac{32}{5}cm^2$ **(4)** $\frac{32}{\sqrt{5}}cm^2$

59. The mean of three numbers is 10 more than the least number and 15 less than greatest number. If the median of three number is 5, then the sum of square of these number is

(1) 625 **(2)** 650 **(3)** 675 **(4)** 725

60. *A* and *B* are two metallic solid spheres such that the surface area of B is 800% more than that of A. If the volume of A is x% less than that of B, then the value of x is closest to

(1) 64.2 **(2)** 72.4 **(3)** 95.5 **(4)** 96.3

61. Which of the following statements regarding the position and role of women during the French Revolution are correct?

I. Olympe de Gouges was a supporter of 'The Declaration of Rights of Man and Citizen.'

II. Women were disappointed that the Constitution of 1791 reduced them to passive citizens.

III. The Revolutionary Government made education compulsory for girls, marriage was made into a contract and divorce was made legal.

IV. The Revolutionary Government finally recognized women's struggle for equal Political Rights and gave them the right to vote

(1) I and II **(2)** I and IV **(3)** II and III **(4)** III and IV

62. Which of the following statements about socialism are correct?

I. Robert Owen was the founder of New Harmony.

II. Louis Blane wanted Government supported co-operatives.

III. Marx argued that all property should be socially controlled

IV. Robert Owen also believed that workers should construct a radically socialist society.

(1) I, II and III **(2)** I, II and IV **(3)** I, III and IV **(4)** II, III and IV

63. Which of the following statements about Maasais are correct?

I. Maasais are found in Tanzania and Kenya.

II. Samburu Natational Park is situated in Tanzania.

III. The title Maasai is derived from the word 'maa', which means 'my land'.

IV. Maasai land was taken away by not only British Kenya, but also German Tanganyika.

(1) I and II **(2)** I and IV **(3)** I, II and III **(4)** II, III and IV

64. With regard to Polo, identify correct statements from the following

I. Polo was a game of European origin.

II. Sultan Qutubuddin Aibak died while playing Polo.

III. Polo was suitable for military and athletic young men.

(1) Only II is true **(2)** Both I and II are true, but III is false

(3) Both I and III are true, but II is false **(4)** Both II and III are true, but I is false

65. With regard to women clothing after World War is Europe; identify the correct statements from the ones given below.

I. Wars eroded distinctions among women in Europe.

II. World War I shortened women's clothes for practical necessity

III. New schools encouraged luxurious dressing and ornamentation.

(1) Only I is true **(2)** I and II are true and III is false

(3) II and III are true and I is false **(4)** I and III are true and II is false

66. In the light of political developments that took place in the first quarter of twentieth century India, match the following

Place	Event	Year
I. Amritsar	A.Mill workers strike	i. 1916
II. Kheda	B.Rowlatt act	ii. 1917
III. Ahmedabad	C. Peasant stoke	iii. 1918
IV. Champaran	D. Plantation workers stike	iv.1919
	E.Khilafat movement	v.1920

(1) I-B-iv, II-C-ii, III-A-iii, IV-D-i **(2)** I-E-ii, II-B-iv, III-A-iii, IV-D-v

(3) I-D-iv, II-C-ii, III-A-iii, IV-B-i **(4)** I-C-ii, II-B-iv, III-A-iii, IV-E-i

67. A history excursion of your school involved a visit to four counties. It first went to a city which had a treaty signed in early nineteenth century approving of a 'new conservatism'. It then travelled to the former kingdom of Sardinia-Piedmont, followed by a visit to the country once ruled by the 'Hohenzollern dynasty' and finally reaching a city where many feel sowed the seed sof Nazism and the Second World War were sown.

The correct sequence of the countries visited would be:

(1) Austria-Italy-Germany and France **(2)** Germany-Italy-Austria and France

(3) France-Germany-Italy and Austria **(4)** Austria-Italy-France and Germany

68. Nationalism in India which emerged as a force in the late nineteenth century meant strong devotion for

(1) all countries of the world

(2) one's own country, its history and culture

(3) one's own country and hatred towards others.

(4) one's own country without appreciation of other nations.

69. Which of the following provides the most appropriate sequence of events in the context of the French revolution?

(1) Increase in population-scarcity of grains rising food prices-inability of the poor to buy bread – food riots.

(2) Scarcity of grains-increase in population-rising food prices-inability of the poor to buy bread-food riots.

(3) Food riots-scarcity of grains-bad harvest-rising food prices-inability of the poor to buy bread.

(4) Increase in population-rising food prices-scarcity of grains-food riots-inability of the poor to buy bread.

70. Imagine yourself as a Kulak during Stalin's Collectivisation programme. Which of the following would you have excluded from your objection(s) to Collectivisation?

I. Support to socialism

II. Independent cultivation

III. Work in collective farms

IV. Transfer of land to collective farms.

(1) I and II only **(2)** I and IV only **(3)** II and III only **(4)** III and IV only

Directions (71-75): Read the statements and select the correct answer from the options given below.

1. Statements –I is True, Statement-II is False
2. Statements –I is False, Statement-II is True
3. Both Statements are True and Statement-II provides explanations to Statement-I
4. Both Statements are True and Statement-II does not provide explanations to Statement-I

71. **Statement-**I: During the Civil Disobedience movement, 'no rent' campaign were carried out in most places.

Statement-II: The relationship between the poor peasants and the congress remained uncertain

(1) **(2)** **(3)** **(4)**

72. **Statement-I:** Mahatma Gandhi successfully organized the Satyagraha movement of 1916 and 1917 in favour of peasants.

Statement-II: In Champaran, Gandhi ji inspired the middle class to struggle against to oppressive plantation system and in Kheda district of Gujarat he supported their demand for relaxation in revenue collection affected by crop failure.

73. **Statement-I:** Khadar soils are poor in organic matter yet these soils are very fertile.

Statement-II: Khadar soils are fertile because they fall in the flood plain zone of the river.

74. **Statement-I:** Indian citizens have the right to freedom.

Statement-II: Indian citizens have the freedom to criticize the core values of the Constitution.

75. **Statement-I:** Some form of social grouping has to be expressed in politics through gender division.

Statement-II: The Panchyati Raj Act was enacted to have a fair proportion of women in the local bodies.

76. In India, there are landlocked states as well as states with long coastilines. Madhavan is planning to travel from Srinagar to Kanyakumari. What is the minimum number of land locked and coastal states that he would have to traverse excluding the origin and destination UTs/States?

(1) 3,2 **(2)** 3,3 **(3)** 2,2 **(4)** 2,3

77. Geological structure, physiography and precipitation regimes influence evolution of drainage patterns. India with its diversity in the above mentioned attributes showcase a variety of drainage patterns across regions. Match the following drainage patterns found in the regions given below

Drainage Pattern	Region
A: Centripetal	I. Narmad Basin
B. Raidal	II. Godvari Basin
C. Trellis	III. Loktak
D. Dendritic	IV. Amarkantak
	V. Aravalli

(1) A-III, B-IV, C-V, D-II **(2)** A-IV, B-III, C-V, D-III

(3) A-III, B-IV, C-I, D-II **(4)** A-V, B-III, C-I, D-IV

78. Colonialism has been so far defined in terms of political, economic and social changes brought in the colonies. The aspect related to changes bringing in the biodiversity of the colonies has received little attention. One such practice was the introduction of new species of trees by the colonizers in the colonies.

Identify two trees that were introduced by colonizers in India.

I. Birch II. Teak III. Chir Pine IV. Rhododendron

(1) I and II **(2)** II and III **(3)** II and IV **(4)** III and IV

79. Indian farmers adopt diverse farming practices in different environmental conditions in order to maximize the yield. Identify the type of farming where the second crop is seeded even before the harvesting of the previous standing crop.

(1) Inter Cropping **(2)** Mixed Cropping **(3)** Relay Cropping **(4)** Multiple Cropping

80. During the South-West monsoon season, Indian receives the maximum amount of rainfall. However, it varies from place to place. Choose the correct sequence of regions arranged in descending order of rainfall received from South West Monsoon.

(1) Khasi Hills, Western Ghats, Bengal Delta

(2) Western Ghats, Khasi Hills, Bengal Delta

(3) Bengal Delta, Khasi Hills, Western Ghats

(4) Bengal Delta, Western Ghats, Khasi Hills

81. Different types of soils are found in India having special characteristic features. One of these extends approximately between 13 degree N to 25 degree N latitudes and 72 degree E to 82 degree E longitudes. Identify the soil type form the given options.

(1) Red Soil **(2)** Black Soil

(3) Laterite Soil **(4)** Red and Yellow Soil

82. Samanwita is taking her friends from Gandhinagar to her Grand Parents' home located in Kolkata. They board the flight from Gandhinagar and fly over Bhopal and Ranchi to reach Kolkata. Which of the following statements are true regarding their travel?

I. Travelled over saline soils, badlands, calcareous soil and alluvial soils.

II. Flew across Vindhyas, Bundelkhand, Chotanagpur plateau and Rahr regions.

III. Almost traversed along the Tropic of Cancer.

IV. Crossed rivers Chambal, Son and Damodar on the way

(1) I and II **(2)** I and IV **(3)** II and III **(4)** III and IV

83. The Western Ghats and Eastern Ghats are marked by many differences in terms of geographical aspects.

Which of the following statements are true about the Eastern and Western Ghats?

I.Western Ghats are more continuous than Eastern Ghats.

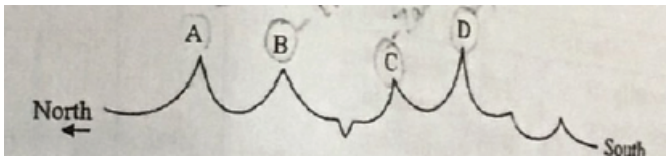
II. Cardamon Hills, Javadi Hills, Hevaroy Hills and Nallamalai Hills and part of Eastern Ghats.

III. Western Ghats have higher elevation than Eastern Ghats.

IV. Doda Betta and Mahendragiri are the highest peaks of Western and Eastern Ghats respectively.

(1) I and II only **(2)** II and II only **(3)** II and IV only **(4)** III and IV only

84. Himalayas are the young mountains originated from the sedimentary deposits of the Tethys Sea due to collision of continental plates. The process has remained active over millions of years resulting into a series of almost parallel ranges of different heights. Identify the Himalayan and Trans-Himalayan ranges from their cross-section given below.



(1) A = Karakoram; B = Zaskar; C = Ladakh; D = Himadri.

(2) A = Zaskar; B = Karakoram; C = Himadri; D = Ladakh.

(3) A = Karakoram; B = Ladakh; C = Zaskar; D = Himadri.

(4) A = Zaskar; B = Himadri; C = Ladakh; D = Karakoram.

85. Rivers are an important element of the physical landscape of India. Variations in the environmental factors have resulted in the evolution of diverse drainage systems, Which of the following statements is/are incorrect about the drainage system of India?

I. The Beas flows into Pakistan and Joins Sutlej.

II. Sutlej and Indus are examples of antecedent drainage.

III. River Luni drains into Sambar Lake which is an example of inland drainage.

IV. The rivers flowing from the western slopes of Western Ghats are swift and have a short course.

(1) I and III **(2)** I, II and III **(3)** II and III **(4)** II, III and IV

86. Understanding the spatio-temporal aspects of population is one of the main concerns of demographers. They have tried to measure the aspects of the same by selecting certain key indicators. Match the indicators listed in column I with the explanations given in column II

Column I		**Column II**	
A.	Density of population	I	Increase or decrease in population
B.	Population Growth	II	Number of people in a given area.
C.	Natural Growth	III	Man-Land ratio
D.	Distribution of population	IV	Birth Rate minus Death Rate
		V	In migration minus out Migration

(1) A-II, B-V, C-I, D-III **(2)** A-III, B-IV, C-I, D-II

(3) A-III, B-I, C-IV, D-II **(4)** A-II, B-IV, C-III, D-V

87. Federalism is the most popular form of democratic governance today. With reference to a federal political system, which of the following does NOT hold true?

(1) Spain, Pakistan and South Africa are examples of a federal system

(2) Holding together federations always give equal power to its constituent units.

(3) The jurisdiction and authority of each tier of government is constitutionally mandated.

(4) For a dispute relating to division of powers it is the High Courts and Supreme Court of India which interpret the Constitution.

88. Regular elections are the backbone of a democracy. Arrange the following election related activities in a correct sequence.

I. Announcement of election schedule. **II.** Election Campaign

III. Making of voters' list. **IV.** Polling of votes.

V. Counting of votes.

VI. Announcement of election results and issue of press note.

Which of the following indicates the correct sequence of activities?

(1) III, IV, VI, V, III, I **(2)** VI, III, I, II, IV, V

(3) I, II, III, V, IV, VI **(4)** III, I, II, IV, V, VI

89. The constitution of India was drafted by a group of elected representatives called the constituent assembly. With reference to the above , the members of the constituent assembly from the provinces were _____.

(1) directly elected by the people of those provinces.

(2) elected by the Provincial legislative assemblies.

(3) nominated by the Indian National congress and the Muslim League

(4) nominated by the government for their expertise on constitutional matters.

90. Consider the following statements about the Rule of Law:

I. Everybody shall be ruled by law as decided by the judiciary.

II. No man shall be punished except for clear breach of law.

III. Every body except persons holding constitutional positions like the present and the election commissioner shall be subjected to law.

IV. The term 'Rule of Law' was coined by F.A. Hayek.

Which of the above statement/s is/are correct?

(1) I, II and III **(2)** I, II and IV **(3)** II, III and IV **(4)** II only

91. Consider the following statements about the process of Amendment in the Constitution of India:

I. An amendment to the constitution of India can be initiated by introduction of a bill in the Lok Sabha only.

II. If such an amendment seeks to make changes in the federal character of the constitution, the amendment need to be ratified by the legislature of all the States of India.

Which of the statement/s given above is/are correct

(1) I only **(2)** II only **(3)** Both I and II **(4)** Neither I nor II

92. The constitution of India provides for division of power between the Union and the States enumerated in three lists. Based on the division of subjects in the lists, identify the ones which are correctly matched.

I. Citizenship and extradition-Union List
II. Public health and sanitation –State list
III. Forest and trade-Concurrent list
IV. Computer software and digital privacy –State list

Choose the correct option:

(1) I and II **(2)** I, II and III **(3)** I, III and IV **(4)** I, II, III and IV

93. In a social science class, the teacher asked the students to give their opinion about ensuring food security in India. Opinions given by Pahi, Saju, Zara and Veda are given below. Whose opinion is NOT suitable for achieving food security?

(1) Saju: Provide subsidy for export of food grains.

(2) Pahi: Increase food grain production in our country

(3) Veda:Penalise the persons who waste food grains in our country.

(4) Zara: Provide free food grains to all people below poverty line in our country.

94. Inexpensive Chinese locks are flooding the Indian markets, thus destroying the traditional lock industry of India. Which of the following methods can the Government of India take up to protect the Indian lock industry?

I.Revalue Indian currency.

II.Give subsidy on the import of Chines lock

III.Impose import tax on the import of Chinese lock.

IV. Place limit on the number of goods that can be imported.

(1) I and II **(2)** I and IV **(3)** II and IV **(4)** III and IV

95. Of the 200 households in the village of Chandanwadi, 100 households are debtors. They have borrowed money from the following sources.

Sources of Credit	**No. of Households**
Landlords	22
Bank of India	5
Farmers cooperative bank	15
Money lenders	18
Bank of Allahabad	10
Friends and relatives	15
Maharashtra State Cooperative Bank	15

Based on the table given above which of the following statements are correct?

I. Formal sources of credit are lower than informal sources.

II. Informal sources of credit are lower than formal sources.

III. One-fifth of debtors borrowed from friends and relatives

IV. Money lenders and landlords continue to be major sources of credit in the village.

(1) I and III **(2)** I and IV **(3)** II and III **(4)** III and IV

96. Dhanno gets up in the morning and milks her cow. She sells milk to three houses. She then cooks food for her family, and prepares her children for school. At 10 a.m. she goes to the market with vegetables from her garden and sells it. By 11.30 a.m. she goes to Simranjeet's family. At 2.00 p.m. she goes to Harpreet's house and washes clothes. By 5.00 pm she goes home and washes her family's clothes.

Identify the economic activities performed by Dhanno**.**

I. Getting her children ready for school. II. Cooking food for her family

III. Cooling for Simranjeet's family IV. Washing her family's clothes

V. Washing Harpreet's clothes VI. Selling vegetables

VII. Selling milk

(1) I, III, IV and VI **(2)** II, V, VI and VII

(3) I, II, III and V **(4)** III, V, VI and VII

97. Himmatveer has inherited land and Rs. 2,50,000 from his father. He decided to build a factory on the land. He spent Rs. 2,00,000 for the building. To purchase the machines he took a loan of Rs. 75,000 from the bank and purchased machines. After six months, he could start production. He used the rest of the money that he has inherited to purchase the raw materials required. His fixed capital and the working respectively are:

(1) Rs. 2,00,000 and Rs. 50,000 **(2)** Rs. 2,75,000 and Rs. 50,000

(3) Rs. 50,000 and Rs. 2,00,000 **(4)** Rs. 50,000 and Rs. 2,75,000

98. Based on the given table, arrange the following households in the order of the most poor to the least poor.

Name of head of house hold	Location of residence	Daily wage	No. of work days per person	Size of the house-hold	No. of working members
Jeewan	Mumbai	100	15	7	2
Yashwant	Village	80	25	3	3
Sheelam	Bangalore	100	25	4	3
Sumer	Village	100	15	6	2

(1) Yeshwnat, Sumer, Sheelam, Jeewan **(2)** Sheelam, Yeshwnat, Jeewan, Sumer

(3) Jeewan, Sumer, Sheelam, Yashwant **(4)** Sumer, Sheelam, Yashwant, Jeewan

99. The following data are given according to the Economic Survey 2012-13

	Life expectancy at birth (2006-10) (in years)	Infant Mortality rate (2011) per 1000 live births	Death rate (per 1000)
Odisha	63.0	57	8.8
Rajasthan	66.5	52	6.7
West Bengal	69.0	32	6.2
Maharashtra	69.0	25	6.3

Which alternative shows the States with descending order of health indicators?

(1) Maharashtra, West Bengal, Rajasthan, Odisha

(2) Maharashtra, West Bengal, Odisha, Rajasthan

(3) West Bengal, Maharashtra , Rajasthan, Odisha

(4) Odisha, Maharashtra, West Bengal, Rajasthan

100. Economic tools and their relevant objectives are as follows:

Tools	A. Issue price
	B. Minimum Support Price
Objectives:	I. To create more buffer stock.
	II. to reduce malnutrition in India
	III. To encourage farmers to produce more food grains.
	IV. To distributed food grains in deficit.

Which alternative gives correct combination of tools and their objectives.

(1) A-I and II, B-III and IV **(2)** A-II and IV, B-I and III

(3) A-I and III, B-II and IV **(4)** A-I and II, B-II and IV

End of NTSE (SAT)