Time. 2 hours

SOS Hermann Gmeiner School Sanothimi

Entrance Exam 2025/Grade XI [MODEL QUESTION]

Instructions.

- Do not write on this question paper.
- There are altogether 100 questions. For every correct answer, the candidates will be awarded with 1 full mark.
- There won't be any negative marking in case of wrong answers.
- Overwriting is strictly prohibited. If found doing so, the particular answer will be considered wrong.
- Use of pencil and calculator is forbidden.
- Read the questions carefully. Indicate the correct answer by shading the circle under the options a, b, c, or d on the given answer sheet.
- Shading should start from the centre of the circle towards the periphery.
- Use black pen only

Example

SOS Hermann Gmeiner School Sanothimi was established in

a. 1973 b. 1970 c. 1948 d. 1946

The correct answer is 'a'.

a	b	c	d
●	○	○	○

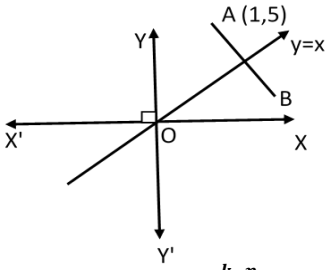
SET-A

1. **If $\sin\theta$ is the geometric mean between $\sin\emptyset$ and $\cos\emptyset$, then $\cos 2\theta$ is equal to**

a. $2\sin^2\left(\frac{\pi}{4}-\emptyset\right)$ b. $2\cos^2\left(\frac{\pi}{4}-\emptyset\right)$ c. $2\cos^2\left(\frac{\pi}{4}+\emptyset\right)$ d. $2\sin^2\left(\frac{\pi}{4}+\emptyset\right)$

2. **In the figure alongside, point B is the reflection of the point A (1,5) in the line y=x. What is the length of AB?**

a. 4 b. $4\sqrt{2}$ c. $4\sqrt{3}$ d. $3\sqrt{2}$



3. **The equation $y^2 - x^2 + 2x - 1 = 0$ represents**

a. a pair of intersecting straight lines b. a pair of parallel straight lines

c. a circle d. a parabola

4. **If $13 \le k \le 21$, $9 \le p \le 19$, $2 < m < 6$, k, p, m are integers, what is the largest possible value of $\frac{k-p}{m}$?**

a. 3 b. 5 c. 6 d. 4

5. **If A and B are positive acute angle such that $\cos A = \frac{3}{\sqrt{10}}$, $\sin B = \frac{1}{\sqrt{5}}$, then A+B is equal to**

a. 135^0 b. 45^0 c. 60^0 d. 120^0

6. **The compound interest calculated yearly on a certain sum of money upto the fourth year is Rs.1320 and fifth year is Rs.1452. Then the rate of interest is**

a. 5% b. 6% c. 8% d. 10%

7. **If $y^2 - y = 0$, $7^{4x-3} = y$ and y is a positive integer, then the value of x is**

a. $\frac{4}{3}$ b. $\frac{3}{4}$ c. $\frac{-4}{3}$ d. $\frac{-3}{4}$

8. **What is the sum of the slopes of the straight lines represented by the equation $3x^2-4xy+2y^2=0$**

a. 2 b. $\frac{3}{2}$ c. $\frac{2}{3}$ d. 5

9. **Let the function g be defined by g = {(-2,4),(-1,1), (0,6), (1,-1), (2,8)}which statement is true?**

a. g(1) =g(-1) b. g(2)+g(-2) =0 c. g(-2)=$\frac{1}{2}$ g(2) d. g(0)=g(1)+g(-1)

10. **If $\sin x+ \sin^2 x =1$, then $\cos^8 x+ 2\cos^6 x+ \cos^4 x=$ ……?**

a. 0 b. -1 c. 2 d. 1

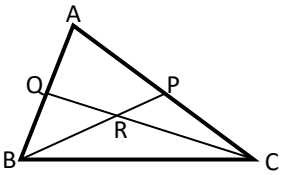
11. **In the figure, BP and CQ are the medians of ΔABC. Then which of the following relation is not true?**

a. ΔAQC = ΔBPC

b. ΔABP = ΔBQC

c. ΔBRC= Quad. AQRP

d. 2Quad. AQRP = ΔABC

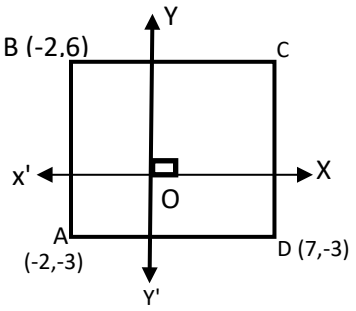


12. **The sum of the first n terms of an AP is $3n^2 -n$ and its common difference is 6, then its first term is**

a. 1 b. 2 c. 3 d. 4

13. **Which of the following is an equation of the line that contains diagonal AC of the square ABCD shown in the adjoining figure?**

a. y=2x+1 b. y=-x+1 c. y=$\frac{1}{2}$x -2 d. y=x-1

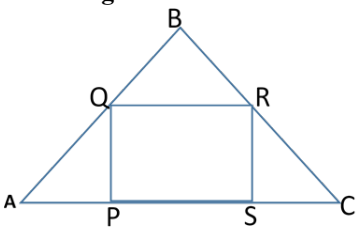


14. **If A and B are two sets, then the symmetric difference of the sets A and B is denoted by**

a. A-B b. B-A c. AΔB d. $\overline{A \cup B}$

15. **In the figure alongside ,the vertices of square PQRS lie on the sides of equilateral triangle ABC. If the area of square is 3, what is the perimeter of ΔABC ?**

a. $6\sqrt{3}$ b. $3 + 6\sqrt{3}$ c. $6 + 3\sqrt{3}$ d.9



16. **The graph of y = f(x), where f(x) is a quadratic polynomial meets the x-axis at (–2, 0) and (–3,0), then the expression for f(x) is :**

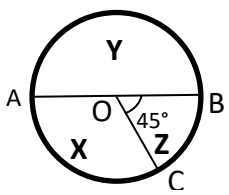
a. $x^2+5x + 6$ b. $x^2 - 5x + 6$ c. $x^2+5x- 6$ d. $x^2 -5x– 6$

17. **The diagonals of a rhombus are 6cm and 8cm. The perimeter of the rhombus is**

a. 18cm b. 28cm c.20cm d.14cm

18. **In the given diagram, a fair spinner is placed at the center O of the circle. Diameter AB and radius OC divides the circle into three regions labelled X,Y and Z. If ∠BOC=45^0, what is the probability that the spinner will lie in the region X?**

a. $\frac{2}{7}$ b. $\frac{3}{5}$ c. $\frac{3}{8}$ d. $\frac{2}{5}$



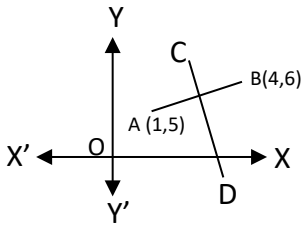
19. In the figure, CD is the perpendicular bisector of AB. At what point does the line CD intersect Y –axis ?

a. (0,13)

b. (0,10)

c. (0,12)

d. (0,15)



20. If a $+\frac{1}{a} = 2$, what is the value of $\sqrt{a} + \frac{1}{\sqrt{a}}$?

a. 2 b. 4 c. 9 d. 13

21. Values of p for which (x-1) is a factor of $x^3 + (p+1)^2x^2 - 10$ are

a. 4,2 b. 2,-4 c. -2, 4 d. -2, -4

22. A cylinder, a cone and a hemisphere have equal base and have same height. What is the ratio of their volumes?

a. 1:2:3 b. 2:3:1 c. 3:2:1 d. 3:1:2

23. Ram ate $\frac{1}{4}$ of a whole pizza and Hari ate $\frac{1}{5}$ of the remaining portion. What fraction of the pizza was not eaten?

a. $\frac{11}{20}$ b. $\frac{9}{20}$ c. $\frac{3}{20}$ d. $\frac{3}{5}$

24. Which of the following cannot be the length of sides of a right angled triangle?

a. 9cm, 15cm, 12cm b. 2cm, 1cm, √5 cm c. 400mm, 300mm, 500mm d. 9cm, 5cm, 7cm

25. A tower subtends an angle α at a point 'A' in the plane of its base and the angle of depression of the foot of the tower at a point b metres just above A is β . Then the height of the tower in metres is

a. b$\tan\alpha.cot\beta$ b. b$\cot\alpha.tan\beta$ c. b$\tan\alpha.tan\beta$ d.b$\cot\alpha.cot\beta$

26. If A=$\begin{pmatrix} 4 & 2 \\ -1 & 1 \end{pmatrix}$ and I is an identity matrix of order 2x2, then (A-2I) (A-3I)=

a. 1 b. 0 c. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ d. $\begin{bmatrix} 0 & 0 \\ 0 & 1 \end{bmatrix}$

27. If 2a+b =7 and b+2c=23, what is the arithmetic average of a, b and c?

a. 5 b. 10 c. 15 d. 7.5

28. The circle $x^2 + y^2$ -2ax-2ay+a^2=0 (a≠0)

a. passes through the origin b.touches only x-axis

c. touches only y-axis d. touches both the axes

29. ABCD is parallelogram with diagonals AC and BD .Then$\overrightarrow{AC} - \overrightarrow{BD}$ =

a. $\overrightarrow{AC}$ b. $2\overrightarrow{AB}$ c. $3\overrightarrow{BD}$ d. $4\overrightarrow{DA}$

30. A number 'a' increased by 20% of a results in a number b. when b is decreased by $33\frac{1}{3}$ % of b, the results is c. the number c is what percentage of a ?

a. 40% b. 60% c. 80% d. 120 %

31. Three identical cylindrical vessels, A, B, and C, contain liquids with densities $\rho_A < \rho_B < \rho_C$. The height of the liquid columns in all three vessels is the same. Which of the following statements is true about the pressure exerted by the liquids on the base of the vessels?

a. Pressure is maximum in vessel A b. Pressure is maximum in vessel B

c. Pressure is maximum in vessel C d. Pressure is equal in all the vessels

32. Specific heat capacity of a substance can be expressed as C_1 cal/g°C or C_2 cal/g°F. What is the value of C_1 in terms of C_2?

a. $C_2/1.8$ b. $C_2 \times 1.8$ c. C_2 d. $C_2+1.8$

33. When two liquids of equal mass but different temperatures are mixed, the final temperature of the mixture is observed to be closer to the initial temperature of one of the liquids. What does this imply about the specific heats of the two liquids?

a. The specific heat of the liquid whose initial temperature is closer to the final temperature is higher.

b. The specific heat of the liquid whose initial temperature is closer to the final temperature is lower.

c. The specific heats of both liquids are equal.

d. It implies nothing about their specific heats.

34. Which of the following combinations correctly expresses 1 Volt in terms of other SI based units?

a. 1 $(kgm^2)/(s^3\ A)$ b. 1 $(kgm^2)/(s^2\ C)$ c. 1 Nm/A d. 1 C/S

35. A boat of dimensions 3 meters in length and 2 meters in breadth sinks by 1 cm when a person gets on it. If the density of water is 1000 kg/m³, what is the approximate mass of the person?

a. 50 kg b. 60 kg c. 70 kg d. 80 kg

36. If the acceleration due to gravity at the surface of the Earth is g and at a height 2R above the surface is g′, what is the value of g′?

a. g/2 b. g/4 c. g/9 d. g/16

37. A ray of light passes from vacuum to medium of refractive index μ, the deviation suffered by refracted ray is equal to the half of angle of incidence. The angle of incidence is

a. $\cos^{-1}(\mu/2)$ b. $2\cos^{-1}(\mu/2)$ c. $2\sin^{-1}\mu$ d. $2\sin^{-1}(\mu/2)$

38. An ant is approaching a convex lens with a uniform speed up to first focus. How does the speed of image of ant formed by the lens change?

a. remains constant b. increases uniformly

c. first increases and then decreases d. first decreases and then increases

39. Which of the following sounds has maximum speed in air?

a. sound produced by explosion of bomb b. roaring of lion

c. buzzing sound of mosquito d. all have equal speed

40. A car covers the first half of the distance between two places at 40km/h and another half at 60km/h then what is the average speed of the car ?

a. 40km/h b. 48km/h c. 50km/h d. 60km/h

41. The kinetic energy acquired by a mass m in travelling distance d, starting from rest, under the action of constant force is directly proportional to

a. m b. m^0 c. $\sqrt{m}$ d. $1/\sqrt{m}$

42. What is the minimum distance between real object and its real image formed by concave mirror?

a. f b. infinity c. 4f d. zero

43. Three resistors of resistances R_1, R_2 & R_3 are connected in parallel grouping. If $R_1 < R_2 < R_3$, then what is the equivalent resistance ?

a. less than R_1 b. greater than R_3 c. equal to R_2 d. $(R_1+R_2+R_3)/3$

44. Which of the following is transformer's formula? (Symbols carry their usual meanings)

a. $N_1/N_2 = V_2/V_1$ b. $N_1/N_2 = I_2/I_1$ c. $I_2/I_1 = V_2/V_1$ d. $N_1/N_2 = I_1/I_2$

45. What is the significance of the slope in a temperature vs. time graph during heating or cooling?

a. It indicates the rate at which time passes.

b. It shows the amount of heat energy transferred.

c. It represents the rate of temperature change.

d. It determines the specific heat capacity of the substance.

46. In halogen group which tendency works with increase in atomic number ?

a. ionization energy increases

b. tendency to lose electrons decreases

c. ionization energy decreases

d. MX_2 (M=metal, X=halogen) covalent character decreases

47. The isomeric pair is

a. ethane and propane b.propane and butane

c.ethane and ethane d. butane and 2-methyl propane.

48. Which information is not conveyed by a balanced chemical equation?

a. Physical states of reactants and products

b. Symbols and formulae of all the substances involved in a particular reaction

c. Number of atoms/molecules of the reactants and products formed

d. Whether a particular reaction is actually feasible or not

49. On immersing an iron nail in $CuSO_4$ solution for few minutes, we will observe

a. no reaction takes place

b. the colour of solution fades away

c. the surface of iron nails acquire a black coating

d. the colour of solution changes to green

50. Soaps are formed by saponification of

a. alcohols b. glycosides c. simple esters d.carboxylic acids

51. Which among the following alloys contain non-metal as one of its constituents?

a. Brass b. Amalgam c. Gun metal d. Steel

52. The compound in which the Hydroxy group is attached to the saturated carbon atom which has other two carbon atom attached to it.

a. aldehyde b. secondary alcohol c. tertiary alcohol d. carboxylic acid

53. A greenish coating develops on copper utensils due to formation of

a. $CuSO_4.5H_2O$ b. $Cu(OH)_2$ c. $Cu(OH)_2.CuCO_3$ d. CuO

54. An element has an atomic number of 15, with which the element will show similar chemical properties.

a. Be b. Ne c. N d. O

55. 4.2gm of N^{3-} contain …….no of valence electrons (NA=$6.023x10^{23}$)

a.1.6NA b. 2.2NA c 2.4NA d 3NA

56. Which tissue type in plants is responsible for the transport of water and nutrients?

a. Parenchyma b. Collenchyma c. Sclerenchyma d. Xylem and phloem

57. The development of a specialized structure that allows plants to reproduce without seeds is called:

a. Fragmentation b. Budding c. Alternation of generations d. Apomixis

58. Select which of the following is not a characteristic of all vertebrates?

a. Bilateral symmetry b. Notochord at some stage of development

c. Dorsal hollow nerve cord d. Pharyngeal gill slits

59. The "fight or flight" response in humans is primarily regulated by:

a. Endocrine system b. Nervous system c. Circulatory system d. Lymphaticsystem

60. Which of the following is a function of the human liver?

a. Production of insulin b. Production of bile

c. Regulation of body temperature d. Regulation of blood pressure

61. The human skeleton is divided into how many major parts?

a. 2 b. 3 c. 4 d.5

62. Cytokinesis in plant cells differs from that in animal cells because it involves:

a. Formation of a cleavage furrow b. Formation of a cell plate

c. Binary fission d. Fragmentation of the cell wall

63. Crossing over, which increases genetic diversity, occurs in:

a. Prophase I b. Metaphase I c. Anaphase I d. Telophase I

64. Given that honey bees exhibit complex dances to communicate food source locations, what inference can be drawn about their cognitive abilities?

a. Honey bees have advanced problem-solving skills comparable to primates

b. The dance communication suggests a high degree of social intelligence

c. Honey bees rely solely on instinct and genetic programming for foraging

d. The dance is a form of territorial marking rather than communication

65. The reason for daughter cells to differ from parent cells and also each other in meiosis is:

a. Segregation and crossing over b. Segregation and independent assortment

c. Segregation, crossing over, and independent assortment d. Independent assortment and crossing over

66. In a monohybrid cross, homozygous recessive in the F2 generation will be:

a. 25% b. 50% c. 75% d. 100%

67. In the context of forensic science, what genetic technology is commonly used to compare DNA samples from crime scenes with those of suspects?

a. CRISPR-Cas9 b. DNA microarrays c. DNA fingerprinting d. Gene cloning

68. The condition in which heart beat occurs slowly than the normal is:

a. Tachycardia b. Bradycardia c. Cardiac arrest d. Stenocardia

69. Among the following viral diseases, which one primarily affects the parotid glands and can lead to complications such as orchitis or oophoritis?

a. Typhoid b. Mumps c. Plague d. Whooping cough

70. The intrinsic conduction system of the heart, which enables it to function continuously without rest, includes all the following components except……

a. Sinoatrial (SA) node b. Atrioventricular (AV) node c. Bundle of His d. Pancreatic duct

Read the passage below and answer the questions (71 to 75)

Structuralists seek to analyze the adult mind (the total sum of experience from birth to the present) in terms of the simplest definable components of experience and then to find how these components fit together to form more complex experiences as well as how they correlate to physical events. To do this, structuralists employ introspection: self-reports of sensations, views, feelings, and emotions.

Titchener believed the mind was the accumulated experience of a lifetime. He believed that he could understand reasoning and the structure of the mind if he could define and categorize the basic components of mind and the rules by which the components interacted.

Structuralists believe that our consciousness is composed of individual parts which contribute to overall structure and function of the mind. Titchener's theory began with the question of what each element of the mind is. He concluded from his research that there were three types of mental elements constituting conscious experience: Sensations (elements of perceptions), Images (elements of ideas), and affections (elements of emotions). These elements could be broken down into their respective properties, which he determined were quality, intensity, duration, clearness, and extensity. Both sensations and images contained all of these qualities; however, affections were lacking in both clearness and extensity. And images and affections could be broken down further into just clusters of sensations. Therefore, by following this train of thinking all thoughts were images, which being constructed from elementary sensations meant that all complex reasoning and thought could eventually be broken down into just the sensations which he could get at through introspection.

The second issue in Titchener's theory of structuralism was the question of how the mental elements combined and interacted with each other to form conscious experience. His conclusions were largely based on ideas of associationism. In particular, Titchener focuses on the law of contiguity, which is the idea that the thought of something will tend to cause thoughts of things that are usually experienced along with it.

Titchener rejected Wundt's notions of apperception and creative synthesis (voluntary action), which were the basis of Wundt's voluntarism. Titchener argued that attention was simply a manifestation of the "clearness" property within sensation.

Once Titchener identified the elements of mind and their interaction, his theory then asked the question of why the elements interact in the way they do. In particular, Titchener was interested in the relationship between the conscious experience and the physical processes. Titchener believed that the physical processes provide a continuous substratum that gives psychological processes a continuity they otherwise would not have. Therefore, the nervous system does not cause conscious experience, but can be used to explain some characteristics of mental events.

71. What method do structuralists primarily use to analyze the components of the mind?

a. Psychoanalysis b. Introspection c. Behavioral observation d. Neuroimaging

72. According to Titchener, which of the following are the three types of mental elements constituting conscious experience?

a. Sensations, thoughts, emotions b. Sensations, images, affections

c. Perceptions, ideas, memories d. Thoughts, feelings, actions

73. Which qualities did Titchener believe were present in both sensations and images but not in affections?

a. Quality and intensity b. Duration and clearness c. Clearness and extensity d. Intensity and extensity

74. What theory did Titchener reject from Wundt's voluntarism?

a. Law of contiguity b. Apperception and creative synthesis

c. Quality and intensity of sensations d. Physical processes in psychology

75. According to Titchener, what explains the continuity of psychological processes?

a. Conscious experience b. Nervous system as a continuous substratum

c. Associationism d. Apperceptiation

76. He'd a sandwich for breakfast, ----------?

a. hadn't he b. didn't he c. did he d. had he

77. Would you like to eat ----------lunch at a restaurant?

a. a b. an c. the d. X (no article)

78. In the beginning, the new student was shy--------her classmates.

a. of b. to c. on d. about

79. We had wonderful idea to save money but it didn't succeed. In this sentence, succeed means;

a. catch up b. bring out c. come off d. come up

80. This new employee appears to be a *queer fish*; I find it very difficult to work with him. In this sentence *queer fish* means;

a. having too much critical habit b. dishonest person

c. very mean d. eccentric and peculiar person

81. He said his car ----------.

a. was stolen the day before b. has been stolen the previous day

c. was stolen the following day d. had been stolen the day before

82. We believe that the government has prepared a plan to control bribery i.e., ----------.

a. The government is believed to have prepared a plan to control bribery.

b. The government has prepared a plan to control bribery is believed by us.

c. It is believed that a plan has prepared by the government to control bribery.

d. The government is believed to prepare a plan to control bribery.

83. I ----------glasses when I was younger, but now I-------contact lenses.

a. was wearing/have had b. have worn/am having c. wore/was having d. wore/have

84. The list of items ----------on the desk when I entered the room.

a. was b. were c. is d. are

85. The phonetic transcription of the word _____ is /ti:tʃ/.

a. cheat b. tick c. teeth d. teach

86. If we had been too careful and cautious, we ----------the top of the mountain.

a. could never have reached b. should never have reached c. might never reach d. would never reach

87. Hilda ----------her sister to iron her uniform.

a. made b. let c. had d. got

88. His listeners enjoyed his ----------wit but his victims often---------- at his satire.

a. lugubrious-----suffered b. caustic -----laughed c. subtle----smiled d. trenchant---winced

89. Which one of the given words is wrongly spelt?

a. encyclopedia b. veterinarian c. enterpreneaurship d. mischievous

90. Which one of the given verbs is incorrectly conjugated?

a. seek/sought/sought b. set/set/set c. sling/slang/slung d. sow/sowed/sown

91. Which one of the given singular-plural pair is incorrect?

a. analysis/analyses b. alumnus/alumni c. basis/bases d. None

92. Which one of the following is not a suffix?

a. -ee b. -all c. -al d. -xion

93. She ------have gone to the doctor. All she ----done was to rest at home for a few days.

a. would rather/needed to b. needn't /should have c. had better/wouldn't have d. could/won't have

94. In the following question, four words are given, of which two words are opposite in meaning. Find the two words that opposite in meaning and indicate the number of the correct letter combination provided in the options.

A. Frantic B. Panic C. Calm D. Angry

a. A – C b. B – C c. A – B d. B – D

95. Identify the sentence with adjectives in the right order:

a. Anjali found an attractive tiny round porcelain blue vase.

b. Anjali found a blue tiny round porcelain attractive vase.

c. Anjali found a tiny round blue attractive porcelain vase.

d. Anjali found an attractive tiny blue round porcelain vase.

96. Choose the word that can substitute the given group of words:

Walk or move at a slow relaxed pace

` a. amble b. romp c. strut d. prance

97. The company, …… products are highly sought after, announced a new product launch.

a. that b. whose c. whom d. who

98. Which bird can eat only when its head is upside down?

a. Flamingo b. penguin c. swan d. warbler

99. Who holds the record for the most goals scored in FIFA World Cup history?

a. Lionel Messi b. Cristiano Ronaldo c. Miroslav Klose d. Pelé

100. Which ancient Nepali kingdom was known for its extensive trade relations with Tibet and India?

a. Malla Kingdom b. Thakuri Kingdom c. Shah Kingdom d. Licchavi Kingdom

****