I. Choose the correct answer: 10x1=10

1. Grasph of a linear polynomial is a _____.

  a) straight line   b) circle   c) parabola d) hyperbola

2. If number of columns and rows are not equal in a matrix then it is said to be a _____ matrix.

  a) diagonal   b) square   c) identity   d) rectangular

3. If $A = \begin{pmatrix} 5 & x \\ y & 0 \end{pmatrix}$ and $A = A^T$ then

  a) $x = 0, y = 5$ b) $x + y = 5$ c) $x = y$ d) none

4. The discriminant Δ of the equation $3\sqrt{3}\ x^2 + 10x + \sqrt{3} = 0$

  a) 64   b) -64   c) 81   d) none

5. If $\frac{1}{\alpha}$ is a root of $2x^2 - 5x + 7 = 0$, then the value of $7\alpha^2 - 5\alpha$ is

  a) 2   b) -2   c) 5   d) -5

6. How many tangents can be drawn to the circle from an exterior point?

  a) one   b) two   c) infinite d) zero

7. The two tangents from an external points P to a circle with centre at O are PA and PB. If $\angle APB = 70°$ then the value of $\angle AOB$ is _____.

  a) 100°   b) 110°   c) 120°   d) 130°

8. If two circles touch internally, the distance between the centre is _____.

  a) $r_1 + r_2$ b) $2r_1$ c) $r_1 - r_2$ d) $\frac{r_1}{2}$.

9. The lengths of the two tangents drawn from an _____ to a circle are equal.

  a) centre b) interior points c) chord d) exterior point

10. Sum of the opposite angles of a cyclic quadrilateral is _____.

  as) 60°   b) 180°   c) 90°   d) 30°

II. Answer any six of the following: 6x2=12
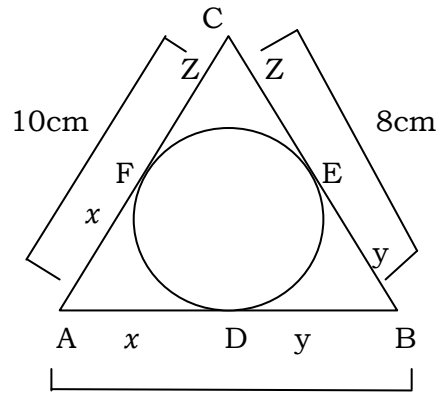
11. a) _____ is a cevian that divides the angle, into two equal halves.

  b) Say True or False

   Pythagoras theorem is otherwise called as Thales theorem.

12. A tangent ST to a circle touches it at B. AB is a chord such that $\angle ABT = 65°$ find $\angle AOB$, where "O" is the centre of the circle.

13. A man goes 18m due east and then 24m due north. Find the distance of his current position from the starting point.

14. If the difference between a number and its reciprocal is $\frac{24}{5}$, find the number.

15. Construct a matrix of 3×3 whose elements are aij= $i^2 j^2$.

16. If $A = \begin{pmatrix} 1 & 2 & 0 \\ 3 & 1 & 5 \end{pmatrix}$ $B = \begin{pmatrix} 8 & 3 & 1 \\ 2 & 4 & 1 \\ 5 & 3 & 1 \end{pmatrix}$ find AB.

17. Verify that $A^2 = I$ when $A = \begin{pmatrix} 5 & -4 \\ 6 & -5 \end{pmatrix}$

18. Determine the nature of the roots of $9y^2 - 6\sqrt{2}\ y + 2 = 0$.

III. Answer any four of the following: 4x5=20

19. A girl is twice as old as her sister. Five years hence, the product of their ages (in years) will be 375. Find their present ages.

20. If one root of the equation $2y^2 - ay + 64 = 0$ is twice the other then find the values of 'a'

21. Let A = $\begin{pmatrix} 1 & 2 \\ 1 & 3 \end{pmatrix}$ B=$\begin{pmatrix} 4 & 0 \\ 1 & 5 \end{pmatrix}$ and C=$\begin{pmatrix} 2 & 0 \\ 1 & 2 \end{pmatrix}$ then find
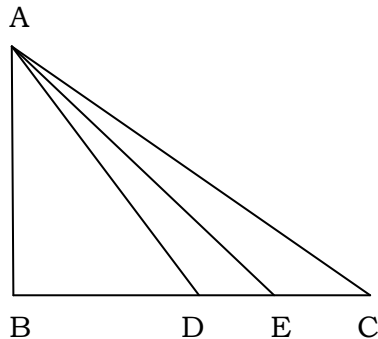
(A-B) C=AC-BC.

22. If A=$\begin{pmatrix} 5 & 4 & -2 \\ \frac{1}{2} & \frac{3}{4} & \sqrt{2} \\ 2 & 4 & \\ 1 & 9 & 4 \end{pmatrix}$, B = $\begin{pmatrix} -7 & 4 & -3 \\ \frac{1}{4} & \frac{7}{2} & 3 \\ 5 & -6 & 9 \end{pmatrix}$ then find 4 A -3B.

23. A circle is inscribed in Δ ABC having sides 8cm, 10cm and 12cm as shown in figure, Find AD, BE and CF

24. In the adjacent figure, ABC is a right angled triangle with right angle at B and points D, E trisect BC. Prove that

$8AE^2=3AC^2+5AD^2$

25. State and prove Bandhayana theorem.

IV. Answer the following: 1x8=8

26. a) Draw a tangent at any point R on the circle of radius

3.4 cm and centre at P.

(or)

b) Determine the nature of the solutions by using the graph

$x^2 - 9 = 0$.

I. Choose the appropriate synonym of the underlined word: 3x1=3

1. He has fixed his gaze on the icon that is required.

   a) stare b) geek c) eyes d) face

2. Technology is also a boon to citizens with special needs.

   a) art b) blessing c) comfort d) danger

3. David advocates to other students.

   a) administrates b) opposes c) comforts d) supports

II. Choose the appropriate antonym of the underlined word: 3x1=3

4. Technology helps one to live in comfort.

   a) comfy b) discomfort c) misuse d) easiness

5. They continue to grapple with the challenges of inclusion.

   a) seclusion b) enclosure c) addition d) exclusion

6. Technology determines if its impacts are positive.

   a) confident b) affirmative c) negative d) promote

III. Combine the sentences using "Relative Pronouns". 2x2=4

7. Kavitha is my teacher. She teaches us English.

8. This is Varun. His father is an architect.

IV. Quote from memory: 1x5=5

9. Write five lines from the poem

   "The secret of the machines".

   From: We were cut...................

   To: .... hours a day!

V. Read the following poetic lines and answer the following
   questions: 2x4=8

10. "We can pull and haul and push and lift and drive,
    We can print and plough and weave and heat and light
    We can run and race and swim and fly and dive,
    We can see and hear and count and read and write".

 a) Mention the figure of speech in first line.

 b) Pick out the alliterated words from the second line.

 c) What is the rhyme scheme of the above lines?

 d) Pick out the rhyming words from the above lines.

11. "But remember, please, the law by which we live,
    We are not built to comprehend a lie,
    We can neither love nor pity nor forgive,
    If you make a slip in handling us you die!"

 a) What will happen is a mistake is done by man?

 b) What is the Law by which a machine lives?

 c) What is the reminder given by the machines?

 d) Give the meaning for the word "Comprehend."

VI. Paraphrase the following poetic lines: 1x5=5

12. "We were taken from the ore-bed and the mine,
    We were melted in the furnace and the pit -
    We were cast and wrought and hammered to design".

VII. Answer any five of the following: 5x2=10

13. Who is Kim?

14. Which software helps Alisha to overcome her difficulty in
    typing?

15. Is it possible to control the computer screen with eye gaze?

16. Which devices are controlled using ACTIV controller?

17. Why is technology important according to David?

18. What devices help David to move from one place to other?

19. How does David operate computers with the Liberator Communication Device?
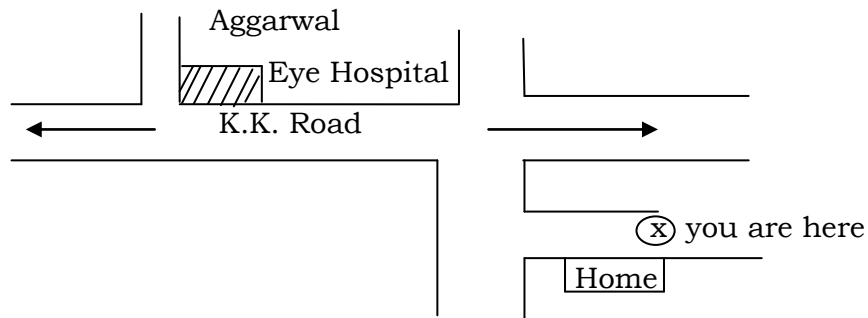
VIII. Answer any one in a paragraph: 1x5=5

20. "Technology is a boon to the disabled" - Justify.

21. Describe in your own words the poem,

   "The secret of the machines" by Rudyard Kipling.

IX. Road Map: 1x2=2

     Guide Mr. Kumar to Aggarwal Eye Hospital. Here you find the road-map. Write three instructions by way of helping him.

X. Read the following passage carefully and make notes (or) summarize: 1x5=5

    The distribution of forests among different districts of the state is very uneven. Concentration of forests is mostly in the hills of Western districts and in the Javadi group of hills in Vellore district. Dense forests are also seen in Salem district. More than half of the area in the Nilgiris is under forest. Other districts hold 1% to 5% of area under forests. Thanjavur being the alluvial plain is suitable for agriculture which has less than 1% of forest cover. The forest of Tamil Nadu have different types of trees. Most of the trees in the state shed their leaves in the dry season. Tamil Nadu has large areas of sandal wood plantations, about 5,88,000 hectares. Hard wood trees are available in the forests of Coimbatore, Nilgiris and Kanyakumari. Trees that are used as fuel are found in Madurai, Coimbatore and Thanjavur districts. Kanyakumari district has rubber plantations.

I. Choose the correct answer: 7x1=7

1. Doppler effect in sound is due to _____.
   a) Motion of source   b) motion of observer
   c) relative motion of source and observer
   d) none of these

2. The region of a sound wave having low pressure is _____.
   a) interference   b) refraction c) rarefraction   d) compression

3. Powdered $CaCO_3$ reacts more rapidly than flaky $CaCO_3$ because
   of _____.
   a) large surface are   b) high pressure
   c) high concentration   d) high temperature

4. Photolysis is a decomposition reaction caused by _____.
   a) heat   b) mechanical energy   c) electricity d) light

5. The term ethnobotany was coined by _____.
   a) Khorana   b) J.W. Harshberger
   c) Ronald Ross   d) Hugo de Vries

6. Vermiform appendix, nictitating membrane, etc are examples
   of organs.
   a) Homologous   b) Analogous   c) Vestigial d) Rudimentary

7. _____ is called the father of Indian Paleobotany.
   a) Leonardo da Vinci   b) Birbal Sahani
   c) Kaspar Maria Von Sternberg   d) J.W. Harshberger

II. Answer the following in one or two sentences: 5x2=10

Part - A (any one)

8. Why does sound travel faster on a rainy day than a
   dry day?

9. What is the minimum distance needed for an echo?

Part-B (any one)

10. Why does the reaction rate of a reaction increase on raising
    the temperature?

11. Calculate the pH of 1.0×10^{-4} molar solution of HNO_3

Part - C (any three)

12. Define Ethnobotany.

13. Define Atavism. Give two examples.

14. Write a note on abiogenesis.

15. What is geological time scale?

16. What is goldilocks zone for life?

III. Answer the following: 4x3=12

Part -A (any one)

17. Mention fore cases in which there is no Doppler
    effect in sound?

18. A source producing a sound of frequency 90HZ is
    approaching a stationary listener, with a speed equal
    to $(^1/_{10})$ of the speed of sound. What will be the frequency
    heard by the listener?

Part - B (any one)

19. Differentiate between reversible and irreversible reactions.

20. Explain the types of double displacement reaction with
    examples.

Part - C (any one)

21. List out the importance of Ethnobotany (4 points)

22. Write a note on Analogous organs.

IV. Answer in detail: 3x7=21

Part - A (any one)

23. a) What do you understand by the term ultrasonic
       vibration?
    b) State three uses of ultrasonic vibrations.

24. a) What are the factors that affect the speed of sound in
       gases?
    b) A sound wave has a frequency of 200HZ and a speed
       of $400ms^{-1}$ in a medium. Find the wavelength of the
       sound wave.

Part - B (any one)

25. a) Explain the factors influencing the rate of a reaction.
    b) Lemon juice has pH2. What is the concentration of
       H^+ ions?

26. a) How does pH play an important role in everyday life?
    b) If the pH of a solution is 4.5, what is its pOH?

Part - C (any one)

27. Write a note on Lamarckism and explain its principles.
    a) What does astrobiology deal with?
    b) List out the two important criteria that fulfills and
       supports the existence of life on planets.
    c) What are extremophiles?