



**TELANGANA OPEN
SCHOOL SOCIETY**

MODEL QUESTION PAPER

INTER

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MODEL QUESTION PAPER

Intermediate (TOSS)

MATHEMATICS

311 (E) (Set – II)

Time: 3 hrs

Max. Marks: 100

Instructions:-

- 1) All questions are Compulsory.
- 2) This question paper consists of two parts viz., A and B
- 3) All questions from Part A are to be attempted
- 4) Part-B has two options. Candidates are required to attempt questions from one option only.

(Part – A)

SECTION – 1

Each question carries 1 mark.

(13 x 1 = 13 marks)

- 1) If $Z_1 = x + iy$, and $Z_2 = a + ib$ then what is $Z_1 + Z_2$?
- 2) What are the roots of $x^2 + 5x + 6 = 0$?
- 3) Show the region represented by the in-equations $x \leq 0$ and $y \leq 0$.
- 4) If the two straight lines one perpendicular, then what is the product of their slopes?
- 5) Find the distance between the points $(-1,2)$ and $(0,-6)$?
- 6) Convert 270° into Radians.
- 7) What is the domain of the function?
 $f = \{ (0,1), (2,3), (4,5), (6,7), \dots, (100, 101) \}$
- 8) Evaluate $\lim_{x \rightarrow 0} [(2x + 1)^3 - 5]$
- 9) What is the derivative of x^n w.r.t x ?
- 10) What is the slope of the = x . Write the formulae of slope of the tangent of the curve $y = f(x)$ at (x_1, y_1)
- 11) What is $\int e^x [f(x) + f'(x)] dx$?
- 12) Write the Integrating factor of $\frac{dy}{dx} + f(x)y = Q(x)$
- 13) What is the principle of standard deviation for grouped data?

Section – 2

(Each question carries 2 marks)

14) If $A = \begin{bmatrix} 1 & 2 \\ -1 & 0 \end{bmatrix}_{2 \times 2}$ and $B = \begin{bmatrix} 2 & 1 \\ 2 & 2 \end{bmatrix}_{2 \times 2}$ then prove that $AB \neq BA$

15) What is the expanded form of $\begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}$

16) Find the inverse of the matrix $\begin{bmatrix} \cos x & -\sin x \\ \sin x & \cos x \end{bmatrix}$

17) Find the equation of the parabola whose focus is (2,3), directrix is $3x + 4y = 1$.

18) What is the sum of the series $3 + 5 + 7 + \dots + (2n + 1) \dots$

19) Draw the Venn diagram for $A \cup B$, when A and B are disjoint sets.

20) What is the principle value of $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$

21) If $y = \cos^{-1}(4x^3 - 3^x)$ find $\frac{dy}{dx}$.

22) What is the Area bounded by the curve $x = y$, Y-axis and the line $y = 0$, $y = 3$.

23) A die is tossed twice. Find the probability of a number greater than 4 in each throw.

Section - 3

(Each question carries 5 marks)

24) There are 5 Mathematics, 4 Physics and 5 Chemistry books. In how many ways can you arrange 4 Mathematics, 3 Physics and 4 Chemistry books, if the books on the same subjects are arranged together?

25) If the 4th term and the 9th term of a G.P. are 8 and 256 respectively, then write the G.P.

26) Find the Maximum and Minimum value of the function $f(x) = \sin x (1 + \cos x)$ in $(0, \pi)$

27) The data below presents the earning of 50 labours of a factory. Calculate the Mean deviation.

Earning in Rs:	1200	1300	1400	1500	1600	1800
No. of Labors:	4	7	15	12	7	3

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Section – 4

(Each question carries 8 marks)

28) Using Principle of Mathematical induction, prove the following

$$\frac{1}{1.3} + \frac{1}{3.5} + \frac{1}{5.7} + \cdots + \frac{1}{(2n-1)(2n+1)} = \frac{n}{(2n+1)}$$

29) Find the equation of the circle which passes through the points (0,2), (2,0) and (0,0)

30) In ΔABC , if $\angle A = 60^\circ$ prove that $\frac{b}{c+a} + \frac{c}{a+b} = 1$

31) If $y = (\tan x)^{\cot x} + (\cot x)^x$ then find $\frac{dy}{dx}$.

Part – B

Optional – I (VECTORS and 3 – D Geometry)

32) If $\vec{r}_1 = \vec{i} - \vec{j} + \vec{k}$ and $\vec{r}_2 = 2\vec{i} - 4\vec{j} - 3\vec{k}$, then the magnitude of $\vec{r}_1 + \vec{r}_2$ 1 Mark

33) Write the position vector of the centroid of the triangle, whose vertices are A ($\vec{a}$), B ($\vec{b}$), C ($\vec{c}$) 4 Marks.

34) If the foot of the perpendicular drawn from the origin to the plane is (4, -2, -5), then find the equation of the plane. (5 Marks)

35) Find the centre and radius of the circle $x^2 + y^2 + z^2 - 6x - 4y + 12z - 36 = 0$, $x + 2y - 2z = 1$

(Optional – II)

32) Define Share 1 Mark

33) Write any one use of Index numbers 1 Mark

34) Discuss the characteristics of VAT 5 Marks

35) For a new product a manufacturer spends Rupees 1,00,000 on the infrastructure and the variable cost is estimated as Rs. 150 per unit of the product the sale price per unit fixed at Rs. 200.

- Calculate
- (1) Cost function
 - (2) Revenue function
 - (3) Profit function and
 - (4) the breakeven point

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