KT-XI-1601

Sig. of Supdt. .....

MATHEMATICS (Part-I)
(Fresh / New Course)

Roll No. .....

Fic. # .....

Fic. # .....

Total Marks: 100 | **MATHEMATICS (Part-I)** | Time Allowed : 3 Hrs.

(Fresh / New Course)

Marks: 20 | **Section "A"** | Time : 20 Mins.

NOTE : Section-A is compulsory. All parts of this section to be answered on the questions paper itself. It should be completed in the given time and handed over to the Centre Superintendent. Deleting / Overwriting is not allowed. Do not use lead pencil.

NOTE : Insert the correct option (a, b, c, d) in the empty box opposite to each part.

Q. 1 Insert the correct option (a, b, c, d) in the empty box opposite to each part. Each part carries one mark.

i) The matrix $\begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$ is called .....matrix. [b]

(a) Diagonal (b) Scalar (c) Row (d) Null

ii) The mid-point of the vectors (1, 2, 3) and (–1, –2, –3) is ..... [b]

(a) (–1, –4, –9) (b) (0, 0, 0) (c) $\left(\frac{-1}{2}-2\frac{-9}{2}\right)$ (d) (2, 4, 6)

iii) If in a square matrix A, $A^t = -A$, then the matrix A is called .....matrix. [c]

(a) Symmetric (b) Singular (c) Skew symmetric (d) Non singular

iv) The $\overline{AB}$ vector having the points A(–4, 6) and B(6, 8) then $\overline{AB}$ = [a]

(a) 10i + 2j (b) 10i – 2j (c) 2i + 10j (d) –10i – 2j

v) If $\bar{a}$ is any vector, then the unit vector $\hat{a}$ =..... [b]

(a) $\bar{a} \cdot |a|$ (b) $\frac{\bar{a}}{|a|}$ (c) $\frac{|a|}{\bar{a}}$ (d) $\bar{a} + |a|$

vi) $\sum_{x=1}^{4}(2x-3) =$ ..... [b]

(a) 7 (b) 8 (c) 9 (d) 10

vii) The general term of the Arithmetic sequence is an = ... [a]

(a) a+(n–1)d (b) a+(n+1)d (c) ar^{n+1} (d) ar^{n-1}

viii) For a geometric sequence with first term a_1 and common ratio r = 1, then the sum of the first n term is s_n = ... [c]

(a) $a_1\left(\frac{1-r^n}{1-r}\right)$ (b) $a_1\left(\frac{r^n-1}{r}\right)$ (c) na_1 (d) $a_1 + (n-1)d$

ix) How many different words can be formed from the letter "ABBAS"? [a]

(a) 30 (b) 40 (c) 60 (d) 120

x) If two events can not both occurs at the same time, they are called .....events. [d]

(a) Simple (b) Equally likely (c) Compound (d) Mutually exclusive

xi) The magnitude of the vector $\bar{a} = 3i - j - k$ is..... [b]

(a) $\sqrt{13}$ (b) $\sqrt{11}$ (c) $\sqrt{3}$ (d) $\sqrt{5}$

xii) If f(–x) = –f(x), then the function f is called .....function. [a]

(a) An odd (b) An even (c) An identity (d) A linear

xiii) $\cos(2\pi - \theta) =$ ..... [c]

(a) $-\cos\theta$ (b) $-\sin\theta$ (c) $\cos\theta$ (d) $\sin\theta$

xiv) If none of the angle of a triangle is right angle, then the triangle is called .....triangle. [c]

(a) Single (b) Scalene (c) Oblique (d) Right angle

xv) The general term of the binomial expression $(a + b)^n$ is T_{r+1} = ... [a]

(a) $\binom{n}{r}a^{n-r}b^r$ (b) $\binom{n}{r}a^{r-n}b^r$ (c) $\binom{r}{n}a^{r-n}b^n$ (d) $\binom{n}{r}a^nb^{n-r}$

xvi) $1 - 2\sin^2\theta =$ ..... [a]

(a) $\cos 2\theta$ (b) $\sin 2\theta$ (c) $2\cos 2\theta$ (d) $2\sin 2\theta$

xvii) A function has an inverse if and only if it is .... [a]

(a) 1 – 1 (b) Onto (c) 1–1 and onto (d) None of these

xviii) In a right angled triangle one angle is ..... ; [d]

(a) 270° (b) 180° (c) 120° (d) 90°

xix) 2π is the period of ..... [d]

(a) $\operatorname{cosec}\theta$ (b) $\cot\theta$ (c) $\sec\theta$ (d) Both a and c

xx) Real part of the complex number of the form $(x - iy)^2$ is ..... [a]

(a) $x^2 - y^2$ (b) $x^2 + y^2$ (c) x^2 (d) y^2

KT-XI-2016(A)

MATHEMATICS

(Part – I)

(Old Course)

Time Allowed : 2:40 Hrs. Total Marks : 80

Section – B

Marks : 50

Q. 2 Write short answers of any TEN of the following parts. Each part carries equal marks.

(i) Express $1+\sqrt{3}i$ in term of polar co-ordinates.

(ii) Let $S=\{0,1,2,3,4\}$, draw the table which define a binary operation addition modulo 5.

(iii) Find the remainder if $f(x)=x^3-4x^2+2x$ is divided by x – 3.

(iv) Decompose into partial fraction $\frac{x^2+7}{(x^2-1)(x-1)^2}$

(v) Prove that $C_r^n = C_{n-r}^n$

(vi) Prove that $1^2+2^2+3^2+.....n^2=\frac{n(n+1)(2n+1)}{6}$

(vii) Prove that $(Sec\vartheta-\tan\vartheta)=\frac{1-Sn\vartheta}{1+Sn\vartheta}$

(viii) Sum the infinite series $1+\frac{3}{4}+\frac{7}{16}+\frac{15}{16}+.....$

(ix) $\frac{Cos75^0+Cos15^0}{Sin75^0-Sin15^0}=\sqrt{3}$

(x) Find the first three terms of the G.P when $a_3=\frac{9}{4}$ and $a_6=\frac{243}{256}$

(xi) A die is thrown. What is the probability to get even number.

(xii) For triangle ABC if a = 7, b = 5, c = 4. Find β

(xiii) Verify that $\tan^{-1}\left(\frac{5}{6}\right)+\tan^{-1}\left(\frac{1}{11}\right)=\frac{\Lambda}{4}$

Section – C

Marks : 30

NOTE : Attempt any THREE questions. Each question carries equal marks.

Q. 3 a) If $\propto, \beta$ are the roots of the equation $mx^2+nx+n=0$ then prove that $\sqrt{\frac{\propto}{\beta}}+\sqrt{\frac{\beta}{\propto}}+\sqrt{\frac{n}{m}}=0$

(b) b) Find the coefficient of x^5 in the expansion of $\left(2x^2-\frac{3}{x}\right)^{10}$

Q. 4 a) Use Cramer's rule to solve

$x-2y+4=0$

$3x+y+5=0$

$2x+z+1=0$

b) Show that $Sin3\propto=3Sin\propto-4Sin^3\propto$

Q. 5 a) Show by mathematical induction that $\frac{5^{2n}-1}{24}$ is an integer.

b) Find S_8 If $S_5 = 175$ $a_{10} = 49$.

Q. 6 a) Solve the equation $\sqrt{2x^2+3x-15}+\sqrt{2x^2+3x+1}=32$

b) If $\cot\vartheta=-1$ When $-\Lambda\le\vartheta\le\Lambda$ find the other corresponding trigonometric ratios.