J.K. SHAH CLASSES

MATHEMATICS & STATISTICS

FYJC TERMINAL TEST – 01

DURATION – 2 HR MARKS – 50

Q1. (A) Attempt ANY **THREE OF** THE FOLLOWING (09)

01. $3x + y = 2$; $kx + 2y = 3$; $2x - y = -3$ are consistent . Find k

02. If A.M. of two numbers exceeds their G.M. by 15 and their H.M. by 27 , find the numbers

03. in G.P. $t_4 = 24$; $t_9 = 768$. Find S_8

04. If for a sequence , $Sn = 2n^2 + 5n$, find tn and show that the sequence is an A.P.

(B) Attempt ANY **ONE OF** THE FOLLOWING (04)

01. Prove without expanding as far as possible

$$\begin{vmatrix} a^2+2a & 2a+1 & 1 \\ 2a+1 & a+2 & 1 \\ 3 & 3 & 1 \end{vmatrix} = (a-1)^3$$

02. Prove without expansion

$$\begin{vmatrix} x+y & y+z & z+x \\ z+x & x+y & y+z \\ y+z & z+x & x+y \end{vmatrix} = 2 \begin{vmatrix} x & y & z \\ z & x & y \\ y & z & x \end{vmatrix}$$

Q2. (A) Attempt ANY **TWO OF** THE FOLLOWING (06)

01. Find the coordinates of the orthocenter of a triangle whose vertices are
(–2,3) , (6,–1) , (4,3)

02. Find points on the line $x + y + 3 = 0$ whose distance from $x + 2y + 2 = 0$ is $\sqrt{5}$ units

03. if the acute angle between the lines $4x - y + 7 = 0$ and $kx - 5y - 9 = 0$ is 45^o , find k

(B) Attempt ANY **TWO OF** THE FOLLOWING (06)

01. if $\cos\theta = -3/5$; $\pi < \theta < 3\pi/2$. find $\dfrac{\operatorname{cosec}\theta + \cot\theta}{\sec\theta - \tan\theta}$

02. Prove : $\sin A \cdot \sin(B - C) + \sin B \cdot \sin(C - A) + \sin C \cdot \sin(A - B) = 0$

03. Prove : $\tan 54^\circ = \tan 36^\circ + 2 \tan 18^\circ$

Q3. (A) Attempt ANY **ONE OF** THE FOLLOWING (04)

01. 7 persons sit in a row . Find the total number of seating arrangements if
   a) 3 persons A , B ,C sit together in particular order
   b) A , B and C sit together in any order
   c) A and B occupy the end seats

02. how many even numbers of four digits can be formed using digits 0 , 1 , 2 , 3 & 4 if no digit being used more than once

(B) Attempt ANY **THREE OF** THE FOLLOWING (09)

01. From the following data , find the percentage of workers who are weighing more than 68 kgs

Weight (in kg) :	50 – 55	55 – 60	60 – 65	65 – 70	70 – 75
No. of worker :	15	18	30	25	12

02.

Monthly Bal. less than	1000	900	800	700	600	500	400	300	200
No of A/c holder	500	498	480	475	440	374	300	125	25

Find the 7^{th} decile

03. Solve : $\log_3 x + \log_9 x + \log_{243} x = 34/5$

04. if $a^2 - 12ab + 4b^2 = 0$; Prove $\log(a + 2b) = \frac{1}{2}(\log a + \log b) + 2\log 2$

Q4. (A) Attempt ANY **TWO OF** THE FOLLOWING (06)

01. Find coefficient of variation for the following data : 10 ; 20 ; 18 ; 12 ; 15

02. Bowley's coefficient of skewness is 0.6 .The sum of upper and lower quartiles is 100 and the median is 38 . Find the upper and lower quartiles

03. in a series of 5 observations , the value of mean and variance is 3 and 2 . If three observations are 1 , 3 & 5 find the remaining two

(B) Attempt ANY **TWO OF** THE FOLLOWING (06)

01. for moderately skewed distribution mean = 40 ; Karl Pearson's coefficient of skewness is 0.1 & coeff. of variation is 20% . Find mode

02. ${}^{11}P_{(r-1)} : {}^{12}P_{(r-2)} = 14 : 3$. Find r

03. the first three moments about 4 are 1 , 4 and 10 respectively . Find the coefficient of skewness γ_1