

J.K. SHAH CLASSES

MATHEMATICS & STATISTICS

FYJC TERMINAL TEST - 03

DURATION - 2 HR

MARKS - 50

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

01. Find k if the equations are consistent

$$ky = x + 1 ; 2x - 3y + 5 = 0 , 3x + 2y + 1 = 0$$

02. If A.M. of two numbers exceeds their G.M. by 1 and their H.M. by $\frac{9}{5}$, find the numbers

03. Find sum of $\frac{1^3}{1} + \frac{1^3 + 2^3}{1 + 2} + \frac{1^3 + 2^3 + 3^3}{1 + 2 + 3} + \dots$

04. Find square root of : $2(1 - \sqrt{3}i)$

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

01. Prove without expanding as far as possible

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

02. Prove without expansion

$$\begin{vmatrix} 11 & 4 & 10 \\ 2 & 7 & 6 \\ 5 & 1 & 4 \end{vmatrix} = 3 \begin{vmatrix} 5 & 2 & 3 \\ 11 & 5 & 2 \\ 10 & 4 & 6 \end{vmatrix}$$

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

01. find the equation of the line so that the line segment intercepted between the axes is divided by the point P(-5,4) internally in the ratio 1:2

02. Find points on the line $y = x + 1$ whose distance from $4x - 3y + 20 = 0$ is 5 units

03. Find the angle subtended by the line segment PQ at the origin where $P \equiv (1, \sqrt{3})$ & $Q \equiv (\sqrt{3}, 1)$

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

(06)

01. find the acute angle θ satisfying : $4\sin^2\theta - 2(\sqrt{3} + 1)\sin\theta + \sqrt{3} = 0$
02. Prove :
$$\frac{\operatorname{cosec}(90 - A) \cdot \sin(180 - A) \cdot \cot(360 - A)}{\sec(180 + A) \cdot \tan(90 + A) \cdot \sin(-A)} = 1$$
03. if $\sin A = \frac{4}{5}$, $\frac{\pi}{2} < A < \pi$ and $\cos B = \frac{5}{13}$, $\frac{3\pi}{2} < B < 2\pi$. find $\sin(A - B)$

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

(04)

01. Four digit number (without repetition) is to be formed using digits 1 – 9 in all possible ways . Find how many of them are
- a) greater than 4000 b) divisible by 2
02. Find the number of all arrangement of the letters of the word 'TRIANGLE'
- a) How many of them begin with T and end with E
- b) In how many of them do the vowels occupy the odd places
- c) in how many of them do the vowels occupy second , third and fourth places

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

(09)

01. Calculate the quartile deviation for the following data

CI	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Frequency	6	25	36	20	13

02. Calculate the mean deviation from the median . Also find the coefficient of MD

CI	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Frequency	5	25	25	18	7

03. Solve : $\log_{\sqrt{3}} x + \log_3 x + \log_{\sqrt{27}} x = 11$
04. if $\log\left(\frac{x-y}{4}\right) = \log\sqrt{x} + \log\sqrt{y}$, then show that $(x+y)^2 = 20xy$

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

(06)

01. Find SD for the following data : 15 , 16 , 18 , 18 , 19 , 20 , 20 , 21 , 21 , 22

02. Find Bowley's coefficient of skewness for the following data

11 , 8 , 3 , 10 , 6 , 10 , 1

03. For a moderately skewed distribution

Mean = 200 ; median = 198.4 , SD = 16 . Find mode and the Karl Pearson's coefficient of skewness (SKp)

(B) Attempt ANY **ONE** OF THE FOLLOWING (03)

01. For the following data find the age above which we have the oldest 20% of persons

Age	Below 35	35 – 50	50 – 65	65 – 80	Above 80
Frequency	8	22	25	17	8

02. following is the distribution of age of 500 workers , find the percentage of workers whose age is more than 45 years

Age	20 – 30	30 – 40	40 – 50	50 – 60
No of workers	80	160	180	80

(C) Attempt ANY **ONE** OF THE FOLLOWING (03)

01. Find n , ${}^n P_3 : {}^n P_6 = 1 : 210$

02. the first four moments about 4 are 1 , 4 , 10 , 46 . Find Personian's coefficients of kurtosis

