



FEDERAL PUBLIC SERVICE COMMISSION
SECTION OFFICERS PROMOTIONAL EXAMINATION - 2016

Roll No.

561

BASIC MATHEMATICS & STATISTICS

TIME ALLOWED: THREE HOURS

MAXIMUM MARKS: 100

- NOTE:**(i) Attempt **FIVE** questions in all by selecting at least **TWO** questions from **EACH SECTION**. **ALL** Questions carry **EQUAL** Marks.
(ii) All the parts (if any) of each Question must be attempted at one place instead of at different places.
(iii) Candidate must write **Q. No.** in the **Answer Book** in accordance with **Q. No.** in the **Q. Paper**.
(iv) No **Page/Space** be left blank between the answers. All the blank pages of Answer Book must be crossed.
(v) Extra attempt of any question or any part of the attempted question will not be considered.
(vi) Leave some blank space and draw two horizontal lines (====) at the end of each answer.
(vii) **Use of calculator is allowed.**

SECTION-A

- Q. 1.** (a) Extract the square root of 0.002106, carrying result to 4 significant figures. (10)
(b) Perform $792.57 \div 6.4$ by utilizing the device of successive divisions by factors, and check. (10) (20)
- Q. 2.** (a) On the same set of axes, make graphs of the following equations and find the coordinates of the point at which they intersect. (10)
 $5x + 4y = 29$
 $4x + 3y = 23$
(b) Find the value of: (10) (20)
 $86 - \left[52 + \{47 - 12(10 - 4)\} + \frac{2}{5}(80 - 5) \right]$
- Q. 3.** (a) Among 21 employees of a small manufacturing concern, there are 10 production employees, 6 sales employees, and 5 management employees. In how many ways a committee of 7 can be formed containing 3 production employees, 2 sales employees, and 2 management employees. (10)
(b) Find the value of $(1 + 3\%)^6$ correct to six places of decimals. (10) (20)
- Q. 4.** (a) Find $\frac{dy}{dx}$ if $y = \frac{x^3}{\sqrt{x^2 + 1}}$ (10)
(b) Solve: $2x - 3y = 1$ (10) (20)
 $4x + 2y = 22$
using the inverse of a square matrix.

SECTION-B

- Q. 5.** (a) The following distribution shows Kilowatt-hours of electricity used in one month by 75 residential customers in a certain locality of Lahore. (10)

Consumption in Kilowatt hours	5-24	25-44	45-64	65-84	85-104	105-124	125-144	145-164
No of Consumers	1	6	14	22	14	5	7	3

Estimate the mean, the median and the two quartiles.

- (b) Two candidates X & Y at the B.A (Hons.) Examination obtained the following marks in ten papers. Which of the candidate showed a more consistent performance: (10) (20)

Paper	I	II	III	IV	V	VI	VII	VIII	IX	X
X	58	49	76	80	47	72	61	59	77	48
Y	39	38	86	72	75	69	57	49	83	66

BASIC MATHEMATICS & STATISTICS

- Q. 6.** (a) Give a brief account of the importance of the statistics in different fields. (10)
(b) Explain the difference between normal and ordinal scale, interval and ratio scale. (10) (20)
- Q. 7.** (a) A coin is biased so that the probability that it fails showing tails is $\frac{3}{4}$ (10)
(i) Find the probability of obtaining at one head when the coin is tossed five times.
(ii) How many times must the coin be tossed so that the probability of obtaining one head is greater than 0.98?
(b) If X is the binomial distribution with mean 3.20 and variance 1.152, find the complete binomial probability distribution. (10) (20)
- Q. 8.** (a) Discuss the properties of Chi-square. (10)
(b) Compute the least square regression equation of Y on X for the following data. (10) (20)
What is the regression coefficient and what does it means?

X	5	6	8	10	12	13	15	16	17
Y	16	19	23	28	36	41	44	45	50
