

PSG COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)  
BSc DEGREE EXAMINATION MAY 2024  
(Fifth Semester)

Branch – STATISTICS

EDUCATIONAL & PSYCHOLOGICAL STATISTICS

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 1 = 5)

1) In usual notations  $r_{12,3}$  is equal to

(i)  $\frac{r_{12} - r_{13}r_{23}}{\sqrt{1-r_{13}^2}\sqrt{1-r_{23}^2}}$

(ii)  $\frac{r_{12}^2 - r_{13}r_{23}}{\sqrt{1-r_{13}^2}\sqrt{1-r_{23}^2}}$

(iii)  $\frac{r_{13}r_{23} - r_{12}^2}{\sqrt{1-r_{13}^2}\sqrt{1-r_{23}^2}}$

(iv)  $\frac{r_{13}r_{23} - r_{12}}{\sqrt{1-r_{13}^2}\sqrt{1-r_{23}^2}}$

2) A boy scores of 11 in an exam and the class average of 10 and variance of 4. If we transform in to z-scores then value will be

(i) 0.5

(ii) 1

(iii) 0.25

(iv) 3

3) The stanine scale is a

(i) Z Scale

(ii) Totally different from T. Scale

(iii) Condensed form of T. Scale

(iv) None of these

4) The split-half method is used as a test of

(i) Stability

(ii) Internal reliability

(iii) Inter-observer Consistency

(iv) External validity

5) Which of the following refers to concurrent validity?

(i) That two tests are done at the same time

(ii) Two or more clinicians agree on the outcome

(iii) The items on the test consistently relate to each other

(iv) The notation that scores on a test correlate highly with scores from tests that measure the same attribute

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(5 x 3 = 15)

6) a) What is Tetrachoric correlation? When is it computed?

OR

b) From a certain number of schools in Delhi, a sample of 500 students studying in classes IX and X was taken. These students were evaluated in terms of their academic achievement and participation in co-curricular activities. Their I.Q's were also tested. The correlation among these three variables was obtained and recorded as follows:

$$r_{12}=0.18 \quad r_{13}=0.60 \quad r_{23}=0.70$$

Find out the independent correlation between the main (first two) variables- academic achievement and participation in co-curricular activities

7) a) Write the uses of T-Scores

OR

b) In the sub-tests of an entrance test, Naresh scored 56 in spelling test, 72 in reasoning test, and 38 in arithmetic test. The mean and SD of these sub-test were as follows

	Spelling test	Reasoning Test	Arithmetic test
Mean(m)	50	66	30
SD( $\sigma$ )	8	12	10

Assuming the distribution of these sub-tests as normal, find out in which sub-set Naresh performed better than the other two.

8) a) Write the procedure for converting raw scores in to C- scores.

OR

b) Briefly discuss scaling of rankings in terms of normal probability curve.

Cont...

- 9) a) Write the merits and demerits of split of method  
OR  
b) What is the concept of reliability of a test and obtain the expressions for index of reliability?
- 10) a) Is it true that a test can have high reliability and low validity? If so, explain how?  
OR  
b) Write a short note on i) Concurrent validity and ii) construct validity

**SECTION -C (30 Marks)**

Answer ALL questions

ALL questions carry EQUAL Marks (5 x 6 = 30)

- 11) a) Discuss i) Biserial Correlation ii) Point biserial correlation  
OR  
b) In a tri-variate distribution  $\sigma_1=2$ ,  $\sigma_2=\sigma_3=3$ ,  $r_{12}=0.7$ ,  $r_{23}=r_{13}=0.5$ ,  
Find  $b_{12.3}$  and  $b_{13.2}$
- 12) a) What is a T-Scale? Explain the process of T scale construction by a hypothetical frequency distribution  
OR  
b) A number of students were examined in a subject by three examiners  $E_1$ ,  $E_2$  and  $E_3$  independently. The standards of marking of the examiners are reflected in the percentage frequency distribution of score given in the below table:

Marks	Percentage frequency distribution of		
	$E_1$	$E_2$	$E_3$
0-10	5	10	5
10-30	15	20	25
30-50	50	60	50
50-70	24	8	10
70-90	5	2	8
90-100	1	-	2

Determine the relative ranks of the three students A, B and C who have scored the marks with the three examiners  $E_1$ ,  $E_2$  and  $E_3$  as given in the below table

Students	Marks given by examiner		
	$E_1$	$E_2$	$E_3$
A	25	62	73
B	48	51	35
C	78	25	50

- 13) a) Discuss scaling rating in terms of normal curve.  
OR  
b) What is Stanine scores? How can you construct Stanine scales? What is their importance?
- 14) a) Explain on Method of rational Equivalence.  
OR  
b) A given test has a reliability coefficient of 0.8 and standard deviation of 20  
i) What is the maximum correlation which this test is capable of yielding as it stands?  
ii) What is the S.E of a score obtained on this test?  
iii) What is the estimated reliability coefficient of this test in a group in which standard deviation is 15?  
iv) What proportion of the variance of the scores in this test is attributable to 'true' variance?
- 15) a) Distinguish between validity and reliability?  
OR  
b) Explain briefly the concepts of validity of scores in educational and psychological experiments.