

No. 3-2(a)/2023-E.I (RC)

Dated 13.02.2024

Office Memorandum

**Sub: Normalization method/formula to be used for normalizing the scores of candidates in multi-session examinations in CSIR – reg.**

It is notified for all concerned that following normalization formula/method for normalization of scores/marks shall be used by CSIR for normalizing the raw scores of candidates in the examination conducted in multiple shifts.

1) **Percentile Scores:** Percentile scores are scores based on the relative performance of all those who appear for the examination. The marks obtained are transformed into a scale ranging from 100 to 0 for each shift of examinees. The percentile score is not the same as the percentage of marks obtained.

2) The Percentile Score indicates the percentage of candidates that have scored EQUAL TO OR LESS MARKS (same or lower raw scores) out of total candidates who have appeared in that session. Therefore, the topper (highest score) of each shift will get the same Percentile of 100.

3) The Percentile score shall thereafter be converted into the Normalized Score for the examination (instead of the raw marks of the candidate) and shall be used for the preparation of the merit list.

4) The Percentile score of a candidate for a particular shift will be calculated as below

$$\text{Percentile Score} = \frac{\text{Number of candidates appeared in the 'Shift' with raw score EQUAL TO OR LESS than the candidate}}{\text{The total number of the candidates who appeared in the 'Shift'}} \times 100$$

5) The percentile scores will be calculated up to 7 decimal places.

6) In order to finalize the merit based on percentile score as mentioned above it will include only those candidates in the merit who have secured prescribed minimum percentage of Marks for eligibility in various categories: UR, EWS, OBC (Non creamy layer), SC, ST and PwBD as per qualifying criteria prescribed by CSIR. Short listing of candidates for various stages shall be based on the "Normalized Marks" obtained by them.

7) **CALCULATION OF "NORMALIZED MARKS" FROM PERCENTILE SCORES:**

For this, the Percentile Score of each candidate will be converted into "Normalized Marks" by interpolation of raw marks into "Base Shift" by using standard mathematical formula of interpolation for the purpose of deciding minimum qualifying marks. The Raw Marks of each candidate will be normalized using the Equi-percentile method as detailed below:

**1.1) Selection of Base Shift:**

"Base Shift" is a shift having the "Highest Mean" (Average) among all the shifts of CBT/Examination with a condition that it's Present Candidate Counts should be 70% or more

than the average of all Shifts. In case the "Highest Mean" of two Shifts are same then Shift having "Highest Individual Marks" shall be considered as "Base Shift". In case both the "Highest Mean" and "Highest Individual Marks" are same then the Shift having "Highest Present Count" shall be considered as "Base Shift" to break the tie.

**1.2) Calculation of Normalized Marks:** When Percentile Score is to be converted to normalized marks for deciding minimum qualifying marks.

a) X is the percentile score of a candidate. If X percentile score is found in base shift, then corresponding marks are directly available, otherwise following formula of interpolation is to be used. This formula is nothing but interpolation formula. For the candidates whose Percentile Score is greater than or equal to the Base Shift percentile:

$$N = \left[ \frac{(Y_2 - Y_1) * (X - X_1)}{(X_2 - X_1)} \right] + Y_1$$

N = Normalized Marks

X<sub>2</sub> is immediate higher percentile score in base shift

X<sub>1</sub> is immediate lower percentile score in base shift

Y<sub>2</sub> is marks corresponding to X<sub>2</sub> percentile score in base shift

Y<sub>1</sub> is marks corresponding to X<sub>1</sub> percentile score in base shift

b) For the candidates whose Percentile Score is less than the Base Shift Percentile:

$$N = Y_1 - \frac{(Y_2 - Y_1) * (X_1 - X)}{(X_2 - X_1)}$$

N = Normalized Marks

X<sub>1</sub> is immediate higher percentile score in base shift

X<sub>2</sub> is immediate next higher percentile score in base shift

Y<sub>1</sub> is marks corresponding to X<sub>1</sub> percentile score in base shift

Y<sub>2</sub> is marks corresponding to X<sub>2</sub> percentile score in base shift

8) The 'Normalized Marks' of all the candidates for all the shifts would be merged and shall be called the final normalized scores which will then be used for the compilation of results and further processing for deciding the relative merit.

9) In case of two or more candidates securing same threshold Normalized Percentile Score, all the candidates with equal scores will be called for stage-II examination without breaking the tie. In case there is no second stage of examination, the policy of CSIR on breaking the tie shall be applied.

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Deputy Secretary

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