9. (a) Derive the Weddle's rule of numerical integration.

Deeekeâkeâ meceekeâueve keâ eueS Je[ue keâ me$e keâe %eele keâeepeS~

(b) Using Simpson's 3/8 rule, obtain the approximate value of $\int_0^1 \frac{1}{(1+x^2)}\,dx$.

emechemeve keâ 3/8 eveÙece Éeje :

$\int_0^1 \frac{1}{(1+x^2)}\,dx$ keâe ceeve evekeâeeueS~

A (Printed Pages 8)

Roll No. _____

S-694

B.A. (Part-I) Examination, 2015

MATHEMATICAL STATISTICS

Second Paper

(*Statistical Methods & Numerical Statistics Analysis*)

Time Allowed : Three Hours] [Maximum Marks : 33

Note : Attempt Five questions in all, taking one question from each Unit. Question No. 1 is compulsory.

ØelÙekeâ FkeâeF me Skeâ ØeMve uele nS, keâue heeÙe ØeMvee keâe nue keâeepeS~ ØeMve me.1 DeeveJeeÙe n~

1. (a) Explain 'variable' and 'attribute' with example.

'ieCe' leLee 'Ûeje' keâe Goenjce meenle meceePeeFÙe~

(b) Show that A.M. ≥ G.M.

eoKeeFS ekeâ A.M. ≥ G.M.

(c) Explain Kurtosis.

keâkeâolee keâe mecePeeFS~

(d) What is rank correlation? Give its limits.

keâeeš menmecyevOe keÙee n? Fmekeâe meeceeS oeepeS~

(e) If $R_{1.23} = 1$, then write the regression equation for it.

Ùeeo $R_{1.23} = 1$, lee Fmekeâe meceeßeÙeCe jKee eueeKeS~

(f) What do you understand by partial correlation coefficient? Give expression for $r_{12.3}$ in terms of total correlation coefficients.

Deehe DeeeMekeâ menmecyevOe ieCeekeâ me keÙee mecePele n? $r_{12.3}$ keâ eueÙe mecheCe mecemecyevOe ieCeekeâe keâ ce

Deelece yeejcyeejlee keÙee n? leeve ieCee keâe menelÙelee me mecePeeFÙe~

7. Describe various measures of association. Find χ^2 for 2×2 table.

mecyevOee keâ ceeheve keâe eJeeYeVe eJeeOeÙee JeCeve keâeepeS~ 2×2 meejCee keâ eueS χ^2 keâe ceeve ßeehle keâeepeS~

Unit-IV

FkeâeF-IV

8. (a) State and prove Newton's forward formula for interpolation.

vÙeešve keâ DevleJeMeve keâe Dee«ece me$e eueeKeS leLee Fme emeæ keâeepeS~

(b) Prove that :

$$U_x = U_{x-1} + \Delta U_{x-2} + \Delta^2 U_{x-3} + \ldots + \Delta^{n-1} U_{x-n} + \Delta^n U_{x-n-1}.$$

emeæ keâeepeS ekeâ :

$$U_x = U_{x-1} + \Delta U_{x-2} + \Delta^2 U_{x-3} + \ldots + \Delta^{n-1} U_{x-n} + \Delta^n U_{x-n-1}.$$

Unit-I

FkeâeF-I

2. Define different measures of central tendency. Let $\overline{x}_i$ and s_i be the mean and standard deviation respectively obtained from a set of n_i observations for i = 1, 2. If S represents the standard deviation of the combined set of $n_1 + n_2$ observation, show that :

$$S^2 = \frac{n_1 s_1^2 + n_2 s_2^2}{n_1 + n_2} + \frac{n_1 n_2}{(n_1 + n_2)^2}(\overline{x}_1 - \overline{x}_2)^2 .$$

keâvõeÙe ØeJeeòe keâe eJeeYeVe ceehee keâe heejYee<ee oeepeS~ Ùeeo n_i, i = 1, 2 Øe#eCee Jeeue meceÙne keâ ceeOÙe Je ceevekeâ eJeÛeueve ›eâceMe: $\overline{x}_i$ leLee s_i ne Deej oevee meceÙne keâe eceueekeâj $n_1 + n_2$ Øe#eCee keâe ceevekeâ eJeÛeueve S ne lee emeæ keâeepeS ekeâ :

$$S^2 = \frac{n_1 s_1^2 + n_2 s_2^2}{n_1 + n_2} + \frac{n_1 n_2}{(n_1 + n_2)^2}(\overline{x}_1 - \overline{x}_2)^2 .$$

3. (a) What is dispersion? Explain the meaning of skewness and discuss how skewness

and kurtosis can be measured?

Øeme jCe keÙee n? eJe<ecelee Meyo keâe DeLe mecePeeFS leLee yeleeFÙe ekeâ eJe<ecelee SJe keâkeâolee keâe ke e ceehee peelee n?

(b) Prove that : $\beta_2 \geq \beta_1$

emeæ keâeepeS ekeâ : $\beta_2 \geq \beta_1$

Unit-II

FkeâeF-II

4. (a) Describe the method of least squares in curve fitting.

Je›eâ Deemepeve ce vÙevelece Jeie emeæevle keâe eeFÙe~

(b) Define correlation. Obtain the limits between which the correlation coefficient lies.

menmecyevOe ieCeekeâ keâe heejYee<ee oeepeS~ Gve meeceeDee keâe ieCevee keâeepeS epevekeâ Devleiele menmecyevOe ieCeekeâ keâe ceeve jnlee n~

5. (a) In a trivariate distribution $\sigma_1 = 2, \sigma_2 = 3 = \sigma_3$, $r_{12} = 0.7, r_{23} = 0.5 = r_{31}$. Find $r_{23.1}$ and $R_{1.23}$.

Skeâ e$eÛej yeš ve ce Ùeeo $\sigma_1 = 2, \sigma_2 = 3 = \sigma_3$, $r_{12} = 0.7, r_{23} = 0.5 = r_{31}$ ne; lee $r_{23.1}$ leLee $R_{1.23}$ keâe ceeve %eele keâeepeS~

(b) Obtain the equation of regression plane of X_1 on X_2 and X_3.

X_1 keâe X_2 Deej X_3 hej meceeßeÙeCe leue keâe meceekeâjCe %eele keâeepeS~

Unit-III

FkeâeF-III

6. Discuss the classification of attributes. What are class frequencies and ultimate class frequencies? Explain with the help of three attributes.

ieCee keâ Jeieekeâj Ce keâe JeCeve keâeepeS~ keâ#ee yeejcyeejlee SJe

JÙepekeâ eueeKeS~

(g) Write the conditions for independence and association of two attributes A and B.

oe ieCee A Deej B keâ mJele$e SJe meenÛeÙe neve keâ Øeeleyevoe eueeKeS~

(h) Define interpolation and write down the fundamental assumptions for interpolation.

Deevlejieceve keâe heejYee<ee oeepeS leLee Deevlejieceve ce ceue keâuheveeDee keâe eueeKeS~

(i) Prove that : $(1 + \Delta)(1 - \nabla) \equiv 1$

emeæ keâeepeS ekeâ : $(1 + \Delta)(1 - \nabla) \equiv 1$

(j) Define Simpson's 1/3 rule.

emechemeve keâ 1/3 eveÙece keâe heejYee<ee oeepeS~