FOUNDATION COURSE EXAMINATION

SUGGESTED ANSWERS TO QUESTIONS

DECEMBER 2011

PAPER- 4: BUSINESS MATHEMATICS AND STATISTICS FUNDAMENTALS

Time Allowed : 3 Hours **Full Marks: 100**

The figures in the margin on the right side indicate full marks.

Answer all questions

Notations and symbols have usual meanings

Section I (Arithmetic- 10 marks)

Question

1. Answer any two of the following:

Choose the correct option showing the proper reasons / calculations. [3×2]

(a) Two numbers are in the ratio of 3:4. If 10 is subtracted from both of them then the ratio becomes 1:3. The numbers are:

(i) 9 and 12 (ii) 12 and 16 (iii) 15 and 20 (iv) none of these

(b) A person drove his car 50km at an average speed of 20km/h. He drove first 30km of his journey at an average speed of 60km/h. The average speed of last 20km is

(i) 40 km/h (ii) 25 km/h (iii) 10 km/h (iv) none of these

(c) For a sum of money to become $2\frac{1}{4}$ times of itself in 5 years, the rate of interest is

(i) 25% (ii) 30% (iii) 35% (iv) none of these

Answer to Question No 1:

(a) Let the numbers be 3k and 4k

Now $\frac{3k-10}{4k-10}=\frac{1}{3}\Rightarrow 9k-30=4k-10$

$\Rightarrow 5k=20\Rightarrow k=4$

So the numbers are 3×4=12, and 4×4=16 Ans. (ii)

(b) X = Required speed in km/h.

From the given conditions we get

$\frac{50}{20} = \frac{30}{60} + \frac{20}{x}$ => $x = 10$ Ans. (iii)

(c) $\frac{9P}{4} = P\left(1+\frac{5r}{100}\right) \Rightarrow \frac{5r}{100} = \frac{9}{4} - 1 \Rightarrow r = 25\%$ Ans. (i)

Question

2. Answer any one of the following: [4×1]

(a) If $\frac{\alpha}{q-r} = \frac{\beta}{r-p} = \frac{\gamma}{p-q}$ then prove that $\alpha + \beta + \gamma = 0 = p\alpha + q\beta + r\gamma$.

(b) The Bill Value (B.V.) of a bill is Rs 1,01,000. Find the Banker's Gain (B.G.) after 73 days at 5% p.a.

Answer to Question No 2(a):

Let $\frac{\alpha}{q-r} = \frac{\beta}{r-p} = \frac{\gamma}{p-q}$ = k

$\propto + \beta + \gamma$ = k(q - r + r - p + p - q) = 0

p$\propto + q\beta + r\gamma$ = k (pq - pr +qr - pq + pr - qr) = 0

Answer to Question No 2(b):

PV $= \frac{\text{BV}}{1+ni} = \frac{101000}{1+\frac{73}{365}\text{X}\frac{5}{100}}$ = 100000

BD =BV x ni = 101000 x 0.01 = Rs 1010

TD= PV x ni = 100000 x 0.01 = Rs 1000

BG = BD-TD = Rs 10

Section II (Algebra - 15 marks)

Question

3. Answer any three of the following: [3×3]

Choose the correct option showing the proper reasons/calculations.

(a) Solution of $(\sqrt[3]{2})^{2x+7} = (\sqrt[4]{2})^{7x+2/3}$ is

(i) x =1 (ii) x=3 (iii) x= 4 (iv) none of these

(b) The number of ways can the letters of the word MONDAY be arranged to end with Y but not begin with M is

(i) 24 (ii) 96 (iii) 600 (iv) none of these

(c) Let A-k varies directly as B where k is constant. If A =750 then B=500 If A =1175 then B=1350. If A= 550 then B will be

(i) 100 (ii) 200 (iii) 250 (iv) none of these

(d) If A = {1,2,3,4},B = {2,3,5,6}, and C = {3,4,6,7}, then (A-B) ∩ (A-C) is

(i) {1} (ii) {1, 2} (iii) {1, 2, 3} (iv) none of these

(e) Let *p* be the statement " the student is tall" and *q* be the statement " the student is intelligent" then symbolic form of the statement that " the student is neither tall nor intelligent" is

(i) $p \vee q$ (ii) $p \wedge q$ (iii) $p \wedge \sim q$ (iv) $\sim p \wedge \sim q$

Answer to Question No 3:

(a) $(2^{1/3})^{2x+7} = (2^{1/4})^{7x+2/3}$

$\therefore \frac{2x+7}{3} = \frac{7x+\frac{2}{3}}{4}$ => x = 2 Ans. (iv)

(b) No of arrangements beginning with M and ending with Y = (6-2)! = 24

No of arrangements ending with Y = (6-1)! = 120

∴ Reqd. No. of ways = 120-24 = 96 Ans. (ii)

(c) $(A\text{-}k) \propto B$ => $A - k = lB$, l = constant of variation

∴ $750 - k = 500\, l$ and $1175\text{-}k = 1350\, l$

=> $l = \frac{1}{2}$

So $k = 750\text{-}500\, l = 500$

i.e $A = 500+\frac{B}{2}$ when A = 550 we get B =100 Ans. (i)

(d) A-B = {1, 4} and A-C = {1, 2}

∴ (A-B) ∩ (A-C) = {1} Ans. (i)

(e) By Demorgan's Law $\sim(p \vee q) = \sim p \wedge \sim q$ Ans. (iv)

Question

4. Answer any two of the following: [3×2]

(a) In how many ways can a committee of 2 ladies and 3 gentlemen be formed from a group of 5 ladies and 6 gentlemen?

(b) Evaluate : $\frac{\log 3\sqrt{3}+\log\sqrt{8}-\log\sqrt{125}}{\log 6-\log 5}$

(c) If *w* be an imaginary cube root of unity then show that $(1+w-w^2)(1-w+w^2) = 4$

Answer to Question No 4(a):

Required no of ways = ${}^5C_2 \times {}^6C_3 = 200$

Answer to Question No 4(b):

$$\frac{\log 3\sqrt{3}+\log\sqrt{8}-\log\sqrt{125}}{\log 6-\log 5} = \frac{\log\frac{3^{3/2}\times 2^{3/2}}{5^{3/2}}}{\log 6-\log 5} = \frac{\frac{3}{2}(\log 6-\log 5)}{\log 6-\log 5} = \frac{3}{2}$$

Answer to Question No 4(c):

$(1+w-w^2)(1-w+w^2) = (-w^2-w^2)(-w-w) = (-2w^2)(-2w) = 4w^3 = 4$

Section III (Mensuration - 15 marks)

Question

5. Answer any three of the following: [3×3]

Choose the correct option showing proper reasons / calculations.

(a) Altitude of an equilateral triangle having a base of length 2 cm is

(i) $\sqrt{3}$ cm (ii) $\frac{\sqrt{3}}{2}$ cm (iii) $\frac{\sqrt{3}}{4}$ cm (iv) none of these

(b) How many times will wheel of a car rotate in a journey of 1925 meters if it is known that the radius of the wheel is 49 cm? ($\pi = \frac{22}{7}$)

(i) 600 (ii) 625 (iii) 650 (iv) none of these

(c) The volume (in cu. cm) of a right triangular prism with sides as 10,15 and 19 cm with altitude of prism as 8 cm is

(i) 594 (ii) 595 (iii) 596 (iv) none of these

(d) Three solid metal spheres of radii 3 cm, 4cm, and 5 cm are melted to form a new sphere. The radius of this new sphere is

(i) 4 cm (ii) 9 cm (iii) 12 cm (iv) none of these

(e) The volumes of two cones having equal radius of their bases are in the ratio 1:2. The ratio of their heights is

(i) 1:3 (ii) 3:1 (iii) 2:1 (iv) none of these

Answer to Question No 5:

(a) Altitude = $\sqrt{2^2 - 1^2} = \sqrt{3}$ cm Ans. (i)

(b) Perimeter of the wheel = $2\pi r = 2 \times \frac{22}{7} \times 49 = 308$ cm

Number of rotations = $\frac{1925 \times 100}{308} = 625$ Ans. (ii)

(c) $s = \frac{a+b+c}{2} = 22$ cm

Area of the base = $\sqrt{s(s-a)(s-b)(s-c)} = 74.5$ sqcm

Volume = 74.5 x 8 = 596 cm Ans. (iii)

(d) Let R = radius of the new sphere

$\therefore \frac{4}{3}\pi R^3 = \frac{4}{3}\pi (3^3+4^3+5^3) = \frac{4}{3}\pi (6)^3 \Rightarrow R = 6$ cm Ans. (iv)

(e) $\frac{\frac{1}{3}\pi r^2 h_1}{\frac{1}{3}\pi r^2 h_2} = \frac{1}{2} \Rightarrow h_1 : h_2 = 1:2$ Ans. (iv)

Question

6. Answer any two of the following: [3×2]

(a) The length, breadth, and height of a cage made of wire are 6 m, 3 m, and 2 m respectively. Find the length of the longest stick that can be placed in the cage.

(b) Curved surface area of a solid right circular cylinder having 10 cm as diameter of the base is 100 sq cm. Find the volume of this cylinder.

(c) If a circle and a square have the same perimeter then show that their areas are in the ratio 14:11. ($\pi = \frac{22}{7}$)

Answer to Question No 6(a):

Length = $\sqrt{6^2 + 3^2 + 2^2}$ = 7cm

Answer to Question No 6(b):

r = 5 cm Curved surface area = $2\pi rh$ = 10 πh

So, 10πh = 100 => πh = 10

Volume = πr^2h = (πh) x 5^2 = 10 x 25 = 250 cu cm

Answer to Question No 6(c):

Let r = radius of a circle, a = side of a square

Given 2 πr = 4a => r = $\frac{4a}{2\pi} = \frac{7a}{11}$

$\therefore \frac{\text{Area of circle}}{\text{Area of square}} = \frac{\pi r^2}{a^2} = \frac{22}{7} \text{X} \frac{49}{121} = \frac{14}{11}$

Section IV (Co-ordinate Geometry -10 marks)

Question

7. Answer any two of the following: 3X2

Choose the correct option showing the proper reasons / calculations.

(a) The ratio in which the point (2,3) divide the portion of a straight line joining the points (1,2) and (4,5) internally is

(i) 1:2 (ii) 2:1 (iii) 1:3 (iv) none of these

(b) A straight line passing through the point of intersection of lines 2x+y = 4 and x-y+1 = 0 and parallel to the line 3x+2y = 5 is

(i) 3x+2y = 1 (ii) 2x-3y = 1 (iii) 3x+2y = 7 (iv) none of these

(c) The centre and radius of the circle (x-2) (x-4)+(y-3) (y-5) =0 are

(i) (3,-4); 2 (ii) (3,4); $\sqrt{2}$ (iii) (-3,4); 4 (iv) none of these

(d) The eccentricity of the ellipse $4x^2$-24x+$9y^2$+36y+36=0 is

(i) $\sqrt{\frac{5}{3}}$ (ii) $\frac{\sqrt{5}}{3}$ (iii) $\frac{5}{3}$ (iv) none of these

Answer to Question No 7:

(a) Let the ratio be m:n

Then $2 = \frac{4m+n}{m+n}$ and $3 = \frac{5m+2n}{m+n}$

i.e. m:n = 1:2 Ans. (i)

(b) Point of intersection of the lines in (1,2)

Gradient of the line 3x+2y= 5 is $-\frac{3}{2}$

The equation of the required line is $y-2 = -\frac{3}{2}(x-1)$ i e. 3x+2y = 7 Ans. (iii)

(c) (x-2) (x-4) +(y-3) (y-5) = 0

⇨ $x^2 + y^2 - 6x - 8y + 23 = 0$

Centre = (-g,-f) = (3,4)

Radius = $\sqrt{g^2 + f^2 - c} = \sqrt{2}$ Ans. (ii)

(d) Given equation of ellipse is $4x^2 - 24x + 9y^2 + 36y + 36 = 0$

i.e. $\frac{(x-3)^2}{9} + \frac{(y+2)^2}{4} = 1$

Eccentricity $e = \sqrt{1 - \frac{4}{9}} = \frac{\sqrt{5}}{3}$ Ans. (ii)

Question

8. Answer any one of the following: [4×1]

(a) Find the equation of the parabola whose vertex and focus are at (3,5) and (6,5).

(b) Given for a hyperbola, co-ordinates of the centre is (-3,2), length of latus rectum is 9 and eccentricity is $\frac{\sqrt{13}}{2}$**.** Find the equation of the hyperbola.

Answer to Question No 8(a):

Distance between focus and vertex is given by a= 6-3=3

Equation of the parabola is

$(y-5)^2 = 4\times3\times(x-3) \Rightarrow y^2 - 10y - 12x + 61 = 0$

Answer to Question No 8(b):

Centre = (-3,2). From the given conditions we get $\frac{2b^2}{a}$ = 9 => $b^2 = \frac{9a}{2}$

Now, $b^2 = a^2(e^2\text{-}1)$ Substituting $b^2 = \frac{9a}{2}$ and $e^2 = \frac{13}{4}$, we get a = 2 and b^2 = 9

∴ The equation of the hyperbola is $\frac{(x+3)^2}{4} - \frac{(y-2)^2}{9} = 1$

= > $9x^2 - 4y^2 + 54x + 16y + 29 = 0$

Section V (Calculus -15 marks)

Question

9. Answer any three of the following: [3×3]

Choose the correct option showing proper reasons / calculations.

(a) If $f(x) = \frac{x-1}{x+1}$ then $f\left(\frac{x-1}{x+1}\right)$ is

(i) x (ii) $\frac{1}{x}$ (iii) $-\frac{1}{x}$ (iv) none of these

(b) The value of k for which $f(x)$ = x+2 for $x \le 2$
= $k - x^2$ for x>2

Is continuous at x=2 is

(i) 8 (ii) 6 (iii) 4 (iv) none of these

(c) If $y = x^3$, then the value of $1+\left(\frac{d^2y}{dx^2}\right)^2$ when x = -1 is

(i) -37 (ii) 37 (iii) 35 (iv) none of these

(d) If $u = x^2+y^2+z^2$, the value of $xu_x + yu_y + zu_z$ is

(i) 2u (ii) 2 (iii) -2u (iv) none of these

(e) The value $\int_0^1 5^{2x}\,dx$ is

(i) 12 $\log_e 5$ (ii) 12 $\log_5 e$ (iii) 2 $\log_e 5$ (iv) none of these

Answer to Question No 9:

(a) $\int\left(\frac{x-1}{x+1}\right) = \dfrac{\frac{x-1}{x+1}-1}{\frac{x-1}{x+1}+1} = -\frac{1}{x}$ Ans. (iii)

(b) For the continuity at x=2, we need

$\lim_{x\to 2-}(x+2) = \lim_{x\to 2+}(k-x^2)$ i.e. 4=k - 4 i.e. k= 8 Ans. (i)

(c) y= x^3 => $\frac{d^2y}{dx^2}$ = 6 x

$\therefore$ 1+ $\left(\frac{d^2y}{dx^2}\right)^2$ = 1+36 x^2 = 37 at x = -1 Ans. (ii)

(d) $xu_x + yu_y + zu_z = x\,(2x) + y\,(2y) + z(2z) = 2(x^2+y^2+z^2) = 2u$ Ans. (i)

(e) $\int_0^1 5^{2x}dx = \int_0^1 25^x dx = \frac{1}{loge^{25}}$ [25-1] = $\frac{24}{2\,log\,e^5}$ = 12 $\log_5 e$ Ans. (ii)

Question

10. Answer any two of the following: 3X2

(a) If y = $x^2 \log_e x$, show that $x^2\frac{d^2y}{dx^2} + 4y = 3x\frac{dy}{dx}$

(b) Show that x^3-6 x^2+9 x -10 is maximum at x =1 but is minimum at x = 3.

(c) Evaluate $\int \frac{dx}{\sqrt{x+2}-\sqrt{x+3}}$

Answer to Question No 10(a)

y = $x^2\log_e x$

$\frac{dy}{dx} = x + 2\,x\log_e x$

$\frac{d^2y}{dx^2} = 3+2\log_e x$

$x^2\frac{d^2y}{dx^2} + 4y = 3\,x^2 + 2\,x^2\log_e x + 4\,x^2\log_e x = 3\,x\,(x + 2\,x\log_e x) = 3x\frac{dy}{dx}$

Answer to Question No 10(b)

y= x^3 - 6 x^2 + 9 x -10

$\frac{dy}{dx}$ = 3 x^2 -12 x+9 = 3 (x -1)(x -3)

$\frac{dy}{dx}$ = 0 gives x =1 or 3

$\frac{d^2y}{dx^2}$ = 6 x -12. So $\left[\frac{d^2y}{dx^2}\right]_{x=1}$ = -6< 0 and $\left[\frac{d^2y}{dx^2}\right]_{x=3}$ = 6>0

So y is maximum at x =1 and minimum at x =3

Answer to Question No 10(c)

$\int \frac{dx}{\sqrt{x+2}-\sqrt{x+3}}$ = - $\int(\sqrt{x+2}+\sqrt{x+3}$) dx

$= -\left[\frac{(x+2)^{3/2}+(x+3)^{3/2}}{\frac{3}{2}}\right]$ + c

= $-\frac{2}{3}[(x+2)^{3/2}+(x+3)^{3/2}]$ + c

Section VI (Statistical Methods -35 marks)

Question

11. Answer any seven of the following : [3×7]

Choose the correct option showing proper reasons / calculations

(a) The harmonic mean of the numbers 1, $\frac{1}{2}$, $\frac{1}{3}$, ……, $\frac{1}{n}$ is

(i) $\frac{1}{n+1}$ (ii) $\frac{2}{n+1}$ (iii) $\frac{3}{n+1}$ (iv) none of these

(b) Geometric mean of first group of 4 observations is 8 and that of second group of 3 observations is 1024. Then geometric mean of all the 7 observations is

(i) 64 (ii) 32 (iii) 128 (iv) none of these

(c) The median of the following frequency distribution of x

x	:	1	2	3	4	5	6
frequency	:	11	20	29	25	13	2 is

(i) 2.5 (ii) 3.5 (iii) 4.5 (iv) none of these

(d) For a group of 10 items $\sum x$ = 60, $\sum x^2$ = 850 and mode =5. Then the Pearson's coefficient of skewness is

(i) $\frac{1}{7}$ (ii) $\frac{1}{8}$ (iii) $\frac{1}{9}$ (iv) none of these

(e) If two variables x and y are related by 3x-2y-4=0 and arithmetic mean of x is 10, then the arithmetic mean of y is

(i) 12 (ii) 10 (iii) 15 (iv) none of these

(f) Mean deviation about median of 13, 84, 68, 24, 96, 139 , 84 ,27 is

(i) 33.88 (ii) 34.88 (iii) 35.88 (iv) none of these

(g) If 25 observations are each 1, 25 observations are each 3 and 50 observations are each 0, then variance of all 100 observations is

(i) 1 (ii) 1.5 (iii) 2 (iv) none of these

(h) If $\sum_{i=1}^{5}(x_i-2)=15$, $\sum_{i=1}^{5}(x_i-3)^2=50$, then variance of x_1, x_2, x_3, x_4, and x_5 is

(i)2 (ii) 4 (iii) 6 (iv) none of these

(i) If the variance of the first *n* natural numbers is 14, then the value of *n* is

(i) 12 (ii) 11 (iii) 13 (iv) none of these

(j) Arithmetic mean of a series of observations is 6 and its coefficient of variation is 50%, then the variance of the observations is

(i) 10 (ii) 9 (iii) 8 (iv) none of these

Answer to Question No 11:

(a) H.M = $\frac{n}{1+2+ \ldots\ldots + n} = \frac{2}{n+1}$ Ans. (ii)

(b) G.M = $(8^4 \text{ X } 1024^3)^{1/7} = 64$ Ans. (i)

(c)

x	:	1	2	3	4	5	6
CF(<type)	:	11	31	60	85	98	100

Median = $\frac{3+3}{2}$ = 3 Ans. (iv)

(d) s.d = $\sqrt{\frac{850}{10} - (\frac{60}{10})^2}$ = 7

co efficient of skewness = $\frac{\text{mean}-\text{mode}}{\text{s.d}} = \frac{6-5}{7} = \frac{1}{7}$ Ans. (i)

(e) $3\bar{x} - 3\bar{y} - 4 = 0 \Rightarrow > \bar{y} = \frac{1}{2}(3\times10\text{-}4) = 13$ Ans. (iv)

(f) Median = $\frac{68+84}{2} = 76$

M.D about median = $\frac{1}{8}\sum_{i=1}^{8}|x_i - 76|$

$= \frac{1}{8}(63+52+49+8+8+8+20+63) = 33.88$ Ans. (i)

(g) Mean = $\frac{25 \text{ x } 1+25 \text{ x } 3+50 \text{ x } 0}{100} = 1$

Variance = $\frac{25(1-1)^2+25(3-1)^2+50(0-1)^2}{100} = 1.5$ Ans. (ii)

(h) $\sum_{i=1}^{5}(x_i - 2) = 15 \Rightarrow \sum_{i=1}^{5} x_i - 10 = 15 \Rightarrow \sum_{i=1}^{5} x_i = 25 \Rightarrow \bar{x} = \frac{25}{5} = 5$

Now Variance = $\frac{1}{5}\sum_{i=1}^{5}(x_i - \bar{x})^2 = \frac{1}{5}\sum_{i=1}^{5}(x_i - 5)^2$

$= \frac{1}{5}\sum_{i=1}^{5}\{(x_i - 3) - 2\}^2 = \frac{1}{5}\sum_{i=1}^{5}(x_i - 3)^2 - \frac{4}{5}\sum_{i=1}^{5}(x_i - 3) + \frac{20}{5}$

$= \frac{50}{5} - \frac{4}{5}(25 - 15) + 4 = 10 - 8 + 4 = 6$ Ans. (iii)

(i) $\frac{n^2-1}{12} = 14 \Rightarrow n^2 = 169 \Rightarrow n = 13$ Ans. (iii)

(j) CV = $\frac{\text{s.d}}{\text{mean}} \times 100 \Rightarrow 50 = \frac{\text{s.d}}{6} \times 100 \Rightarrow \text{s.d} = 3 \Rightarrow \text{variance} = 9$ Ans.(ii)

Question

12. (a) Answer any two of the following: [5×2]

(i) Draw a simple bar chart to represent year-wise student strength (in thousands) in certain university form the following data:

Year	: 1970	1971	1972	1973
Number of students	: 20	30	40	35

(ii) Show that mean deviation about mean and s.d. of two observations x_1 and x_2 are same.

(iii) Find the variance of the following frequency distribution:

Class Interval	: 5-10	10-15	15-20	20-25	25-30
Frequency	: 5	9	16	14	6

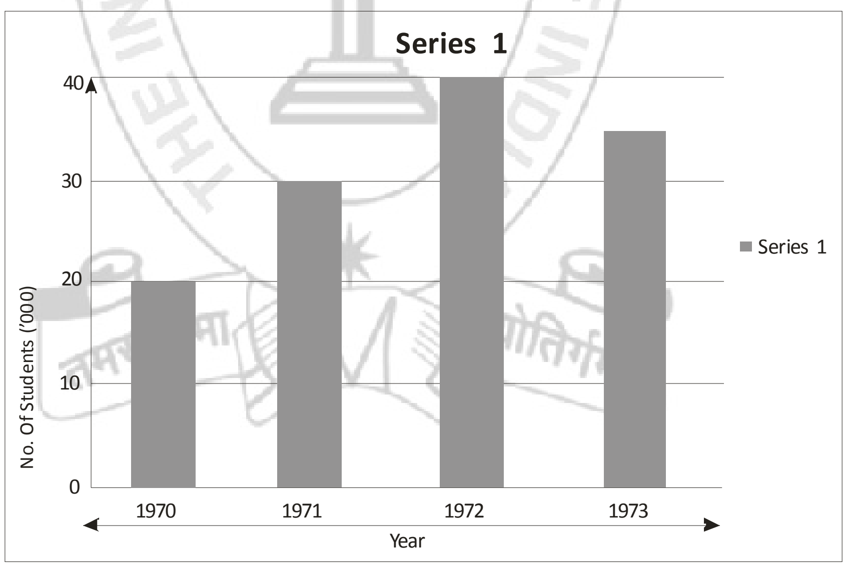
(b) **Write a short note on any one of the following:** [4×1]

(i) Tabulation

(ii) Central Tendency of Data.

Answer to Question No 12(a)(i)

BAR CHART



Answer to Question No 12(a)(ii)

Mean $=\frac{x_1+x_2}{2}$

Mean deviation about mean $= \frac{1}{2}\left[\left|x_1-\frac{x_1+x_2}{2}\right|+\left|x_2-\frac{x_1+x_2}{2}\right|\right]$

$= \frac{1}{2}\left[\frac{|x_1-x_2|}{2}+\frac{|x_2-x_1|}{2}\right]=\frac{|x_1-x_2|}{2}$

$$\text{S.d} = \sqrt{\frac{1}{2}\left[\left(x_1-\frac{x_1+x_2}{2}\right)^2+\left(x_2-\frac{x_1+x_2}{2}\right)^2\right]}$$

$$= \sqrt{\frac{1}{2}\left[\frac{(x_1-x_2)^2}{4}+\frac{(x_2-x_1)^2}{4}\right]} = \sqrt{\frac{(x_1-x_2)^2}{4}} = \frac{|x_1-x_2|}{2}$$

Thus mean deviation about mean = s.d

Answer to Question No 12(a)(iii)

x	f	$u=\frac{x-17.5}{5}$	fu	fu^2
7.5	5	-2	-10	20
12.5	9	-1	-9	9
17.5	16	0	0	0
22.5	14	1	14	14
27.5	6	2	12	24
	50 = N		$\sum fu = 7$	$\sum fu^2 = 67$

Variance $=5^2\times\left[\frac{\Sigma fu^2}{N}-\left(\frac{\Sigma fu}{N}\right)^2\right]=25\left[\frac{67}{50}-\left(\frac{7}{50}\right)^2\right]=33.01$

Answer to Question No 12 (b)

SHORT NOTES:

(i) <u>TABULATION</u>

Tabulation is a systematic and scientific presentation of data in a suitable form for analysis and interpretation.

After the data have been collected, they are tabulated i.e. put in a tabular form of columns and rows. The function of tabulation is to arrange the classified data in on orderly manner suitable for analysis and interpretation. Tabulation is the last stage in collection and compilation of data, and is a kind of stepping –stone to the analysis and interpretation.

A table broadly consists of five parts-

(i) Number and title indicating the serial number of the table and subject matter of the table.

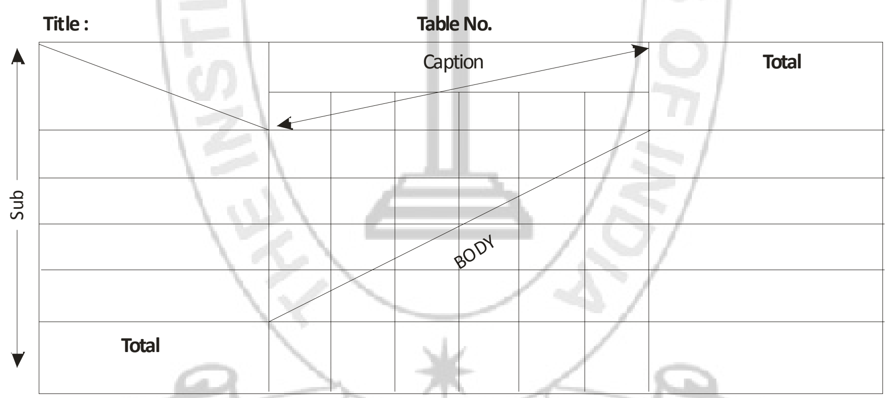
(ii) Stub i.e. space provided for indicating the row headings.

(iii) Caption i.e. the space provided for column and sub column headings.

(iv) Body i.e. figures to be entered in the table.

(v) Foot-note i.e the space provided for the source from which the data have been obtained and for explanation of the symbols if any, used in the table.

Thus table should be arranged as follows :-



Foot Note :

Types of Tabulation:

Mainly there are two types of tables – Simple and Complex. Simple tabulation reveals information regarding one characteristics only, while complex table gives information relating to several characteristics.

(ii) **CENTRAL TENDENCY OF DATA**

A given raw statistical data can be condensed to a large extent by the methods of Classification and tabulation. But this is not enough for interpreting a given data we are to depend on some mathematical measures. Such a type of measure is the measure of Central Tendency.

By the term of Central Tendency of Data we mean that Central Value of the data about which the observations are concentrated. Since the single value has a tendency to be somewhere at the Centre and within the range of all values, it is also known as the measure of Central Tendency.

There are three measures of Central Tendency:

(i) Mean (ii) Median (iii) Mode

Mean is the most important measure which is of three types:

(i) Arithmetic mean
(ii) Geometric Mean
(iii) Harmonic Mean

Mean of a series (usually denoted by $\overline{X}$) is the value obtained by dividing the sum of the values of various items, in a series (∑X) divided by the number of items (N) constituting the series.

Median: If a set of observations is arranged in order of magnitude, then the middle –most or central value gives the median. Median divides the observations into two equal parts, in such a way that the number of observations smaller than median is equal to the number greater than it.

Mode: Mode is the value of the variate which occurs with maximum frequency. It represents the most frequent value of a series.

In most frequency distributions Mean, Median and Mode obey the approximate relation known as Empirical relation expressed as Mean – Mode = 3 (Mean – Median).