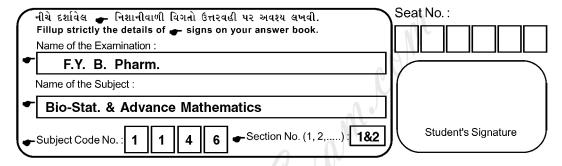# SB-1146

First Year B. Pharm. Examination
March / April – 2011
Bio-Stat. & Advance Mathematics

Time : 3 Hours]   [Total Marks :70

Instructions :

(1)

(2)   Attempt all question.

(3)   All questions are compulsory.

(4)   Tie two sections separately.

SECTION-I

1   Answer the following question : (any **five**)   10

   (1)   Find mean deviation;

       $2, 3, 3, 8, 4, 2, 3, 3, 3$

   (2)   Give your comment for correlation co-efficient r=1, r=–1 and r = 0.85.

   (3)   The regression equation of Y on X is Y = –3+ X/2 and that of X on Y is X =–7+BY If r =0.1 then find B.

   (4)   Give properties of binomial distribution

   (5)   Define mutually exclusive events.

   (6)   Define Alternative hypothesis.

   (7)   What is the difference between rank correlation and Karl Pearson's method ?

SB-1146]   1   [Contd...

2 Answer the following questions : (any four) **16**

   (a) Find standard deviation for the following given data :

       15, 18,17, 18, 17, 15, 16, 10

   (b) Find mean, median and mean deviation for the data given below :

Income	40	45	48	55	69	80	85	100
No of Employee	6	8	3	8	12	15	6	4

   (c) A goal scored by Team A and Team B in football match during a season was as follows. Find out which team is more stable or consistent ?

No of goals scored	0	1	2	3	4	5
Team A	27	9	8	5	4	2
Team B	17	9	6	5	3	2

   (d) In an urn there are 3 red and 7 white balls. One ball is selected at random from the urn and in place of it a ball of other colour is placed. Now one ball is drawn at random from the urn. What is the probability that it is red ?

   (e) The probability that a bomb dropped from a plane will hit a target is 2/5. Two bombs are enough to destroy a palace of bugdad. If 4 bombs are dropped on a palace, find the probabilities that.

       (1) The palace will be destroyed.

       (2) The palace will be partially destroyed.

   (f) Fit a Poisson distribution to the following data;

       $[e^{-0.6} = 0.5488]$

x	0	1	2	3	4
f	110	65	21	3	1

3 Answer the following questions : (any **three**)   **9**

(a) Find coefficient of Rank correlation

x :	35	40	42	43	40	53	54	49	41	55
y :	102	101	97	98	38	101	97	92	95	95

(b) Find the two regression line using the data given below and hence estimate x for y =30.

$$N = 9, \bar{x} = 30, \bar{y} = 40. \left(x - \bar{x}\right)^2 = 120, \left(y - \bar{y}\right)^2 = 346, \left(x - \bar{x}\right)\left(y - \bar{y}\right) = 193.$$

(c) In a random sample of 500 persons from Maharashtra, 200 are found to be consumer of vegetable oil. In another sample of 400 persons from Gujarat., 200 are found to be consumer of vegetable oil. Discuss whether the data reveal a significant difference between Maharashtra and Gujarat so far as production of vegetable oil consumer is concerned.

(d) A company is producing steel tubes in inner diameter of 2.00 cms. A sample of 10 tubes gives mean inner diameter of 2.01 cms, and a variance of 0.004 cms square. Is the difference in the means significant ?

(e) Explain "f "distribution.

SECTION-II

4 Attempt any **eleven** :   **11**

(1) Give an example of order of differential equation.

(2) What is mean Homogeneous differential equation ?

(3) What is linear differential equation ?

(4) What is Laplace transform ?

(5) Find derivative of y = log (log x)

(6) Find L {cost}

(7) Write necessary and sufficient condition for exact differential equation.

(8) Write Bernouli's equation ?

(9) Prove that $L\left(e^{-at}\right) = \dfrac{1}{\left(s+a\right)}$.

(10) Write linearity property of Laplace transform.

(11) Solve the differential equation $(D^2-5D+6)\ y=0$.

(12) Prove that $L(1)=\dfrac{1}{s}$

(13) Define integrating factor.

(14) Write any two characteristic of mathematical model.

(15) Write Cauchy's mean value theorem ?

5 Solve any **three:**   **12**

  (1) $y(1+x)dx+x(1+y)dy=0$

  (2) $(2x+3y-5)dy+(3x+2y-5)dx=0$

  (3) $(x+2y^3)dy/dx=y$

  (4)   Solve $y'' +2y'-8y = e^{3x}$

  (5)   Solve $(D^2+4D+5)\ y = 0$, given that when x =0, y =1 and dy/dx =2.

6 Attempt any **two:**   **12**

  (1)   Explain mathematical model and write steps which are necessary for construction of a mathematical model.

  (2)   Evaluate following :

    (a) $L^{-1}\left\{\dfrac{s^2+2s-4}{(s^2+2s+5)(s^2+2s+2)}\right\}$

    (b) $L^{-1}\left\{\dfrac{4s+12}{s^2+8s+16}\right\}$

    (c)   Use Laplace transforms method to solve $(d^{2y}/dt^2)-3\ (dy/dt)+2y=4e^{2t}$ given that $y(0)=y'(0)=5$.

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