# PARUL UNIVERSITY
## FACULTY OF APPLIED SCIENCE
### B.Sc., Winter2017-18 Examination

Semester: 2                                                    Date: 09/01/2018
Subject Code: 11191151                                          Time: 10:30 am to 1:00 pm
Subject Name: Basic Mathematics & Basic Statistics             Total Marks: 60

**Instructions:**
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

**Q.1. A)**  **Answer the following questions:(Each of 04 marks)**                **(08)**

(a)  Find Mean and Median.

| Class | 0-15 | 15-30 | 30-45 | 45-60 | 60-75 |
|-------|------|-------|-------|-------|-------|
| frequency | 2 | 5 | 12 | 17 | 8 |

(b)  Find the limit $\lim_{x \to 3} \frac{x^2 - 9}{x - 3}$

**Q.1. B)**  **Answer the following questions (Any two)**

(a) 1. Find the mean, median and mode for the following data:        **(04)**
       3,2,6,5,7,3,8,10,3,14,2,1

   2. Find the limit $\lim_{x \to 0} \frac{\sin (5x)}{3x}$

(b) Solve by using Cramer's rule  $5x + 2y = 8, 2x - 3y = 7$        **(04)**

(c) Find the inverse of the matrix $A = \begin{bmatrix} 4 & 7 \\ 2 & 6 \end{bmatrix}$        **(04)**

**Q.2. A)**  **Answer the following questions.**

(a) 1. Differentiate $5x^2 + \sin x \cos x$        **(04)**

   2. Differentiate $e^{2x} \sin 6x$

(b) The score for six games were 10, 20, 30, 40, 50, 60 find standard deviation and hence        **(04)**
coefficient of variance.

**Q.2. B)**  **Answer the following questions (Any two)**

(a) 1. Find the determinant of  $A = \begin{bmatrix} 2 & 3 \\ -1 & 5 \end{bmatrix}$.        **(03)**

   2. If mean =10 and median =12 ,then find the value of mode?

   3. Find the value of  f(x)= $x^3 - 3x + 2$ ,when x= -2.

(b) Find the product matrix AB if $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 9 & 8 & 7 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$        **(03)**

(c) 1. Find the mean of first five prime numbers.        **(03)**
   2. Give an example of a symmetric matrix.

**Q.3. A)**  **Answer the following questions:**        **(08)**

(a) Find the correlation coefficient between the length and weight?

| Length in inches | 3 | 4 | 6 | 7 | 10 |
|------------------|---|---|---|---|----|
| Weight in Kg | 9 | 11 | 14 | 15 | 16 |

(b) A card is drawn from well shuffled pack of cards, what is the probability that it is either a
spade or an ace?

**Q.3. B)**  **Answer the following questions (Any two)**

(a) Two judges have given ranks to 10 students for their honesty. Find the rank correlation        **(04)**
coefficient.

| 1st judge | 3 | 5 | 8 | 4 | 7 | 10 | 2 | 1 | 6 | 9 |
|-----------|---|---|---|---|---|----|---|---|---|---|
| 2nd judge | 6 | 4 | 9 | 8 | 1 | 2 | 3 | 10 | 5 | 7 |

(b) A and B plays a game in which there chances of winning are in the ratio3:2. Find A's **(04)**
chances of winning at least 3 games out of 5 games played.

(c) Integrate $\int x \sin x \, dx$ **(04)**

**Q.4. A)** **Answer the following questions.**

(a) Solve the differential equation by variable separable method $\frac{2dy}{dx} = \frac{y(x+1)}{x}$ **(04)**

(b) A manufacturer knows from his experance that the resistance of resistors he produces is **(04)**
normal with μ=100 ohms, and SD =σ=2 ohms. What percentage of resotors will have
resistance between 98 ohms and 102 ohms? (Use the table attached below)

**Q.4. B)** **Answer the following questions (Any two)**

(a) 1. A card is drawn from a well-shuffled pack of 52 cards, Find the probability of getting a **(03)**
face.

2. State true or false "The value of coefficient of correlation can be 2".

3. $\int x \, dx = $ _____

    (a)     $x + c$     (b) $x^2 + c$    (c) 1    (d) $\frac{x^2}{2} + c$

(b) You are given the following data. Find the regression coefficient and fit regression line X on **(03)**
Y?

| | X | Y |
|---|---|---|
| Arithmetic mean | 36 | 85 |
| Standard Deviation | 11 | 8 |
| Coefficient of correlation between X & Y | 0.66 | |

(c) Solve the differential equation $\frac{dy}{dx} + y = e^{-x}$. **(03)**

## Areas Under the Standard Normal Curve

| z | 0.00 | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0000 | 0.0040 | 0.0080 | 0.0120 | 0.0160 | 0.0199 | 0.0239 | 0.0279 | 0.0319 | 0.0359 |
| 0.1 | .0398 | .0438 | .0478 | .0517 | .0557 | .0596 | .0636 | .0675 | .0714 | .0753 |
| 0.2 | .0793 | .0832 | .0871 | .0910 | .0948 | .0987 | .1026 | .1064 | .1103 | .1141 |
| 0.3 | .1179 | .1217 | .1255 | .1293 | .1331 | .1368 | .1406 | .1443 | .1480 | .1517 |
| 0.4 | .1554 | .1591 | .1628 | .1664 | .1700 | .1736 | .1772 | .1808 | .1844 | .1879 |
| 0.5 | .1915 | .1950 | .1985 | .2019 | .2054 | .2088 | .2123 | .2157 | .2190 | .2224 |
| 0.6 | .2257 | .2291 | .2324 | .2357 | .2389 | .2422 | .2454 | .2486 | .2517 | .2549 |
| 0.7 | .2580 | .2611 | .2642 | .2673 | .2704 | .2734 | .2764 | .2794 | .2823 | .2852 |
| 0.8 | .2881 | .2910 | .2939 | .2967 | .2995 | .3023 | .3051 | .3078 | .3106 | .3133 |
| 0.9 | .3159 | .3186 | .3212 | .3238 | .3264 | .3289 | .3315 | .3340 | .3365 | .3389 |
| 1.0 | .3413 | .3438 | .3461 | .3485 | .3508 | .3531 | .3554 | .3577 | .3599 | .3621 |
| 1.1 | .3643 | .3665 | .3686 | .3708 | .3729 | .3749 | .3770 | .3790 | .3810 | .3830 |
| 1.2 | .3849 | .3869 | .3888 | .3907 | .3925 | .3944 | .3962 | .3980 | .3997 | .4015 |
| 1.3 | .4032 | .4049 | .4066 | .4082 | .4099 | .4115 | .4131 | .4147 | .4162 | .4177 |
| 1.4 | .4192 | .4207 | .4222 | .4236 | .4251 | .4265 | .4279 | .4292 | .4306 | .4319 |
| 1.5 | .4332 | .4345 | .4357 | .4370 | .4382 | .4394 | .4406 | .4418 | .4429 | .4441 |
| 1.6 | .4452 | .4463 | .4474 | .4484 | .4495 | .4505 | .4515 | .4525 | .4535 | .4545 |
| 1.7 | .4554 | .4564 | .4573 | .4582 | .4591 | .4599 | .4608 | .4616 | .4625 | .4633 |
| 1.8 | .4641 | .4649 | .4656 | .4664 | .4671 | .4678 | .4686 | .4693 | .4699 | .4706 |
| 1.9 | .4713 | .4719 | .4726 | .4732 | .4738 | .4744 | .4750 | .4756 | .4761 | .4767 |
| 2.0 | .4772 | .4778 | .4783 | .4788 | .4793 | .4798 | .4803 | .4808 | .4812 | .4817 |
| 2.1 | .4821 | .4826 | .4830 | .4834 | .4838 | .4842 | .4846 | .4850 | .4854 | .4857 |
| 2.2 | .4861 | .4864 | .4868 | .4871 | .4875 | .4878 | .4881 | .4884 | .4887 | .4890 |
| 2.3 | .4893 | .4896 | .4898 | .4901 | .4904 | .4906 | .4909 | .4911 | .4913 | .4916 |
| 2.4 | .4918 | .4920 | .4922 | .4925 | .4927 | .4929 | .4931 | .4932 | .4934 | .4936 |
| 2.5 | .4938 | .4940 | .4941 | .4943 | .4945 | .4946 | .4948 | .4949 | .4951 | .4952 |
| 2.6 | .4953 | .4955 | .4956 | .4957 | .4959 | .4960 | .4961 | .4962 | .4963 | .4964 |
| 2.7 | .4965 | .4966 | .4967 | .4968 | .4969 | .4970 | .4971 | .4972 | .4973 | .4974 |
| 2.8 | .4974 | .4975 | .4976 | .4977 | .4977 | .4978 | .4979 | .4979 | .4980 | .4981 |
| 2.9 | .4981 | .4982 | .4982 | .4983 | .4984 | .4984 | .4985 | .4985 | .4986 | .4986 |
| 3.0 | .4987 | .4987 | .4987 | .4988 | .4988 | .4989 | .4989 | .4989 | .4990 | .4990 |
| 3.1 | .4990 | .4991 | .4991 | .4991 | .4992 | .4992 | .4992 | .4992 | .4993 | .4993 |
| 3.2 | .4993 | .4993 | .4994 | .4994 | .4994 | .4994 | .4994 | .4995 | .4995 | .4995 |
| 3.3 | .4995 | .4995 | .4995 | .4996 | .4996 | .4996 | .4996 | .4996 | .4996 | .4997 |
| 3.4 | .4997 | .4997 | .4997 | .4997 | .4997 | .4997 | .4997 | .4997 | .4997 | .4998 |
| 3.6 | .4998 | .4998 | .4999 | .4999 | .4999 | .4999 | .4999 | .4999 | .4999 | .4999 |
| 3.9 | .5000 | | | | | | | | | |