

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BCom DEGREE EXAMINATION MAY 2026
(Fifth Semester)
Branch – COMMERCE (BUSINESS ANALYTICS)
APPLIED BUSINESS STATISTICS - III

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(10 × 1 = 10)

Question No.	Question	K Level	CO
1	Regression analysis is used for: a) Predicting the value of a dependent variable b) Measuring the strength of a relationship c) Establishing causation d) All of the above	K1	CO1
2	The regression line always passes through which point? a) The origin (0, 0) b) The mean of the independent variable c) The mean of the dependent variable d) The means of both the independent and dependent variables (x,y)	K2	CO1
3	Estimating a value outside the range of known data points is known as: a) Interpolation b) Inverse interpolation c) Extrapolation d) Inverse extrapolation	K1	CO1
4	Newton's forward difference method is best suited for finding values when the interpolating point is: a) Closer to the end of the interval b) At the beginning of the interval c) Outside the given range d) Anywhere in the interval	K2	CO1
5	Which of the following is the ultimate goal of Statistical Quality Control? a) To minimize the costs of inspection b) To prevent defects rather than just detect them c) To ensure the product meets customer expectations d) To achieve a consistent level of quality	K1	CO1
6	Which type of control chart is used to track the proportion of defectives in a process? a) c-chart b) R-chart c) p-chart d) x-bar chart	K2	CO1
7	Quality Control (QC) is primarily concerned with: a) The overall management system of quality b) Finding and eliminating defects after production c) The proactive functions and processes needed to achieve quality d) Designing quality into products and services	K1	CO2
8	The ISO 9000 family of quality management standards is based on which key principle? a) Cost reduction b) Strong customer focus c) Technical innovation d) Marketing strategies	K2	CO2
9	Which statement accurately describes the relationship between reliability (R) and the probability of failure (F)? a) $R + F = 0$ b) $R - F = 1$ c) $R + F = 1$ d) $R * F = 1$	K1	CO2
10	A component that experiences an Increasing Failure Rate (IFR) is most likely in which phase of the "bathtub curve"? a) Infant mortality phase. b) Wear-out phase. c) Constant failure rate phase. d) Design phase.	K2	CO2

SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 × 7 = 35)

Question No.	Question	K Level	CO												
11.a.	You are given the following data: <table> <tr> <td></td> <td>X</td> <td>Y</td> </tr> <tr> <td>Arithmetic mean</td> <td>40</td> <td>6</td> </tr> <tr> <td>Standard deviation</td> <td>10</td> <td>1.5</td> </tr> <tr> <td>r</td> <td></td> <td>0.9</td> </tr> </table> Estimate the value of X when Y is 10		X	Y	Arithmetic mean	40	6	Standard deviation	10	1.5	r		0.9	K2	CO1
	X	Y													
Arithmetic mean	40	6													
Standard deviation	10	1.5													
r		0.9													

Cont...

(OR)			
11.b.	State the properties of regression lines and coefficients.		
12.a.	Interpolate y when X=32 from the following: X: 30 34 36 38 40 Y: 340 353 358 364 369	K3	CO2
(OR)			
12.b.	From the following series, obtain the missing value for 12 th year using Newton's method. Year : 5 10 12 15 20 Price : 4 14 ? 24 34		
13.a.	Discuss the need for statistical quality control?	K3	CO2
(OR)			
13.b.	10 pieces of cloth out of different rolls of equal length contained the following number of defects: 1, 3, 5, 0, 6, 0, 9, 4, 4, 3 Draw a control chart for the number of defects and state whether the process is in a state of statistical control.		
14.a.	Write basic concepts of TQM?		
(OR)			
14.b.	Describe the Elements of the ISO 9000 Series?		
15.a.	Examine the scope of Reliability?	K3	CO3
(OR)			
15.b.	An equipment follows exponential law of reliability and has a 97% probability of survival for the first 100 hours. Find the probability it will survive 200 hours.		

SECTION -C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks

(3 × 10 = 30)

Question No.	Question	K Level	CO
16	Obtain regression equation of Y on X and estimate Y when X=55 from the following: X : 40 50 38 60 65 50 35 Y : 38 60 55 70 60 48 30	K4	CO1
17	The following table gives the normal weight of a baby during the first 6 months of life. Age (Months) : 0 2 3 5 6 Weight (lbs) : 5 7 8 10 12 Estimate the weight of the baby at the age of 4 months by using Lagrange's Method.	K4	CO2
18	10 samples each of size 5 are drawn at regular intervals from a manufacturing process. The sample means ($\bar{X}$) and their ranges (R) are given below: Mean ($\bar{X}$): 49 45 48 53 39 47 46 39 51 45 Range (R): 7 5 7 9 5 8 8 6 7 6 Calculate the control limits in respect of $\bar{X}$ chart and R chart. (You are given ; $A_2=0.58$, $D_3=0$, $D_4=2.15$). Comment on the state of control. Chart need not be drawn.	K4	CO3
19	Explain the evolution of quality management, define Total Quality Management (TQM), and explain the fundamental concepts of TQM?	K4	CO3
20	A system has a constant failure rate, λ , of 0.005 failures per hour during its useful life phase. Assume the time-to-failure follows an exponential distribution. a. What is the reliability of the system after 100 hours of operation? b. What is the Mean Time To Failure (MTTF) for this system? c. What is the cumulative hazard rate at 100 hours?	K4	CO3