

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BCOM DEGREE EXAMINATION MAY 2026
(Second Semester)

Branch – **COMMERCE (BUSINESS ANALYTICS)**

APPLIED BUSINESS STATISTICS - I

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks

(10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	The outcome of tossing a coin is a a) Mutually exclusive event b) Mutually exhaustive event c) Simple event d) Compound event	K1	CO1
	2	The result of no interest of an experiment is called: a) Constant b) Event c) Failure d) Success	K2	CO1
2	3	If in a table all possible values of a random variable are given their corresponding probabilities, then this table is called as: a) Probability density function b) Distribution function c) Probability distribution d) Continuous distribution	K1	CO2
	4	A variable that can assume any possible value between two points is called: a) Discrete random variable b) Continuous random variable c) Discrete sample d) Random variable	K2	CO2
3	5	A statement about a population developed for the purpose of testing is called: a) Hypothesis b) Hypothesis testing c) Level of significance d) Test statistic	K1	CO3
	6	A statement about the value of a population parameter is called a) Null hypothesis b) Alternative hypothesis c) Simple hypothesis d) Composite hypothesis	K2	CO3
4	7	Paired t – test is applicable when the observations in the two samples are a) Paired b) not Correlated c) not Equal in number d) not paired	K1	CO4
	8	The range of statistic - χ^2 is a) - 1 to + 1 b) - ∞ to ∞ c) 0 to ∞ d) 0 to 1	K2	CO4
5	9	Run test is a test of _____ a) Non-randomness b) Randomness c) Lack of randomness d) Sequence of test	K1	CO5
	10	Sign test for paired samples is founded on the _____ between paired values a) Sample b) Population c) Difference d) Equal	K2	CO5

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks

(5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	A and B throw with three dice, if A throws 14, find B's chance of throwing a higher number.	K3	CO1
		(OR)		
	11.b.	An urn contains 4 tickets numbered 1,2,3,4 and another contains 6 tickets numbered 2,4,6,7,8,9. If one of the two urns is chosen is chosen at random and a ticket is drawn at random from the chosen urn, find the probability that the ticket drawn bears the number (i) 2 or 4 (ii) 3 (iii) 1 or 9		

Cont...

2	12.a.	A random variable X has the probability density function $f(x)$ given by $f(x) = \begin{cases} cx e^{-x}, & x \geq 0 \\ 0, & \text{otherwise} \end{cases}$. Find the value of 'c'	K2	CO2																														
	(OR)																																	
	12.b.	If X and Y have joint pdf $f(x, y) = \begin{cases} x + y; & 0 < x < 1, 0 < y < 1 \\ 0 & ; \text{otherwise} \end{cases}$. Check whether X and Y are independent.																																
3	13.a.	500 apples are taken at random from a large basket and 50 are found to be bad. Estimate the proportion of bad apples in the basket and assign limits within which the percentage most probably lies.	K3	CO3																														
	(OR)																																	
	13.b.	In a random sample of 1,000 persons from town A, 400 found to be consumers of wheat. In a sample of 800 from town B, 400 are found to be consumers of wheat. Do these data reveal a significant difference.																																
4	14.a.	Twelve students were given intensive coaching and tests were before and after coaching. Is there any improvement due to coaching? <table><tr><td>Marks in I test (before)</td><td>50</td><td>42</td><td>51</td><td>26</td><td>35</td><td>42</td><td>60</td><td>41</td><td>70</td><td>55</td><td>62</td><td>38</td></tr><tr><td>Marks in II test (after)</td><td>62</td><td>40</td><td>61</td><td>35</td><td>30</td><td>52</td><td>68</td><td>51</td><td>84</td><td>63</td><td>72</td><td>50</td></tr></table>	Marks in I test (before)	50	42	51	26	35	42	60	41	70	55	62	38	Marks in II test (after)	62	40	61	35	30	52	68	51	84	63	72	50	K4	CO4				
	Marks in I test (before)	50	42	51	26	35	42	60	41	70	55	62	38																					
	Marks in II test (after)	62	40	61	35	30	52	68	51	84	63	72	50																					
(OR)																																		
14.b.	A die was thrown 498 times. Denoting x to be the number of appearing on the top face it, the observed frequency of x is given below <table><tr><td>x</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>f</td><td>69</td><td>78</td><td>85</td><td>82</td><td>86</td><td>98</td></tr></table> What opinion you would form for the accuracy for the die?	x	1	2	3	4	5	6	f	69	78	85	82	86	98																			
x	1	2	3	4	5	6																												
f	69	78	85	82	86	98																												
5	15.a.	In 30 tosses of a coin the following sequence of heads (H) and tails (T) is obtained. <table><tr><td>H</td><td>T</td><td>T</td><td>H</td><td>T</td><td>H</td><td>H</td><td>H</td><td>T</td><td>H</td><td>H</td><td>T</td><td>T</td><td>H</td><td>T</td></tr><tr><td>H</td><td>T</td><td>H</td><td>H</td><td>T</td><td>H</td><td>T</td><td>T</td><td>H</td><td>T</td><td>H</td><td>H</td><td>T</td><td>H</td><td>T</td></tr></table> (a) Determine the number of runs V . (b) Test at the 0.05 significance level whether the sequence is random.	H	T	T	H	T	H	H	H	T	H	H	T	T	H	T	H	T	H	H	T	H	T	T	H	T	H	H	T	H	T	K4	CO5
	H	T	T	H	T	H	H	H	T	H	H	T	T	H	T																			
	H	T	H	H	T	H	T	T	H	T	H	H	T	H	T																			
(OR)																																		
15.b.	During one semester a student received in various subjects the marks shown below. <table><tr><td>Mathematics</td><td>72</td><td>80</td><td>83</td><td>75</td></tr><tr><td>Science</td><td>81</td><td>74</td><td>77</td><td></td></tr><tr><td>English</td><td>88</td><td>82</td><td>90</td><td>87</td><td>80</td></tr><tr><td>Economics</td><td>90</td><td>71</td><td>77</td><td>70</td></tr></table> Use H test at 0.05 significance level whether there is a difference between the marks in these subjects.	Mathematics	72	80	83	75	Science	81	74	77		English	88	82	90	87	80	Economics	90	71	77	70												
Mathematics	72	80	83	75																														
Science	81	74	77																															
English	88	82	90	87	80																													
Economics	90	71	77	70																														

SECTION -C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks

(3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	In a certain town there are equal number of male and female residents. It is known that 5% females and 20% males are unemployed. If any unemployed person is picked – up at random, what is the probability that (a) it is male (b) it is female? (Use Baye's rule)	K2	CO1

Cont...

2	17	Find the mean and variance of the probability mass function $P(X = x) = \begin{cases} nC_x p^x q^{n-x} & , \quad x = 0,1,2,\dots,n \\ 0 & otherwise \end{cases}$	K2	CO2																				
3	18	You are given the following information relating to purchase of bulbs from two manufacturers A and B <table><tr><td>Manufacturer</td><td>No. of bulbs bought</td><td>Mean life</td><td>S.D</td></tr><tr><td>A</td><td>50</td><td>1980 hrs</td><td>80 hours</td></tr><tr><td>B</td><td>70</td><td>2010 hrs</td><td>60 hours</td></tr></table> Is the difference between the standard deviation significant at 10% level of significance?	Manufacturer	No. of bulbs bought	Mean life	S.D	A	50	1980 hrs	80 hours	B	70	2010 hrs	60 hours	K3	CO3								
Manufacturer	No. of bulbs bought	Mean life	S.D																					
A	50	1980 hrs	80 hours																					
B	70	2010 hrs	60 hours																					
4	19	In a test given to two groups of students drawn from two normal populations, the marks obtained were obtained as follows. <table><tr><td>Group A:</td><td>18</td><td>20</td><td>36</td><td>50</td><td>49</td><td>36</td><td>34</td><td>49</td><td>41</td></tr><tr><td>Group B:</td><td>29</td><td>28</td><td>26</td><td>35</td><td>30</td><td>44</td><td>46</td><td></td><td></td></tr></table> Examine at 5% level, whether the two population have the same variance.	Group A:	18	20	36	50	49	36	34	49	41	Group B:	29	28	26	35	30	44	46			K4	CO4
Group A:	18	20	36	50	49	36	34	49	41															
Group B:	29	28	26	35	30	44	46																	
5	20	The nicotine contents of two brands of cigarettes, measured in milligrams was found to be as follows. Brand A: 2.1 4.0 6.3 5.4 4.8 3.7 6.1 3.3 Brand B: 4.1 0.6 3.1 2.5 4.0 6.2 1.6 2.2 1.9 5.4 Test the hypothesis at the 0.05 level of significance that the average nicotine contents of the two brands are equal against the alternative that they are unequal. Use Mann-Whitney U Test.	K5	CO5																				

Z-Z-Z

END

