

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 86
(For candidates admitted from the academic year 2023 – 2024 & thereafter)

B.C.A. DEGREE EXAMINATION, APRIL 2026
FOURTH SEMESTER

COURSE : ALLIED CORE

PAPER : MATHEMATICS FOR COMPUTER SCIENCE-II

SUBJECT CODE : 23MT/AC/MS45

TIME : 3 HOURS

MAX. MARKS: 100

Q. No.	SECTION A (5 × 2 = 10) Answer ANY FIVE questions	CO	KL
1.	The mean of a binomial distribution is 20 and standard deviation is 4. Find out n, p and q .	1	1
2.	Four coins are tossed simultaneously. What is the probability of getting 2 heads and two tails?	1	1
3.	What are Type I and Type II errors in testing of hypothesis.	1	1
4.	Write any two characteristics of χ^2 test.	1	1
5.	What is coefficient of correlation?	1	1
6.	Give the uses of Analysis of variance	1	1
Q. No.	SECTION B (10 × 1 = 10) Answer ALL questions	CO	KL
7.	In a binomial distribution, if n is the number of trials and p is the probability of success, then the mean value is given by a) np b) n c) p d) $np(1 - p)$	2	2
8.	For a normally distributed variable X with mean μ and standard deviation σ , the standard normal variate z is _____. a) $z = \frac{x+\mu}{\sigma}$ b) $z = \frac{\mu-x}{\sigma}$ c) $z = \frac{x-\mu}{\sigma}$ d) $z = \frac{x+\mu}{\sigma^2}$	2	2
9.	A sample of size n may be regarded as a large sample if a) $n = 30$ b) $n < 30$ c) $n > 30$ d) $n \leq 30$	2	2
10.	What is the standard error of the mean for a large sample? _____. a) σ b) σ/\sqrt{n} c) σ/n d) $\sqrt{\sigma/n}$	2	2
11.	The Chi-Square Goodness of Fit test is used to determine: a) If two categorical variables are related. b) If an observed frequency distribution matches a theoretical one. c) If the means of two populations are equal. d) The strength of a linear correlation	2	2
12.	How do you calculate the degrees of freedom for a test of independence with r rows and c columns? a) $r + c - 1$ b) $n - 1$ c) $(r - 1)(c - 1)$ d) $r \times c$	2	2
13.	What is the range of Karl Pearson's Coefficient of Correlation? a) 0 to 1 b) -1 to 0 c) -1 to 1 d) $-\infty$ to ∞	2	2

14.	In the simple linear regression equation $y = a + bx$, what does b represent? a) Slope of the line b) Independent variable c) y-intercept d) Dependent variable	2	2																				
15.	Which of the following is not an assumption of ANOVA? a) The samples are random samples. b) The samples are independent. c) The samples are drawn from normal population. d) The samples are dependent.	2	2																				
16.	If you are comparing the mean income level across three different cities, which test is appropriate? a) One-way ANOVA b) Two-way ANOVA c) One-sample t-test d) Simple linear regression	2	2																				
Q. No.	SECTION C ($2 \times 15 = 30$) Answer ANY TWO questions	CO	KL																				
17.	The screws produce by a certain machine were checked by examining samples of 12. The following table shows the distribution of 128 samples according to the number of defective items they contained. <table border="1" style="margin-left: auto; margin-right: auto;"><tr><td>No. of defectives in a sample of 12</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>Total</td></tr><tr><td>No. of samples</td><td>7</td><td>6</td><td>19</td><td>35</td><td>30</td><td>23</td><td>7</td><td>1</td><td>128</td></tr></table> Fit a binomial distribution and find the expected frequencies if the chance of screw being defective is $\frac{1}{2}$. Find the mean and variance of the fitted distribution.	No. of defectives in a sample of 12	0	1	2	3	4	5	6	7	Total	No. of samples	7	6	19	35	30	23	7	1	128	3	3
No. of defectives in a sample of 12	0	1	2	3	4	5	6	7	Total														
No. of samples	7	6	19	35	30	23	7	1	128														
18.	In a certain sample of 2000 families, 1400 families are consumers of tea. Out of 1800 Hindu families, 1236 families consume tea. Use χ^2 test and state whether there is any significant difference between consumption of tea among Hindu and non-Hindu families.	3	3																				
19.	Find out the coefficient of correlation in the following case: <table border="1" style="margin-left: auto; margin-right: auto;"><tr><td>Height of father (in inches)</td><td>65</td><td>66</td><td>67</td><td>67</td><td>68</td><td>69</td><td>71</td><td>73</td></tr><tr><td>Height of son (in inches)</td><td>67</td><td>68</td><td>64</td><td>68</td><td>72</td><td>70</td><td>69</td><td>70</td></tr></table>	Height of father (in inches)	65	66	67	67	68	69	71	73	Height of son (in inches)	67	68	64	68	72	70	69	70	3	3		
Height of father (in inches)	65	66	67	67	68	69	71	73															
Height of son (in inches)	67	68	64	68	72	70	69	70															
20.	For a salesman who served four different areas sold the units as follows: <table border="1" style="margin-left: auto; margin-right: auto;"><tr><td>A</td><td>25</td><td>19</td><td>21</td><td>15</td></tr><tr><td>B</td><td>18</td><td>35</td><td>28</td><td>23</td></tr><tr><td>C</td><td>21</td><td>30</td><td>32</td><td>25</td></tr><tr><td>D</td><td>29</td><td>28</td><td>23</td><td>20</td></tr></table> Is there any significant difference in their performance?	A	25	19	21	15	B	18	35	28	23	C	21	30	32	25	D	29	28	23	20	3	3
A	25	19	21	15																			
B	18	35	28	23																			
C	21	30	32	25																			
D	29	28	23	20																			

Q. No.	SECTION D ($2 \times 15 = 30$) Answer ANY TWO questions	CO	KL																									
21.	A box contains 100 transistors, 20 of which are defective, 10 are selected for inspection. Indicate what is the probability that (i) all are defective (ii) all are good (iii) atleast one is defective (iv) at the most 3 are defective.	4	4																									
22.	a) A wholesaler in apples claims that only 4% of the apples supplied by him are defective. A random sample of 600 apples contained 36 defective apples. Test the claim of the wholesaler. b) In 600 throws of a six faced dice, odd points appeared 360 times. Would you say that the dice is fair at 5% level of significance. (8+7)	4	4																									
23.	Determine the equation of straight line that best fits the data. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>X</td> <td>10</td> <td>12</td> <td>13</td> <td>16</td> <td>17</td> <td>20</td> <td>25</td> </tr> <tr> <td>Y</td> <td>10</td> <td>22</td> <td>24</td> <td>27</td> <td>29</td> <td>33</td> <td>37</td> </tr> </table>	X	10	12	13	16	17	20	25	Y	10	22	24	27	29	33	37	4	4									
X	10	12	13	16	17	20	25																					
Y	10	22	24	27	29	33	37																					
24.	The following table gives the number of refrigerators sold by 4 salesmen in three months: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th colspan="4">Salesman</th> </tr> <tr> <th>Month</th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> </tr> </thead> <tbody> <tr> <td>I</td> <td>50</td> <td>40</td> <td>48</td> <td>39</td> </tr> <tr> <td>II</td> <td>46</td> <td>48</td> <td>50</td> <td>45</td> </tr> <tr> <td>III</td> <td>39</td> <td>44</td> <td>40</td> <td>59</td> </tr> </tbody> </table> (i) Is there any significant difference in the sale made by the four salesmen? (ii) Is there any significant difference in the sales made during different month?		Salesman				Month	A	B	C	D	I	50	40	48	39	II	46	48	50	45	III	39	44	40	59	4	4
	Salesman																											
Month	A	B	C	D																								
I	50	40	48	39																								
II	46	48	50	45																								
III	39	44	40	59																								

Q. No.	SECTION E ($2 \times 10 = 20$) Answer ANY TWO questions	CO	KL
25.	The scores made by a candidate in a certain test are normally distributed with mean 500 and standard deviation 100. What percent of candidates receive (i) less than 400 (ii) between 400 and 600.	5	5
26.	An examination was given to two classes consisting of 40 and 50 students respectively. In the first class the mean mark was 74 with a standard deviation of 8, while in the second class the mean mark was 78 with a standard deviation of 7. Is there a significant difference between the performance of the two classes at a level of significance of 0.05?	5	5

27.	<p>4 coins were tossed 160 times and the following results were obtained:</p> <table border="1" data-bbox="293 304 1075 472"> <tr> <td>No. of heads</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>Observed frequencies</td> <td>17</td> <td>52</td> <td>54</td> <td>31</td> <td>6</td> </tr> </table> <p>Under the assumption that coins are balanced, find the expected frequencies of getting 0, 1, 2, 3 or 4 heads and test the goodness of fit.</p>	No. of heads	0	1	2	3	4	Observed frequencies	17	52	54	31	6	5	5										
No. of heads	0	1	2	3	4																				
Observed frequencies	17	52	54	31	6																				
28.	<p>Find Karl Pearson's coefficient of correlation from the following data:</p> <table border="1" data-bbox="293 640 1193 797"> <tr> <td>Wages</td> <td>100</td> <td>101</td> <td>102</td> <td>102</td> <td>100</td> <td>99</td> <td>97</td> <td>98</td> <td>96</td> <td>95</td> </tr> <tr> <td>Cost of living</td> <td>98</td> <td>99</td> <td>99</td> <td>97</td> <td>95</td> <td>92</td> <td>95</td> <td>94</td> <td>90</td> <td>91</td> </tr> </table>	Wages	100	101	102	102	100	99	97	98	96	95	Cost of living	98	99	99	97	95	92	95	94	90	91	5	5
Wages	100	101	102	102	100	99	97	98	96	95															
Cost of living	98	99	99	97	95	92	95	94	90	91															

