

Reg.No. _____

**Karunya UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – Nov/Dec – 2016

Code : 16MA1004
Sub. Name : Applied Mathematics - Probability and Statistics

Semester : 2016-17 ODD
Duration : 3hrs
Max. marks : 100

Q. No.	Questions	Course outcome	Marks
PART-A (40X1=40 MULTIPLE CHOICE QUESTIONS)			
1.	How many arrangements can be formed using all of the letters of the word MUSIC?	CO2	
	a. 500 b. 150 c. 200 d. 120		(1)
2.	How many students in a class must there be to ensure that 6 students get the same grade (one of A, B, C, D, or F)?	CO2	
	a. 5 b.26 c. 15 d. 15		(1)
3.	If there are 9 cars in a race, in how many different ways can they place first, second and third?	CO2	
	a. 560 b. 504 c. 750 d. 720		(1)
4.	How many license plates can be made if each is to be three digits followed by 3 letters?	CO2	
	a. 18,153,400 b.17,123,456 c.24,234,567 d.15,818,400		(1)
5.	In how many different ways can a local union with a membership of 25 choose a vice president and a president?	CO2	
	a.600 b.630 c.900 d.950		(1)
6.	In how many ways can you arrange 5 different books on a shelf?	CO2	
	a. 720 b. 120 c. 25 d. 10		(1)
7.	What is the value of ${}^{50}C_{48}$?	CO2	
	a. 50! b. 1200 c. 12000 d. 1225		(1)
8.	In how many ways can 3 of 20 laboratory assistants be chosen to assist with an experiment?	CO2	
	b. 1460 c. 1500 d. 6840 d.1140		(1)
9.	If A and B are independent events then $P(A \cap B) =$	CO2	
	a. $P(A)+P(B)$ b. $P(A)-P(B)$ c. $P(A)P(B)$ d. 1		(1)
10.	Probability of an impossible event is -----	CO2	
	a. 1 b. $\frac{1}{2}$ c. 0 d. $\frac{1}{6}$		(1)
11.	A pair of dices are thrown, what is the probability of getting sum of 6 or 9?	CO2	
	a. $\frac{1}{3}$ b. $\frac{1}{2}$ c. $\frac{1}{4}$ d. $\frac{1}{6}$		(1)
12.	If events A and B are mutually exclusive and $P(A)=0.45$, $P(B)=0.30$, then find $P(A \cup B)$	CO2	
	a. 0.85 b.0.75 c.0.87 d.0.62		(1)
13.	The probability that a non-leap year should have 53 Tuesdays is	CO2	
	a. $\frac{1}{7}$ b. $\frac{2}{7}$ c. $\frac{1}{2}$ d. $\frac{3}{7}$		(1)
14.	If $P(A) = 0.3$, $P(B) = 0.4$ and $P(A/B) = 0.5$ then find the value of $P(A \cup B)$	CO2	
	a. 0.2 b. 0.5 c. 0.1 d. 0.6		(1)

15.	If $P(A) = 0.38$, $P(B) = 0.35$ and $P(A \cap B) = 0.12$ then $P(A \cap \bar{B})$				CO2	
	a. 0.38	b. 0.23	c. 0.26	d. 0.35		(1)
16.	The probability that an integrated circuit chip will have defective etching is 0.06. The probability that it will have a crack defect is 0.03, and the probability that it has both defects is 0.02. What is the probability that it will get at least one is defect?				CO2	
	a. 0.07	b. 0.02	c. 0.11	d. 0.05		(1)
17.	Which one of the following is an example of normal distributions?				CO2	
	a. Rolling a die	b. Tossing a coin	c. No of car accidents	d. Cyclic issues		(1)
18.	In a Poisson distribution if $2P(X = 1) = P(X = 2)$, then the variance is				CO2	
	a. 0	b. -1	c. 4	d. 2		(1)
19.	Find the probability value of normal distribution $P(Z > 1.56)$				CO2	
	a. 0.0668	b.0.0594	c. 0.4406	d.0.4332		(1)
20.	The mean of the normal distribution is _____				CO2	
	a. σ	b. σ^2	c. μ	d. $\sqrt{\sigma}$		(1)
21.	Find the mean in a sample of 1% of the 50 bolts chosen using poisson distribution.				CO2	
	a. 4	b.2	c. 3.5	d. 0.5		(1)
22.	If X be normal with mean 10 and variance 4, then $P(X < 11)$ is				CO4	
	a. 0.1915	b. 0.3085	c. 0.6915	d. 0.5		(1)
23.	If $n=25$, $p=0.05$, Find the mean of the Binomial Distribution.				CO4	
	a. 0.25	b. 1.25	c. 1.35	d. 0.35		(1)
24.	If mean of the poisson is m, then S.D of this distribution is					
	a. m	b. \sqrt{m}	c. m^2	d. nm	CO4	(1)
25.	Which one of the following is an example for mean?					
	a. Average Speed	b. Finding Poverty Line	c. Mode of travel	d. None of these	CO4	(1)
26.	Find the mean of following data : 15, 14, 25, 27 and 13				CO4	
	a. 18.8	b. 20	c. 18.5	d. 19.8		(1)
27.	Calculate co efficient of variance, when variance = 2.37 and mean 5					
	a. 30.78	b. 47.40	c. 21.09	d. 41.09	CO4	(1)
28.	Find the median of 11, 10, 12 , 13 , 9					
	a. 12.5	b. 12	c. 10.5	d. 11		(1)
29.	Co efficient of variation is -----					
	a. $\frac{\sigma}{\bar{x}} \times 100$	b. $\frac{\sigma}{\bar{x}} + 100$	c. $\frac{\sigma}{\bar{x}}$	d. $\frac{\bar{x}}{\sigma} \times 100$	CO4	(1)
30.	The value of x with maximum frequency is known as _____					
	a. Mean	b. Median	c. Mode	d. Harmonic mean		(1)
31.	The formula for coefficient of Quartile deviation is -----				CO4	
	a. $\frac{Q_3 - Q_1}{2}$	b. $Q_3 - Q_1$	c. $\frac{Q_3 + Q_1}{2}$	d. $Q_3 + Q_1$		(1)
32.	Variance is the ----- of standard deviation				CO4	
	a. square	b. cube	c. cube root	d. square root		(1)
33.	The mean of the given data is 28 and median is 29. Calculate the mode					
	a. 30	b. 32.5	c. 29	d. 31	CO4	(1)

34.	The correction factor of rank correlation co efficient is					
	a. $\frac{m(m^2 - 1)}{6}$	b. $\frac{m(m^2 + 1)}{12}$	c. $\frac{m(m^2 - 1)}{12}$	d. $\frac{m(m^2 + 1)}{6}$	CO4	(1)
35.	The correlation co efficient is equal to					
	a. $\sqrt{b_{xy} \times b_{yx}}$	b. $\sigma x / \sigma y$	c. $b_{xy} \times b_{yx}$	d. $\sigma y / \sigma x$	CO4	(1)
36.	The value of co-efficient of correlation lies between ----- and -----					
	a. 1, 2	b. -1, 1	c. -1, 0	d. 0, 1	CO4	(1)
37.	If the correlation coefficient is 0, the two regression lines are					
	a. parallel	b. perpendicular	c. coincident	d. inclined at 45°		(1)
38.	The equation of regression lines are $y = 0.54x + a$ and $x = 0.48y + b$. The correlation coefficient is -----				CO4	
	a. 0.26	b. 0.51	c. -0.56	d. -0.26	CO4	(1)
39.	Find the mean values of the regression equations : $x + y = 3$ and $2x - y = 3$					
	a. -1, 2	b. 1, -2	c. 2, -1	d. 2, 1	CO4	(1)
40.	The regression co-efficient of Y on X is					
	a. b_{xy}	b. $\sigma x / \sigma y$	c. $\sigma y / \sigma x$	d. b_{yx}	CO4	(1)

PART B(8 X 5 = 40 MARKS) (ANSWER ANY EIGHT)

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41.	A lot consists of 10 good article, 4 with minor defects and 2 with major defects. Two articles are drawn at random, Find the probability that (i) both are good article (ii) both have major defects (iii) at least one is good (iv) at most 1 is good (v) Exactly 1 is good				CO2	(5)												
42.	A freshman class consists of 40 students, 30 of which are women. The class needs to select a committee of 7 to represent them in the student senate. How many committees are possible if (i) the committee must have exactly 5 women? (ii) The committee must have at least 5 women?				CO3	(5)												
43.	If the probability that a communication system has high selectivity is 0.54 and the probability that it will have high fidelity is 0.81 and the probability that it will have both is 0.18. What is the probability that (i) a system with high fidelity will also have high selectivity? (ii) a system with high selectivity will also have high fidelity?				CO3	(5)												
44.	It has been claimed that in 60% of 5 solar heat installations for the utility bill is reduced by at least one third. Use binomial distribution and find the probability that utility bill is reduced by at least one third in (i) Exactly four installations (ii) At least four installations.				CO3	(5)												
45.	A typist kept a record of, mistakes per day during 300 working days. Fit a Poisson distribution for the following data: <table><tr><td>Mistakes</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>No of days</td><td>143</td><td>90</td><td>44</td><td>14</td><td>9</td></tr></table>				Mistakes	0	1	2	3	4	No of days	143	90	44	14	9	CO3	(5)
Mistakes	0	1	2	3	4													
No of days	143	90	44	14	9													
46.	The time required to assemble a piece of machinery is a random variable having approximately a normal distribution with mean 12.9 minutes and S D is 2 minutes. Using normal distribution, find the probabilities for assembling a piece of machinery of this kind will take (i) Less than 11.5 minutes (ii) More than 13.5 (iii) between 11 and 14.8.				CO3	(5)												

47.	Draw a less than and more than ogives for the following.												CO4	(5)																											
<table><tr><td>Class</td><td>0-10</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td><td>50-60</td></tr><tr><td>Frequency</td><td>14</td><td>17</td><td>22</td><td>26</td><td>23</td><td>18</td></tr></table>															Class	0-10	10-20	20-30	30-40	40-50	50-60	Frequency	14	17	22	26	23	18													
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Frequency	14	17	22	26	23	18																																			
48.	Calculate the mode for the following data:												CO4	(5)																											
<table><tr><td>Weight</td><td>0-10</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td><td>50-60</td></tr><tr><td>No of articles</td><td>16</td><td>19</td><td>20</td><td>28</td><td>23</td><td>19</td></tr></table>															Weight	0-10	10-20	20-30	30-40	40-50	50-60	No of articles	16	19	20	28	23	19													
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49.	Find the rank Correlation Co-efficient between x and y :												CO4	(5)																											
<table><tr><td>X</td><td>1</td><td>2</td><td>3</td><td>4</td><td>6</td><td>7</td><td>5</td><td>8</td></tr><tr><td>Y</td><td>2.5</td><td>5</td><td>2.5</td><td>8</td><td>4</td><td>1</td><td>6</td><td>7</td></tr></table>															X	1	2	3	4	6	7	5	8	Y	2.5	5	2.5	8	4	1	6	7									
X	1	2	3	4	6	7	5	8																																	
Y	2.5	5	2.5	8	4	1	6	7																																	
50.	Two random variables have the lines of regression as $3x + 2y = 26$ and $6x + y = 31$. Calculate mean values and coefficient of correlation between x and y.												CO4	(5)																											
PART C(2 X 10 = 20 MARKS) (ANSWER ANY TWO)																																									
51.	Fit a binomial distribution to the given data and calculate the expected frequency:												CO4	(10)																											
<table><tr><td>x</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>8</td><td>9</td><td>10</td></tr><tr><td>f(x)</td><td>2</td><td>10</td><td>38</td><td>106</td><td>188</td><td>257</td><td>226</td><td>128</td><td>59</td><td>7</td><td>3</td></tr></table>															x	0	1	2	3	4	5	6	7	8	9	10	f(x)	2	10	38	106	188	257	226	128	59	7	3			
x	0	1	2	3	4	5	6	7	8	9	10																														
f(x)	2	10	38	106	188	257	226	128	59	7	3																														
52.	Calculate mean, median and mode of the following data:												CO4	(10)																											
<table><tr><td>x</td><td>10 - 20</td><td>20 - 30</td><td>30 - 40</td><td>40 - 50</td><td>50 - 60</td><td>60 - 70</td><td>70 - 80</td></tr><tr><td>f</td><td>5</td><td>8</td><td>30</td><td>82</td><td>45</td><td>24</td><td>6</td></tr></table>															x	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	f	5	8	30	82	45	24	6											
x	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80																																		
f	5	8	30	82	45	24	6																																		
53.	Find the Karl Pearson's correlation coefficient for the following data:												CO4	(10)																											
<table><tr><td>x</td><td>68</td><td>66</td><td>68</td><td>65</td><td>69</td><td>66</td><td>68</td><td>65</td><td>71</td><td>67</td><td>68</td><td>70</td></tr><tr><td>y</td><td>65</td><td>63</td><td>67</td><td>64</td><td>68</td><td>62</td><td>70</td><td>66</td><td>68</td><td>67</td><td>69</td><td>71</td></tr></table>															x	68	66	68	65	69	66	68	65	71	67	68	70	y	65	63	67	64	68	62	70	66	68	67	69	71	
x	68	66	68	65	69	66	68	65	71	67	68	70																													
y	65	63	67	64	68	62	70	66	68	67	69	71																													

ALL THE BEST