22NMB103N/ 22NMB103

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BVoc DEGREE EXAMINATION DECEMBER 2024
(First Semester)

Branch - **NETWORKING & MOBILE APPLICATION**

STATISTICAL TECHNIQUES

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 total angle at the center of pie chart is a) 90° b) 180° c) 270° d) 360°	K1	CO1
	2	The mode of 5,6,7,5,4,6,10,5,8 is a) 5 b) 6 c) both 5 and 6 d) No mode	K2	CO1
2	3	When the values of two variables move in the same direction then the correlation is a) linear b) nonlinear c) positive d) negative	K1	CO2
	4	If the regression coefficients b_{xy}= -0.4 and b_{yx}= -1.6, then the correlation coefficient is a) 0.8 b) -0.8 c) 0.64 d) -0.64	K2	CO2
3	5	In time series the cause of floods and cyclones are associated with a) secular trend b) seasonal variations c) cyclical fluctuations d) irregular variations	K1	CO3
	6	A series comprises of five values, as given below: 63, 75,72,78,81. Its moving averages of order 3 are: a) 64,70,76 b) 70,75,77 c) 66,71,76 d) 66,71,77	K2	CO3
4	7	The probability of a certain events is a) 0 b) 1 c) -1 d) 0.5	K1	CO4
	8	If 3 coins are tossed simultaneously, the probability of getting atleast two heads is a) 1/8 b) 3/8 c)1/2 d) 1/4	K2	CO4
5	9	The Excel function that counts the number of numeric entries a) NUM( ) b) COUNT( ) c) SUM( ) d) COUNTIF( )	K1	CO5
	10	In the function VARP, the letter P stands for a) Probability b) Proportion c) Percentage d) Population	K2	CO5

Cont...

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.	Describe Histogram with an example.	K3	CO1
		(OR)		
	11.b.	Solve the following data to calculate the mean and mode. Weight (kg): 47, 50, 59, 65, 68, 53, 71, 74, 65, 68		
2	12.a.	Apply Karl Pearson's coefficient of correlation for the following data: Income ('000): 20, 30, 33, 40, 15, 13, 26, 38, 35, 43 Expenditure ('000): 7, 9, 8, 11, 5, 4, 8, 10, 9, 10	K3	CO2
		(OR)		
	12.b.	Identify and explain the differences between correlation and regression.		
3	13.a.	Below are given the figures of production (in thousand tonnes) of a sugar factory. Use the 3 yearly moving average method to find the trend values. Year: 2015, 2016, 2017, 2018, 2019, 2020, 2021 Production: 80, 90, 92, 83, 94, 99, 92	K4	CO3
		(OR)		
	13.b.	Analyse the following data and findthe seasonal indices by the method of simple averages : 2021: 68, 62, 61, 63 2022: 65, 58, 66, 61 2023: 68, 63, 63, 67 (Year; I Quarter; II Quarter; III Quarter; IV Quarter)		
4	14.a.	Explain the following terms: (i) mutually exclusive events (ii) independent events (iii) conditional probability	K5	CO4
		(OR)		
	14.b.	A lot contains 10 items of which 3 are defective. Three items are chosen at random from the lot one after another. Estimate the probability that all the three are defective if the draws are made (i) with replacement and (ii) without replacement.		
5	15.a.	List the different time series functions available in MS Excel and describe each one with an example.	K4	CO5
		(OR)		
	15.b.	Describe the steps to compute mean and standard deviation using MS Excel.		

Cont...

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

<table>
<tr><th>Module No.</th><th>Question No.</th><th>Question</th><th>K Level</th><th>CO</th></tr>
<tr><td>1</td><td>16</td><td>The scores of two batsmen A and B in ten innings during a certain season are given. Analyse the data and find which batsman is more consistent in scoring.
<table>
<tr><td>A</td><td>32</td><td>28</td><td>47</td><td>62</td><td>71</td><td>39</td><td>10</td><td>60</td><td>96</td><td>14</td></tr>
<tr><td>B</td><td>19</td><td>31</td><td>48</td><td>53</td><td>67</td><td>90</td><td>10</td><td>62</td><td>40</td><td>80</td></tr>
</table></td><td>K4</td><td>CO1</td></tr>
<tr><td>2</td><td>17</td><td>Examine the data given and obtain the two regression equations X on Y and Y on X. Also calculate the value of X when Y =50.
<table>
<tr><td>Price (Rs)(X)</td><td>40</td><td>38</td><td>35</td><td>42</td><td>30</td></tr>
<tr><td>Amount Demanded (Y)</td><td>30</td><td>35</td><td>40</td><td>36</td><td>29</td></tr>
</table></td><td>K4</td><td>CO2</td></tr>
<tr><td>3</td><td>18</td><td>Fit a straight line trend to the given data, find the trend values and estimate the sales for the year 2024.
<table>
<tr><td>Year</td><td>2013</td><td>2014</td><td>2015</td><td>2016</td><td>2017</td><td>2018</td><td>2019</td></tr>
<tr><td>Sales</td><td>77</td><td>88</td><td>94</td><td>85</td><td>91</td><td>98</td><td>90</td></tr>
</table></td><td>K5</td><td>CO3</td></tr>
<tr><td>4</td><td>19</td><td>Compare and contrast the different the properties of Binomial, Poisson and Normal distributions.</td><td>K3</td><td>CO4</td></tr>
<tr><td>5</td><td>20</td><td>Explain the computation procedure for finding Regression using MS Excel. Also write about the measures that has to be interpreted from the results of regression</td><td>K5</td><td>CO5</td></tr>
</table>

Z—Z-Z END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BVoc DEGREE EXAMINATION DECEMBER 2024
(Second Semester)

Branch – **NETWORKING AND MOBILE APPLICATIONS**

MANAGERIAL SKILLS

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	Which of these is a key skill of a competent manager? A) Avoiding delegation B) Resisting change C) Adaptability D) Micromanaging employees	K1	CO1
	2	Outline the steps involved in developing emotional intelligence. A) Identify emotions, Analyze situations, Respond appropriately B) Recognize feelings, Ignore negative emotions, Focus on logic C) Evaluate others, Control emotions, Avoid conflict D) Assess IQ, Develop skills, Lead teams	K2	CO1
2	3	What is the "two-minute rule" in time management? A) If a task takes less than two minutes, do it immediately B) Spend no more than two minutes planning your day C) Limit meetings to two minutes D) Take a two-minute break every hour	K1	CO2
	4	Explain the concept of synergy in the context of teamwork. A) Synergy is the ability to work independently B) Synergy is the process of setting team goals C) Synergy is the act of dividing tasks among team members D) Synergy is the phenomenon where the combined effect of a team is greater than the sum of its individual parts	K2	CO2
3	5	What is a key principle of social etiquette when meeting someone for the first time? A) Discussing personal finances B) Making eye contact and offering a firm handshake C) Ignoring them until they speak first D) Immediately asking about their political views	K1	CO3
	6	Explain the concept of active listening in interpersonal communication. A) Listening without responding B) Hearing the words but not understanding their meaning C) Fully concentrating, understanding, responding, and remembering what is being said D) Nodding occasionally to show you are paying attention	K2	CO3

Cont...

4	7	Which of the following is an example of unprofessional behavior? A) Maintaining confidentiality of client information B) Dressing appropriately for the workplace C) Arriving on time for meetings D) Gossiping about colleagues	K1	CO4
	8	Compare creativity and innovation. Which is true? a) Creativity generates ideas; innovation implements them. b) They are the same process. c) Innovation focuses on art; creativity on practicality. d) Creativity is linear; innovation is random.	K2	CO4
5	9	Which of the following is a key element of effective delegation? a) Clear instructions and expectations b) Lack of support c) Avoiding feedback d) Ignoring employee input	K1	CO5
	10	Outline the key components of stress: A) Physiological response B) Psychological factors C) Environmental influences D) All of the above	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.	List techniques to improve self-awareness	K1	CO1
	(OR)			
	11.b.	Define emotional intelligence and its components.		
2	12.a.	Recall various time management techniques.	K1	CO2
	(OR)			
	12.b.	What is teamwork and why is it significant in achieving organizational goals?		
3	13.a.	Explain the importance of effective interpersonal communication in the workplace.	K2	CO3
	(OR)			
	13.b.	Summarize the benefits of developing relationship skills for improving interpersonal communication.		
4	14.a.	Explain the steps involved in planning for career advancement.	K2	CO4
	(OR)			
	14.b.	Illustrate the benefits of problem-solving skills in a professional environment.		

Cont...

5	15.a.	Choose an initiative to improve the work environment and explain how it would benefit individuals.	K3	CO5
	(OR)			
	15.b.	Identify the main sources of workplace stress and their impact on employees' mental and physical health.		

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	Show how a competent manager can use emotional intelligence to handle conflicts within a team. Provide examples to illustrate your points.	K1	CO1
2	17	Identify common barriers to effective team work and suggest strategies to overcome them.	k3	CO2
3	18	Interpret the impact of digital communication etiquette on professional relationships	K2	CO3
4	19	Explain the role of creativity in solving complex problems within an organization.	K2	CO4
5	20	Explain the importance of occupational safety and health regulations in preventing workplace accidents.	K2	CO5

Z-Z-Z END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BVoc DEGREE EXAMINATION DECEMBER 2024
(Fourth Semester)

Branch – **NETWORKING AND MOBILE APPLICATION**

MATHEMATICAL STRUCTURES

Time: Three Hours Maximum: 50 Marks

SECTION-A (5 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (5 x 1 = 5)

1 In a rectangular matrix, how are the number of columns and the number of rows defined?
(i) Equal (ii) Either equal or not equal
(iii) Not equal (iv) None of these

2 What term is used to denote the process of finding the values outside this interval?
(i) Extrapolation (ii) Interpolation
(iii) Differentiation (iv) Integration

3 If a=0, b=1, and the number of equal parts is 10, what is the value of h?
(i) 0.1 (ii) 0.2
(iii) 0.3 (iv) 0.4

4 In CPM, what is the term used to refer to the shortest possible time to complete the project?
(i) Optimistic (ii) Pessimistic
(iii) Most likely (iv) Normal

5 What is the utilization factor ρ is?
(i) $\frac{\lambda}{\mu}$ (ii) $-\frac{\lambda}{\mu}$
(iii) $\frac{1}{\mu}$ (iv) $\frac{\mu}{\lambda}$

SECTION - B (15 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 3 = 15)

6 a How can you show that the matrix $A=\begin{bmatrix}1 & 0 & -2\\ 2 & 2 & 4\\ 0 & 0 & 4\end{bmatrix}$ satisfies the equation $A^2 - 3A + 2I = 0$.

OR

b How can you check whether the matrix $A=\begin{bmatrix}\frac{1}{3} & \frac{2}{3} & \frac{2}{3}\\ \frac{2}{3} & \frac{1}{3} & \frac{-2}{3}\\ \frac{-2}{3} & \frac{1}{3} & \frac{-1}{3}\end{bmatrix}$ is orthogonal or not?

7 a Using Newton's formula, how can you find the pressure of the steam at a temperature of 142°C based on the following data from the steam table?

Temperature in	140	150	160	170	180
Pressure $kg\ f/cm^2$	3.685	4.854	6.302	8.076	10.225

OR

b Using Newton's formula, how can you find the melting point of the alloy containing 84 percent lead based on the following data?

p	40	50	60	70	80	90
t	184	204	226	250	276	304

8 a Given the following table of values for x and y, find first two derivatives $\frac{dy}{dx}$, $\frac{d^2y}{dx^2}$ for $x=1.05$.

x	1.00	1.05	1.10	1.15	1.20	1.25	1.30
y	1.00000	1.02470	1.04881	1.07238	1.09544	1.11803	1.14017

OR

Cont...

b From the following table of values of x and y, find first two derivatives $\frac{dy}{dx}$, $\frac{d^2y}{dx^2}$ for $x=1.25$

x	1.00	1.05	1.10	1.15	1.20	1.25	1.30
y	1.00000	1.02470	1.04881	1.07238	1.09544	1.11803	1.14017

9 a Draw a network diagram for the following data:

Activity	A	B	C	D	E	F	G	H	I	J
Pre-activity	-	A	A	B	A	B,E	C	D, F	G	H, I

OR

b Draw a network diagram for the following data:

B < E, F; C < G, L; E, G < H; L, H < I; L < M; H< N; H< J; I, J < P; P < Q.

10 a A TV repairman finds that the time spent on his job has an exponential distribution with mean 30 minutes. If the repairs sets in the order in which they come in, and if the arrival of the sets is approximately Poisson with an average rate of 10-per 8 hour a day, what is repairman's expected idle time each day? How many jobs are ahead of the average set just brought-in?

OR

b Assume that the goods trains are coming in a yard at the rate of 30 trains per day and suppose that the inter-arrival times follow an exponential distribution. The service time for each train is assumed to be exponential with an average of 36 minutes. If the yard can admit 9 trains at a time (there being 10 lines, one of which is reserved for shunting purposes), calculate the probability than the yard is empty and find the average queue length.

SECTION -C (30 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 x 6 = 30)

11 a Find the rank $A=\begin{bmatrix} 3 & 1 & -5 & -1 \\ 1 & -2 & 1 & -5 \\ 1 & 5 & -7 & 2 \end{bmatrix}$ by using row and column operation.

OR

b Show that the following matrix A can be written as a sum of a symmetric and a skew-symmetric matrix.

$$A=\begin{pmatrix} -2 & 1 & 4 \\ 8 & -1 & 3 \\ 3 & -5 & 0 \end{pmatrix}$$

12 a How can you construct Newton's polynomial for the following data, and how can you use it to find the value of y for a specific x=5?

x	4	6	8	10
y	1	3	8	16

OR

b Construct Newton's polynomial for the following data. Use it to find the value of y for $x = 9$.

x	4	6	8	10
y	1	3	8	16

13 a Dividing the range into 10 equal parts, find the approximate value of $\int_0^{\pi} \sin x \, dx$ by
(i) Trapezoidal rule (ii) Simpson's rule.

OR

b Dividing the range into 10 equal parts, find the approximate value of $\int_0^{\pi} \cos x \, dx$ by
(i) Trapezoidal rule (ii) Simpson's rule.

14 a A small project is composed of seven activities whose time estimates are listed in the table as follows:

Activity		Estimated duration (in weeks)		
i	*j*	Optimistic	Most likely	Pessimistic
1	2	1	1	7
1	3	1	4	7
1	4	2	2	8
2	5	1	1	1
3	5	2	5	14
4	6	2	5	8
5	6	3	6	15

(i) Draw the project network. (ii) Find the float values (iii) Find the expected duration, variance and standard deviation of project? (iv) If the project due date is 19 weeks, what is the probability of meeting the due date?

Z	0.5	0.67	1	1.33	2
P	0.3805	0.2514	0.1587	0.0918	0.0228

OR

b A project consists of eight activities with the following relevant information:

Activity	Immediate predecessor	Estimated duration (in weeks)		
		Optimistic	Most likely	Pessimistic
A	-	1	1	7
B	-	1	4	7
C	-	2	2	8
D	A	1	1	1
E	B	2	5	14
F	C	2	5	8
G	D, E	3	6	15
H	F, G	1	2	3

(i) Draw the project network.(ii) Find the float values. (iii) Find the expected duration, standard deviation and variance of the project? (iv)What duration will have 95% confidence for project completion? (For standard normal Z=1.645, area under the standard normal curve form 0 to Z is 0.45)

15 a The rate of arrival of customers at a public telephone booth follows Poisson distribution, with an average time of 10 minutes between one customer and the next. The duration of a phone call is assumed to follow exponential distribution, with mean time of 3 minutes.
(i) What is the probability that a person arriving at the booth will have to wait?
(ii) What is the average length of the non-empty queues that from from time to time?
(iii) The Mahanagar Telephone Nigam Ltd. will install a second booth, when it is convinced that the customers would expect waiting for at least 3 minutes for their turn to make a call. By how much time should the flow of customers increase in order to justify a second booth?
(iv) Estimate the fraction of a day that the phone will be in use.
(v) What is the probability that it will take him more than 10 minutes altogether to wait for phone and complete his call?

OR

b. On an average 96 minutes per 24-hour day require the service of an emergency clinic. Also, on an average, a patient requires 10 minutes of active attention. Assume that the facility can handle only one emergency at a time. Suppose that it costs the clinic Rs. 100 per patient treated to obtain an average servicing time of 10 minutes, and that each minute of decrease in this average time would cost Rs. 10 per patient treated. How much would have to be budgeted by the clinic to decrease the average size of the queue from $1\frac{1}{3}$ patients to $\frac{1}{2}$ a patient.

Z-Z-Z END