					Be	asavara	jeswari Gr	oup of	Institut	tions	2024	SCI	IEM	E	
		Balla	iri I	NSTI	τυτ	E O	F TECI	HNC)LO(gy &	MANe	igem	IENT		
		(A	utonon	nous Ins	titute u	nder V	isvesvara	ya Tec	chnolog	gical Uni	versity, B	elagavi)			
U	SN								Cou	ırse Cod	le M	B	A 1	0	4
			First	Seme	ter N	/RΔ	Degree	Fre	min	ations	April 2	025			
			1 11 50		RIIC	INF		ΤΔ	ΤΓ		R 111 2	025			
				Ľ	00		00 0		110		3				
Dı	iratio	on: 3 hrs										N	Max. N	larks:	100
Na	ote:	1. Answer a	nv FO	UR ful	l aues	tions f	rom Oue	estion	No. 1	to 7.					
110		2. Question	No. 8 i	is comp	ulsory	, ,	en gu	50000	11011						
	3	3. Ũsing Stat	tistical	Tables	are pe	ermitte	d								
	4.	. Missing da	ta, if a	ny, may	v be sı	ıitably	assumed	ł							
0															(RBTL
Q. 1	NO Q	Write a not	o o n o o	ntral to	ndana	d.	Question i	on to one	licati					Marks	:CO:PO)
1.	а. ь	Write a not				y and i	find the l	is app		JIIS. J Mada	of the fol	lowing	datas	03	(1:1:1) (1.1.1)
	D.	By the applying concept		1 ave	age s			$\frac{1}{1}$		$\frac{170 1'}{170 1'}$	10wilig	uala.	07	(1.1.1)	
		No. of Dom	ns	145-15	J 15	0-155 4	155-100	100)-105))	105-170) 170-1	15 175	-100		
		No. of Pers	sons	2		4	12		22	30	25		lU		
	c.	Find the mean absolute deviation from mean and Coefficient of absolute deviation								ation	10	(1:1:1)			
		for the following frequency distribution of sales (Rs in thousand) in a co-operativistore.									rative				
		Sales 50-		50-1	100 100-150		0 150-200		200–250 250–)-300 3	00–350			
		Number o	11	1 23			4 19 8 7								
2.	a.	Write the co	oncept	of varia	ability	(dispe	ersion).an	d me	ntion i	ts useful	ness in b	usiness	•	03	(1:1:1)
	b.	By the con-	cept of	f disper	sion, o	calcula	te quart	ile de	eviatio	n and c	oefficien	t of qu	artile	07	(1:1:1)
		deviation,	for the	data on	the p	rofits (in Rs lak	h) eai	med b	y 60 con	npanies:				
		Pr	ofits		0-	10	10-20	20)-30	30-40 40-50		0 50-60			
		No of Company		5		12		20 16		5 2					
	c.	Using the concept of descriptive statistics, determine the (i) Standard Deviation and												10	(1:1:1)
		(ii) Coefficient of Variation for the breaking strength of a certain alloy, given in the									ne				
		following ta	able. T	he valu	es are	measu	red to the	e near	est the	ousand g	rams per	square	inch.		
		Breakiı	ng Stre	ngth	44	-46	46-48	4	8–50	50-3	52 52	2–54			
		Numbe	er of Pi	eces		3	24		27	21	_	5			
3.	a.	Write any f	our dif	ference	s betw	veen co	orrelation	and 1	regress	sion.				03	(2:2:2)
	b.	Calculate K	Karl Pe	arson's	coeff	icient o	of correla	ation	betwe	en expei	nditure o	n adver	tising	07	(2:2:2)
		X ('0 <u>00' R</u> s	s) and s	sales Y	(Lakh	s Rs) f	rom the	data g	iven b	elow :					
		X	39	65	62	90	82	75	25	98	36	78			
		Y	47	53	58	86	62	68	60	91	51	84		4.0	
	c.	The followi	ing dat	a relate	to the	scores	s obtained $(in \mathbf{P}_{\alpha})^{1}$	$\frac{1}{000}$	v sales:	men of a	compan	y in an		10	(2:2:2)
		Salesm	e test al		R R	ly sales	$\frac{s(m Ks)}{D}$	000 s	5) I I		Ц	Т	٦		
		Test sco	res	50	<u> </u>	50	60	80	5	0 80	40	70	1		
		Weekly sales 30 60 40 50 60 30 70 50 60]						
		(i) Obtain the	he regr	ression of	equation	on of s	ales on ii	ntellig	gence t	test score	es of the	salesme	n.		
		(ii) If the in	itellige	nce test	score	of a sa	alesman i	in 65,	what	would b	e his exp	ected w	eekly		

sales.

1

linear association between a country's unemployment rate and its level of inflation

An economist wanted to find out if there was any relationship between the

Country	Α	B	С	D	E	F	G
Unemployment Rate (%)	4	8.5	5.5	0.8	7.3	5.8	2.1
Inflation Rate (%)	3.2	8.2	9.4	5.1	10.1	7.8	4.7

With a suitable diagram, explain how a scatter diagram is helpful in analyzing the data.

unemployment rate in a country and its inflation rate. Data gathered from 7 countries for the year 2004 are given below, by the Rank Correlation method analyze degree of

c. Using the data given below, analyze the relationship between purchase (X) and sales 10 (2:2:2)(Y), determine the two regression coefficients, and derive the two regression equations.

Purchase 'X'	71	75	69	97	70	91	39	61	80	47
Sales 'Y'	91	97	108	121	67	124	51	73	111	57

5. Define probability and explain its significance in decision-making. a.

4.

a.

b.

- b. Evaluate an incidence of occupational disease in an industry is such that the workers have 20 per cent chance of suffering from it. What is the probability that out of six workers 4 or more will come in contact of the disease?
- A manufacturer who produces medicine bottles, finds that 0.1 per cent of the bottles are 10 (3:3:3)c. defective. The bottles are packed in boxes containing 500 bottles. A drug manufacturer buys 100 boxes from the producer of bottles. Using Poisson distribution, find how many boxes will contain: (i) no defectives (ii) at least two defectives
- 6. a. Explain the components of time series in business implication
 - b. The sales of a company in millions of rupees for the years 1994 -2001 are given below:

Year 1994 1995 1996 1997 1998 1999 2000 2001 Sales 550 560 555 585 540 525 545 585

(i) Find the linear trend equation. (ii) Estimate the sales for the year 1993.

(iii) Find the slope of the straight line trend

(iv) Do the figures show a rising trend or a falling trend?

Compute the seasonal index for the following data assuming that there is no need to 10 (4:4:4)c. adjust the data for the trend.

Quarter	2000	2001	2002	2003	2004	2005
Ι	3.5	3.5	3.5	4·0	4·1	4 ·2
II	3.9	4·1	3.9	4.6	4•4	4.6
III	3.4	3.7	3.7	3.8	4 •2	4.3
IV	3.6	4.8	4·0	4· 5	4· 5	4.7

- 7. Formulate the procedure for hypothesis testing a.
 - b. A packaging device is set to fill detergent powder packets with a mean weight of 5 kg, with a standard deviation of 0.21 kg. The weight of packets can be assumed to be normally distributed. The weight of packets is known to drift upwards over a period of time due to machine fault, which is not tolerable. A random sample of 100 packets is taken and weighed. This sample has a mean weight of 5.03 kg. Can we conclude that the mean weight produced by the machine has increased? Use a 5 per cent level of significance.

- 03 (3:3:3)07 (3:3:3)

 - (4:4:4)03 07 (4:4:4)

03 (5:5:5)

07 (5:5:5)

03 (2:2:2)07 (2:2:2) c. A company is interested in determining whether an association exists between the 10 (5:5:5)commuting time of their employees and the level of stress-related problems observed on the job. A study of 116 assembly-line workers reveals the following:

Stress											
Commuting	High	Moderate	Low	Total							
Under 20 min	9	5	18	32							
20-50 min	17	8	28	53							
over 50 min	18	6	7	31							
Total	44	19	53	116							

At $\alpha = 0.01$ level of significance, using Chi-Square test find is there any evidence of a significant relationship between commuting time and stress?

CASE STUDY

8.

The HRD manager wishes to see if there has been any change in the ability of trainees 10 (5:5:5)a. after a specific training program. The trainees take an aptitude test before the start of the program and an equivalent one after they have completed it. The scores recorded are given below. Has any change taken place at 5 per cent significance level?

Trainee	A	B	C	D	E	F	G	Н	Ι
Score before training	75	70	46	68	68	43	55	68	77
Score after training	70	77	57	60	79	64	55	77	76

A production manager wants to test population variances of two population, it was b. decided to draw a two random samples from normal population they are:

Sample 1	20	16	26	27	23	22	18	24	25	19		
Sample 2	27	33	42	35	32	34	38	28	41	43	30	37

Obtain estimates of the variances of the population and test whether the two population have the same variance using F-Test.

** ** **

10 (5:5:5)