

INDIAN STATISTICAL INSTITUTE

QUESTION PAPERS

for

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INDIAN STATISTICAL INSTITUTE

COMPUTER'S CERTIFICATE EXAMINATION, MARCH 1959.

PART 1A : SECTION I.

Time : 3 Hours

Full marks : 100

- (a) Figures in the margin indicate full marks.
 (b) Use of calculating machines is not permitted.

1. (a) From the equation $2x^2 - 3yz + y^2 - z = 0$, find out the values of z for the following pairs of values of x and y : (10)

x	1	2	3	4	9	5	6	3	4
y	2	1	3	9	4	4	3	6	5

(b) Evaluate: (10)

$$\frac{(9.1)^2 - (7.9)^2}{(9.1 - 7.9)^2} \times \frac{31.36 \div 5.6}{(4.3 \times 3.2)(3.2 + 2.4)} - \frac{(4.9 - 0.7) \times (2.5 \times 2.5 - 1.25 \times 4.8)}{4.8 - 6.48 \div 2.4}$$

(c) Express the following in terms of rupees, correct to 2 places of decimal:— (5)

3 as., 4.3 as., 0.7 as. and 9 as.

2. The data given below show the value of India's exports of some commodities to foreign countries during a certain period. Re-arrange the data under the following heads providing appropriate serial number for each head and each commodity and showing sub-totals for each head, as well as the grand total. Also calculate the percentages to the total of the values of exports under each head. (25)

Heads (1) Food :

- (a) Dairy products, eggs and honey
 (b) Cereals and cereal preparations
 (c) Fruits and vegetables
 (d) Coffee, tea, cocoa, spices and manufactures thereof

(2) Textiles, fibres and waste.

<u>Commodity</u>	<u>VALUE OF EXPORTS</u>	<u>Value (in 000 Rs).</u>
1. Live animals for food		1048
2. Rice		501
3. Butter		11
4. Cereals unmilled other than wheat, rice, barley and maize		2
5. Eggs		2232
6. Spices		73705
7. Dried fruits		1340
8. Tea		1064797
9. Milk and cream		2
10. Fruits preserved and fruit preparations		507
11. Silk		1019
12. Jute including jute cuttings and waste		2

13. Cocoa	121
14. Cotton	187562
15. Vegetables preserved and vegetable preparations	8196
16. Natural honey	1
17. Synthetic fibres	1037
18. Chocolate and chocolate preparations	144583
19. Fruits and nuts (fresh)	81690
20. Wool and other animal hair	

3. Copy out the following table after correcting obvious mistakes in columns (5) and (6). Also complete it by working out the figures required in column (7). (23)

PRODUCTION OF CEREALS AND PULSES IN DIFFERENT COUNTRIES IN 1958

country	cropped area under cereals and pulses (in thousand hectares)	production (in thousand metric tons)	total population in 1956 (in thousands)	cropped area under cereals and pulses per head of population (in hectares)	production of cereals and pulses per head of population (in kilograms)	production of cereals and pulses per hectare of cropped area (in kilograms)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
India	103,254	79,494	387,000	0.27	205	
Sudan	1,602	1,427	10,226	0.22	14	
Egypt	2,158	5,757	23,410	0.90	246	
Syria	2,471	1,710	3,970	0.62	400	
Turkey	12,236	11,750	24,797	0.52	500	
Iraq	2,586	1,978	4,842	0.73	408	
Iran	4,196	4,169	21,977	0.20	100	
Lebanon	112	119	1,450	0.80	82	
Saudi Arabia	131	170	7,000	0.02	25	

(1 metric ton = 1,000 kilograms)

4. Either

The following figures represent the monthly production (in million pounds) of a certain commodity in India:— (23)

months	1953	1954	1955	1956	1957
January	6.9	6.4	8.3	7.1	8.1
February	5.8	5.7	7.8	6.7	7.6
March	7.6	10.1	9.2	9.1	11.6
April	34.2	34.0	30.2	29.9	32.9
May	52.6	56.4	50.4	55.2	43.4
June	70.0	70.0	78.6	83.7	80.5
July	86.2	86.2	88.0	88.8	90.1
August	83.0	92.4	99.6	109.5	101.8
September	92.7	101.2	102.3	104.7	106.1
October	93.0	95.6	99.0	100.3	107.1
November	55.0	61.3	73.7	60.0	61.2
December	20.2	21.8	20.0	12.1	22.5

Find out from the above—

(a) the total production in each year and the years in which total production is the maximum and the minimum .

(b) list the month, in each year, in which production is the maximum for the year, together with the corresponding production figure.

(c) calculate the average production in each month over the five-year period and arrange the averages in ascending order of magnitude showing the month corresponding to each average. Also express the average production for each month as a percentage of the average annual production.

(d) calculate the average monthly production for each year and arrange them in ascending order of magnitude mentioning each figure against the year to which it relates.

(e) considering the total production figures for 1953 and 1957, work out the rate of increase of production per year.

Or.

The following data relate to present ages of 50 couples :—

serial husband no.	age of husband (yrs.)	age of wife (yrs.)	serial husband no.	age of husband (yrs.)	age of wife (yrs.)	serial husband no.	age of husband (yrs.)	age of wife (yrs.)
(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
1	32	28	18	64	54	35	57	46
2	45	35	19	32	23	36	65	40
3	40	35	20	27	18	37	29	23
4	24	16	21	32	23	38	30	25
5	40	32	22	25	15	39	36	24
6	40	20	23	33	25	40	33	25
7	22	16	24	43	35	41	53	43
8	45	40	25	29	21	42	72	60
9	42	32	26	28	26	43	50	38
10	62	45	27	53	45	44	24	20
11	34	28	28	50	40	45	70	60
12	50	41	29	48	40	46	45	35
13	51	47	30	36	24	47	60	50
14	68	55	31	47	33	48	63	50
15	60	48	32	29	20	49	28	19
16	50	40	33	36	27	50	30	20
17	41	35	34	42	35	—	—	—

(i) Obtain the average ages of husbands and of wives in the age-group 30 to 50 years (both the ages inclusive).

(ii) Find out the number of couples with age of husband between 30 and 45 years and age of wife between 24 and 39 years (both ages inclusive). Also find the average ages of such husbands and wives.

(iii) Find out the number of couples with difference of age either 5 or 6 years. (25)

PART IA: SECTION II

Time : 3 Hours

Full marks : 100

- (a) Figures in the margin indicate full marks.
 (b) Use of calculating machines is not permitted.

1. Either

- (a) The following table gives the corresponding values of x and y :-

x	y
.30001	.95105
.31039	.95060
.31178	.95015
.31316	.94969
.31454	.94924

Find by simple interpolation the values of y when $x = .31090$ and when $x = .31300$.

Also find the value of x when $y = .94990$. (10)

(b) Solve :

$$29^{2x^2} = 37^{4x+13} \quad (10)$$

(c) Using appropriate tables, write down the values of $\log_e x$, \sqrt{x} and $\frac{1}{\sqrt{x}}$

for $x = \frac{1}{2.37}$ and $x = 0.00671$. (5)

Or,

(a) Solve : $2x^2 - 6x + 17 = 0$ (13)

Hence or otherwise find the values of $2x^2 + 2x^2 - 7x + 72$ when x satisfies the above equation.

(b) Find the value of : $1364.3298 \times 0.0478953$ (12)
 by contracted multiplication correct to 5 places of decimal.

2. (a) Evaluate : (10)

$$\left\{ \sqrt[3]{a^{-\frac{2}{3}} \cdot b^{\frac{5}{4}}} \right\}^{-\frac{3}{2}} \div \left\{ \sqrt[4]{a^{\frac{1}{4}} \cdot b^{-\frac{5}{8}}} \right\}^{\frac{2}{3}}$$

where $a = 4\sqrt{2}$ and $b = 5$.

(b) Find the value of : $\log [(2.7)^2 \times (0.81)^{\frac{4}{3}} \div (90)^{\frac{5}{2}}]$
 given that $\log 3 = 0.4771213$. (16)

3. You are given below the population of a country from 1810 to 1950. Represent the data by a free hand smooth curve on a graph paper.

Estimate from the curve the populations in 1855 and 1955, extending the curve in the latter case.

year	population (in lakhs)	year	population (in lakhs)
1810	72	1890	629
1820	98	1900	780
1830	129	1910	920
1840	171	1920	1057
1850	232	1930	1228
1860	314	1940	1317
1870	398	1950	1507
1880	502		

(15)

4. *Eiher*,

Five candidates A, B, C, D, E, were interviewed for two posts, one of supervisor and the other of assistant supervisor, and the marks allotted to them for the characteristics,

(20)

- Technical knowledge
- Ability to manage primary workers
- Ability to deal with the executives
- Painstakingness
- Capacity for taking independent decision,

were as follows (full marks for each = 100).

Candidate	Marks obtained				
	a	b	c	d	e
A	60	80	65	60	70
B	90	63	75	72	68
C	45	95	80	65	58
D	80	58	58	58	72
E	72	60	64	68	65

If the weightage given to these characteristics are respectively proportional to 4, 4, 6, 5 and 6 for the supervisor's post and to 6, 6, 3, 5 and 5 for the assistant supervisor's post, which of the candidate should be selected as the supervisor? Will he also be the most suitable person for the assistant supervisor's post?

Or,

Values of production of a number of citrus fruits for 1948, 1952 and 1953 are given below. Calculate the index number for values of production for 1952 and 1953, using the 1948 values as base, separately for each fruit. Find also the average of those indices over all the citrus fruits.

citrus fruits	value (in thousand rupees) of production during		
	1948	1952	1953
grape fruit	108.9	132.3	145.2
lemons	87.7	100.9	97.9
orange type A	190.1	222.5	254.5
orange type B	97.5	133.2	100.7

(20)

5. Weights in lbs. of 25 students are given below :—

106	88	104	78	100
90	112	102	100	104
82	101	95	94	111
116	86	90	108	98
108	88	110	106	96

(i) Find the mean m and the standard deviation σ of the weights.

(ii) Find the percentage of students whose weights are (a) above the mean and (b) between $m \pm \sigma$. (20)

PART IB : SECTION I

Time : 3 Hours

Full marks : 100

(a) Figures in the margin indicate full marks.

(b) Use of calculating machines is permitted.

1. Total monthly disbursement of a family comprises of (i) 'consumption expenditures' and (ii) 'other disbursements'. There are four different items under 'consumption expenditure' and six under 'other disbursements'.

A table is required to be prepared for average monthly disbursements on the above break-downs along with percentage to total disbursements for the three classes of families having expenditure levels of Rs. 1-100, Rs. 101-200 and Rs. 201-350, for Bengalee and Non-Bengalee population in Calcutta. Prepare a not blank layout of the table with proper headings, spacing etc. (15)

2. The following distribution of carbon content (percent) was obtained in 178 determinations on a certain mixed powder :—

percent carbon (mid-point) x	frequency f
4.145	1
4.245	2
4.345	7
4.445	20
4.545	24
4.645	31
4.745	38
4.845	24
4.945	21
5.045	7
5.145	3

Find the mean, standard deviation, β_1 and β_2 of the distribution.

(6)

3. *Either,*

Twenty prepared specimens of a synthetic rubber were tested for abrasion loss in c.c. per H.P. hour (Y) and hardness in degress shore (X). The following data were obtained:—

X	Y	X	Y
45	372	64	164
55	206	68	113
61	175	70	182
66	154	81	32
71	136	56	228
71	112	68	196
81	55	75	128
86	43	83	97
53	221	88	64
60	166	59	249

Find the regression line of Y on X and plot it on the scatter diagram. (25)

Or,

The following data were collected to study the effects of eight different experimental conditions, designated A, B, C, D, E, F, G, H, upon performance on a certain task. From a total of 48 subjects, 6 are assigned at random to each of 8 groups and the same test is administered to all. The table below gives the scores for each of the 48 subjects. Do the mean scores achieved under the 8 experimental conditions differ significantly? Carry out an analysis of variance to examine this point. (25)

Conditions							
A	B	C	D	E	F	G	H
64	73	77	78	63	75	78	55
72	61	83	91	65	93	46	66
68	90	97	97	44	78	41	49
77	80	69	82	77	71	59	64
56	97	79	85	65	63	69	70
95	67	87	77	76	76	82	68

4. Index numbers of wholesale prices of different food items with base 1952-53 = 100 are given below. Calculate the composite wholesale price index for food for the different months. (20)

Average of weeks ended Saturday	Food articles							Others
	cereals	pulses	fruits and vegetables	milk and ghee	edible oils	fish, eggs and meat	sugar and gur	
weights	102	43	23	84	47	17	48	50
July 1958	110	100	120	111	126	110	133	160
August 1958	114	102	124	110	129	114	136	155
September 1958	115	105	125	109	133	115	135	157
October 1958	114	109	124	110	131	110	136	159
November 1958	111	112	117	106	124	109	128	160

PART 1B : SECTION II

Time : 3 Hours

Full marks : 100

- (a) Figures in the margin indicate full marks.
 (b) Use of calculating machines is permitted.

1. Below are given the frequency distribution of duration in seconds of 1000 telephone conversations :—

duration in seconds (mid-point)	number of conversations
50	6
150	28
250	88
350	180
450	247
550	200
650	133
750	42
850	11
950	5

Fit a normal curve to the data, obtain the expected frequencies and test for the goodness of fit. Draw the histogram and on it show the fitted frequency curve. (40)

✓ 2. The following table gives the classification of 100 students according to the grades in a selection test and their results in the final passing out examination. Test whether there is any significant relationship between performances in selection test and final examination. (15)

	selection test grades		
	I	II	III
Passed in final examination	12	25	14
Failed in final examination	6	20	23

3. Either,

The following is an extract of a two-way table showing the value of z , which is a function of x and y

y	z	
	0.2	0.3
0.5	0.3147	0.2932
0.6	0.2088	0.2806

Find by linear interpolation, the value of z when $x = 0.257$ and $y = 0.530$. (10)

Or,

In a certain city, there are 2000 electric street lamps. If these lamps have an average life of 1000 burning hours, with a standard deviation of 200 hours, find out

(a) what number of lamps may be expected to fail between 900 and 1300 burning hours.

(b) after how many burning hours would we expect that 10 per cent of the lamps would have failed?

(Assume the distribution of life of lamps to be Normal). (10)

4. Either,

Find the values of

(a) $\frac{1}{2} \log_e \left(\frac{1+r}{1-r} \right)$, when $r = 0.675$ and $r = 0.25$.

(b) $0.547 \cdot (981)^{-0.10} (3.5)^{0.15} \cdot x^{-0.25}$

when $x = 0.00578$. (20)

Or,

The following table gives the values of p and v . Fit an equation of the type $pv^a = b$ by taking $y = \log p$ and $x = \log v$ and obtaining the regression equation of y on x . (20)

p	0.5	1	1.5	2	2.5	3
v	1.62	1	0.75	0.62	0.52	0.46

Find from the equation the value of v if $p = 0.8$.

5. It is required to compile items of information listed below. Select any ten of them and state for each item (a) complete name of one publication containing the information, (b) the name of the publishing authority, and (c) whether it is a weekly, fortnightly, monthly, quarterly or annual publication. (15)

- (i) The index of wholesale prices for the week ending 31st January 1959.
- (ii) Area not available for cultivation in the state of U.P. during 1948.
- (iii) Number of registered trade unions in Bombay State in 1956-1957.
- (iv) Per capita availability of mill-made cloth in India during 1957.
- (v) Export of raw cotton from India in the month of October 1957.
- (vi) Number and amount of foreign money order paid in India during 1949-50.
- (vii) Number of married females between the ages 21-25 in Delhi State in 1941.
- (viii) Gross amount of import duty collected in the month of November 1957 in all the ports of India.
- (ix) Per capita national income of India at current prices during 1950-51.
- (x) Number of deaths of passengers due to railway accidents in India during 1956.
- (xi) Number of passengers carried by railways in India during 1951-53 and earnings therefrom.
- (xii) Value of export of pig iron from India in June 1958.
- (xiii) Average percentage absenteeism in June 1949 in the mills of Bombay and Calcutta.
- (xiv) Index number of cost of living in Bombay for 1955.
- (xv) Number of educational institutions in India and the number of scholars attending in 1953.

PART 1C : SECTION I

Time : 4 Hours

Full marks : 100

(a) Figures in the margin indicate full marks.

(b) Use of calculating machines is permitted.

1. Examine the following sets of results for consistency. Point out the nature of inconsistency if you are able to detect any. (15)

(a) $n = 15, \Sigma x = 40, \Sigma x^2 = 100$

(b) $n = 50, \Sigma x = 55, \Sigma y = 60, \Sigma x^2 = 80, \Sigma y^2 = 90, \Sigma xy = 86.$

(c) The mean and standard deviation of scores of 50 students in an examination were 35 and 10 respectively, 10 students having scored more than 50, with an average of 60 and standard deviation 5.

2. Either,

Solve the equation

(15)

$$\frac{x}{1-e^{-x}} = 3.02$$

graphically or otherwise correct to three places of decimal.

Or,

(a) Using the table of five per cent points of F -distribution, find the values of (5)(i) Five per cent point of F -distribution with

$n_1 = 10, n_2 = 50$

(ii) Ninetyfive per cent point of F -distribution with

$n_1 = 30, n_2 = 10.$

(b) For the binomial probability law for the occurrence of exactly x events in n trials, given by

$${}^n C_x \cdot q^{n-x} \cdot p^x,$$

where p is the probability of the occurrence of the event in a single trial and $q = 1-p$, prepare a table giving values of the probability corresponding to different values of x ranging from 1 to 5, given $p = .04$ and $n = 60$. (10)

3. Either,

Fit a third degree polynomial to the data given below and represent it graphically along with the fitted polynomial. (25)

t	y_t
1	25
2	52
3	80
4	186
5	308
6	507
7	605
8	707
9	783
10	851
11	870

Or,

The following gives the response, y , at given values of two controlled variables x_1 and x_2 .

x_1	x_2	y
0.4	-0.5	100.3
-1.1	1.1	84.9
0.9	0.1	98.5
-0.2	-1.6	99.3
-0.8	-1.4	87.4
0.2	1.7	83.1
1.8	-0.1	95.9
-1.6	1.0	65.5
-0.5	0.2	74.8
1.6	0.2	88.0
-0.9	-1.2	76.2
0.2	0.6	75.4

Obtain the multiple linear regression of y on x_1 and x_2 . Compute the multiple correlation coefficient of y on x_1 and x_2 and test for its significance. (25)

4. The following table gives data regarding yield of wheat obtained in an experiment conducted to test the relative efficacy of two manurial treatments on 5 varieties of wheat at 4 different experimental stations. Set up a complete Analysis of Variance Table and test the significance of all the main effects and first order interactions. (25)

YIELD OF WHEAT
(in lbs. per one-tenth of an acre)

Varieties of wheat	Manurial treatments	Experimental Stations			
		1	2	3	4
V_1	T_1	69	81	96	96
	T_2	75	84	93	105
V_2	T_1	75	62	81	96
	T_2	81	78	96	93
V_3	T_1	57	77	75	109
	T_2	66	73	86	99
V_4	T_1	78	75	99	84
	T_2	72	84	90	102
V_5	T_1	84	81	96	105
	T_2	87	90	96	111

5. The following extract, reproduced from December 1958 of CAPITAL, gives an account of the loans raised in the country during 1958.

“On 24th June, 1958, ten State Governments announced their decisions to float new loans for an aggregate amount of Rs. 47.50 crores. All the loans carried a uniform rate of interest, but the amounts and terms varied. Of the total amount, Rs. 10 crores were on account of Bombay, which offered two issues of equal amounts, one a twelve year loan maturing in 1970 issued at par and the other a thirteen year loan maturing in 1971 and issued at Rs. 99.75 per cent. The redemption yield on this loan was 4.28 per cent. In the case of the remaining 9 states, namely Andhra Pradesh Rs. 5 crores, Kerala Rs. 3 crores, Madhya Pradesh Rs. 2 crores, Madras Rs. 5 crores, Mysore Rs. 5 crores, Orissa Rs. 3 crores, Rajasthan Rs. 2.5 crores, Uttar Pradesh Rs. 7 crores and West Bengal Rs. 5 crores, the loans were to mature in 1969. The issue prices were Rs. 99 per cent in the case of Kerala, Madhya Pradesh and Orissa and Rs. 99.50 per cent in the case of Andhra Pradesh, Madras, Mysore, Rajasthan, Uttar Pradesh and West Bengal. Conversion facilities were offered by 5 states; the 3 per cent 1958 loans of the Government of Bombay, Madhya Pradesh, Madras and Uttar Pradesh and the 3 per cent Cochin loan (1955-58) of the Kerala Government were to be accepted at par for conversion into the new loans of the Governments concerned.

Three new Central Government loans were also floated during the same month on a cash-cum-conversion basis, for a total of Rs. 135 crores. (1) the $3\frac{1}{2}$ per cent bonds, 1963, at an issue price of Rs. 98.75 per cent (yielding to redemption 3.78 per cent), (2) the $3\frac{3}{4}$ per cent National Plan bonds 1968 (5th series) at an issue price of Rs. 99.50 per cent (yielding to redemption 3.81 per cent), and (3) the 4 per cent loan, 1973 at par. The maturing issues offered for conversion into the above loans were the 3 per cent loans, 1958, and the $4\frac{1}{2}$ per cent loan, 1958-68, which were accepted for conversion at Rs. 99.75 per cent and Rs. 100.10 per cent respectively. Total subscriptions including conversions amounted to Rs. 141.87 crores, of which Rs. 58.06 crores were for the $3\frac{1}{2}$ per cent bonds, 1963, Rs. 34.34 crores for the 4 per cent loan, 1973. Subscriptions in cash amounted to Rs. 132.40 crores and the remaining amount was in the shape of conversions (their share in case of each loan being in proportion to the total subscriptions)”.¹³

Represent the above data in a tabular form with suitable headings and give the percentages which the various loans form to the total loans raised in the country. (20)

PART IC : SECTION II

Time : 4 Hours.

Full marks : 100

- (a) Figures in the margin indicate full marks.
 (b) Use of calculating machines is permitted.

1. Either

From the following data, find by interpolation the value of y when $x = 102.0$.

(15)

x	y
93.0	11.38
96.2	12.80
100.0	14.70
104.2	17.70

Or,

The following table gives the values of a function $F(x,y)$ for some values of x and y . Find by interpolation the value of $F(x,y)$ when $x = 0.15$ and $y = 0.08$.

(15)

x	y		
	0.0	0.1	0.2
0.0	3976	3766	3538
0.1	3766	3583	3380
0.2	3538	3380	3204

2. Extracts from the register of an Employment Exchange for the years 1953-55 are given below. Calculate the seasonal indices of the number registered using 12 month moving averages. Comment on special features, if any. (20)

Month	Number of registrations at the end of month (in thousands)		
	1953	1954	1955
January	434	534	613
February	426	539	605
March	425	525	595
April	455	526	606
May	466	532	607
June	473	548	624
July	493	588	666
August	498	599	683
September	512	590	693
October	514	569	695
November	507	583	681
December	522	609	691

3. For a certain frequency distribution,

$$\begin{aligned} \text{mean} &= 0.00 \\ \text{variance} &= 1.00 \\ \beta_1 &= 0.50 \\ \beta_2 &= 3.75 \end{aligned}$$

Find the relative frequency of individuals in the range -0.25 to $+0.25$ by fitting an appropriate Pearsonian Curve. Draw the relative frequency curve by computing a suitable number of ordinates. (20)

4. An experiment was carried out to find the efficiency of five types of calculating machines A, B, C, D and E. Five different pieces of computations denoted by I, II, III, IV and V were performed by each of five students and the time taken for the calculations was noted in minutes and seconds. The experiment was arranged in a Latin square design. The results of the experiment are given below :-

students	computation type				
	I	II	III	IV	V
1	E 3-10	A 2-10	B 3-18	C 5-50	D 1-50
2	A 2-14	B 2-20	C 4-8	D 4-15	E 2-50
3	D 2-20	E 3-10	A 3-25	B 6-15	C 1-50
4	C 3-5	D 2-10	E 6-22	A 3-35	B 2-35
5	B 3-30	C 3-10	D 2-10	E 8-45	A 2-40

Make a complete analysis of variance of the above data.

(25)

5. From the publications supplied to you, prepare a neat table showing the quantity and the value of exports, re-exports and imports for the Indian Union of any five of the items given below, for any one month of the period January 1937 to December 1938. Against each entry, the name or names of the country or countries from or to which the major portion of the item has been exported or imported, should be shown together with their respective quantities and values.

(20)

- | | |
|---------------------------|---------------------------------------|
| 1. Onions | 8. Spirits of Turpentine |
| 2. Jaggory, cane | 9. Toilet soaps |
| 3. Black tea | 10. Vitamin B Complex |
| 4. Cumin seed | 11. Silk fabric |
| 5. Cigarettes | (containing over 90 per cent of silk) |
| 6. Virginia tobacco | 12. Cement (Portland grey) |
| (fluo cured for cigarette | 13. Copper sheets, plates and strips |
| manufacture) | 14. Magazines and Periodicals |
| 7. Lizard skin | 15. Newspaper |

COMPUTER'S CERTIFICATE EXAMINATION, SEPTEMBER 1959

PART 1A : SECTION I

Time : 3 Hours

Full marks : 100

- (a) Figures in the margin indicate full marks.
 (b) Use of calculating machines is not permitted.

1. (a) Complete the calculations in columns 3 to 7 of the following Table. Suggest an easy method of checking the calculations.

x	y	$x+y$	$x-y$	x^2	y^2	x^2-y^2
1	2	3	4	5	6	7
13	6					
5	8					
1	10					
9	11					
2	7					
12	9					
total	42	51				

(15)

(b) Figures of average miles run per gallon of petrol by the different makes of vehicles in a fleet of 3 ton lorries are given below, together with the number of vehicles of each make in the fleet.

Estimate the quantity of petrol required for driving the fleet from Delhi to Calcutta (881 miles).

TABLE

Make	Number of vehicles	average miles per gallon of petrol
Chevrolet	45	11.7
Dodge	12	12.0
Ford	52	14.8
Hillman	3	9.4
Mercedes-Benz	70	15.4
Studobaker	23	13.0

(10)

2. Daily reports showing the number of patients admitted into a hospital during one week are given below :

DAILY REPORTS

Sunday : Traffic accidents-2; Trachoma-1; Food poisoning-1; Tonsillitis-3; Other skin diseases-2; Bronchitis-1; Common cold-2; Scabies-1; Dysentery-1; Other injuries-1; Other diseases-18; Total-33

Monday : Common cold-3; Other skin diseases-2; Burns-1; Pharyngitis-4; Pneumonia-1; Conjunctivitis-1; Other injuries-3; Other diseases-9; Total-24.

Tuesday: Other injuries-4; Common cold-2; Tonsillitis-1; Influenza-1; Dermatophytosis-1; Other skin diseases-2; Diarrhoea-1; Other eye diseases-1; Other diseases-18; Total-31.

Wednesday: Other injuries-3; Tonsillitis-1; Pharyngitis-2; Bronchitis-1; Scabies-1; Other skin diseases-2; Dysentery-1; Conjunctivitis-1; Other diseases-13; Total-25.

Thursday: Traffic accident-1; Other injuries-2; Common cold-2; Tonsillitis-1; Influenza-1; Other skin diseases-1; Other eye diseases-1; Other diseases-9; Total-17.

Friday: Other injuries-3; Common cold-1; Pharyngitis-2; Dermatophytosis-1; Other skin diseases-3; Enteritis-2; Other diseases-14; Total-26.

Saturday: Burns-1; Traffic accident-1; Other injuries-5; Common cold-2; Tonsillitis-1; Pneumonia-1; Scabies-1; Other skin diseases-2; Dysentery-1; Diarrhoea-1; Other eye diseases-1; Other diseases-14; Total-31.

Compile this information so as to show the number of admissions for each day in the week, and for the week as a whole, under each of the broad classifications shown below:—

CLASSIFICATIONS

1. *Injuries* (a) Burns, (b) Traffic accidents, (c) Other injuries.
 2. *Respiratory group of diseases* (a) Common cold, (b) Tonsillitis and Pharyngitis, (c) Bronchitis, (d) Influenza.
 3. *Skin diseases* (a) Dermatophytosis, (b) Scabies, (c) Other skin diseases.
 4. *Dysentery and Diarrhoea group* (a) Dysentery, (b) Food poisoning including diarrhoea and enteritis.
 5. *Eye diseases* (a) Conjunctivitis, (b) Trachoma, (c) Other eye diseases.
 6. *Other diseases.* (25)
3. Fill up the missing figures and correct mistakes, if any, in the following table and copy the table neatly with necessary improvements in presentation. (25)

NUMBER OF DRIVING AND VEHICULAR LICENSES ISSUED IN CALCUTTA

Type of license	year							total
	1947	1948	1949	1950	1951	1952	1953	
<i>Motor driving</i>								
A. Private car drivers:								
Now	2517	2941	73	2677	2363	2343	2216	18230
Renewal	8138	9246	11254	12272	14022	14007	15357	.....
Foreign	1189	1376	1475	2091	2061	1863	.....	12125
B. Professional drivers:								
Now	2080	3951	4578	3810	3604	.....	3323	24803
Renewal	.....	23588	30285	28119	28863	31119	30871	192745
Foreign	997	1720	1129	783	28734	717	684	6764
C. Total motor drivers:								
license	34801	42825	51894	449752	51647	53566	54541	339026
Hackney carriages	1833	1674	1413	1103	888	743	.....	8278
Rickshaw pullers	22692	.....	22221	23530	22509	21350	20689	160680
Total	65926	72119	75528	.....	75104	75639	75854	507984

4. *Either.*

Two tables showing the quantities of some selected commodities exported from West Bengal to different states and imported to West Bengal from different states are given below. Draw up a neat table combining the two tables. The commodities should be divided into two groups, viz., (i) food group and (ii) non-food group and within each group the commodities are to be arranged alphabetically.

(25)

SELECTED COMMODITIES IMPORTED TO WEST BENGAL IN THE YEAR 1956

Commodity	Unit	Bihar	Orissa	Uttar Pradesh	Punjab	Madhya Bharat	Bombay	Madras
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Cement	00 mds.	88410	5575	202	7	1964	-	2396
Rice not in husk	00 mds.	3095	11083	1674	277	2388	6	220
Sugar	00 mds.	22046	32	17009	808	1	860	1600
Hides (raw)	mds.	301511	13246	68205	1468	388	387	8
Cotton twists & yarns	mds.	641	4772	7996	563	3923	17840	66618
Bonga	mds.	269571	5419	494935	94048	13754	517	-
Wheat	00 mds.	1138	-	17117	1653	1396	5571	2772
Coal & coke	000 mds.	72442	-	7	-	-	-	-
Rice in husk	mds.	182142	848965	261451	297	132283	-	102941
Pulses other than grams	00 mds.	7209	551	17136	704	9408	485	44
Cotton piece goods	mds.	2225	19961	33926	1209	15778	670616	11367
Lao and shellac	mds.	63511	5644	9613	66	115452	82	-

SELECTED COMMODITIES EXPORTED FROM WEST BENGAL IN THE YEAR 1956

Bones	mds.	16	782	115	-	-	294	21802
Rice in husk	mds.	181617	497962	12725	3455	179	1133	-
Lao & shellac	mds.	5040	-	1043	153	8	29	121
Coal and coke	000 mds.	36228	15	20952	3749	89	8380	123
Wheat	00 mds.	3996	459	1500	1944	-	11	2
Hides (raw)	mds.	2696	138	2520	-	13	592	154426
Pulses other than grams	00 mds.	654	229	725	104	12	9	15
Cotton twists & yarns	mds.	34795	17216	22472	1484	2882	16904	1216
Rice not in husk	00 mds.	16327	1057	17062	579	198	3053	165
Cement	00 mds.	1155	48	308	38	1	11	1
Sugar	00 mds.	10022	424	291	6	34	10	7
Cotton piece goods	mds.	110523	31054	44132	2431	6299	3496	1057

Or,

Population of a certain state classified according to livelihood classes is given below :—

Description of livelihood classes	males	females
(1)	(2)	(3)
<i>I. cultivators of land, wholly or mainly owned</i>		
1) self-supporting persons	1665893	205590
2) non-earning dependants	2171662	3685019
3) earning dependants	229343	68250
<i>II. cultivators of land, wholly or mainly unowned</i>		
1) self-supporting persons	677907	69938
2) non-earning dependants	750393	1323384
3) earning dependants	93232	56548

III. <i>cultivating labourers</i>		
1) self-supporting persons	890579	145786
2) non-earning dependants	640930	1222931
3) earning dependants	74151	67484
IV. <i>non-cultivating owners of land, rent receivers etc.</i>		
1) self-supporting persons	29491	9426
2) non-earning dependants	43304	83408
3) earning dependants	2298	1198
V. <i>production other than cultivation</i>		
1) self-supporting persons	1345092	320583
2) non-earning dependants	779795	1184879
3) earning dependants	51584	29367
VI. <i>commerce</i>		
1) self-supporting persons	721127	53689
2) non-earning dependants	581714	920310
3) earning dependants	27070	7199
VII. <i>transport</i>		
1) self-supporting persons	318836	7218
2) non-earning dependants	155043	265906
3) earning dependants	6700	2594
VIII. <i>other services</i>		
1) self-supporting persons	1127963	227632
2) non-earning dependants	913318	1396952
3) earning dependants	47996	22380

Obtain correct to the nearest thousand the total number of males as well as of females in the state in each of the following classes : self-supporting persons, earning dependants and non-earning dependants. (25)

PART IA : SECTION II

Time : 3 Hours

Full marks : 100

- (a) Figures in the margin indicate full marks.
 (b) Use of calculating machines is not permitted.

1. *Either,*

Obtain by contracted multiplication the continued product

$$49.704859 \times 11.349768 \times 26.0483917 \quad (13)$$

correct to the nearest integer.

Or,

For the n numbers $a_1, a_2, a_3, \dots, a_n$,

$$H = \frac{n}{\left(\frac{1}{a_1} + \frac{1}{a_2} + \frac{1}{a_3} + \dots + \frac{1}{a_n}\right)}$$

and

$$G = \sqrt[n]{a_1 a_2 a_3 \dots a_n}$$

Calculate H and G for the following numbers :—

.1098,	.0087,	.1384,	.1875,
.2089,	.0896,	.1706,	.2343.

(13)

2. Area in acres and yield rate of paddy in mds. per acre are given for 10 experimental plots. Find the weighted average of yield rate, using area in acres as weight. (15)

plot no. *	area in acres	yield rate in mds. per acre	plot no.	area in acres	yield rate in mds. per acre
1	0.32	33.08	6	0.12	27.17
2	0.40	31.70	7	0.20	26.90
3	0.40	31.04	8	0.32	26.28
4	0.34	28.74	9	0.48	25.79
5	0.55	27.98	10	0.33	24.66

3. Either,

The saturated vapour pressures in millibars of a liquid at different temperature levels (in degrees centigrade) are given below :—

temperature (t)	pressure (p)
60	199.2
70	311.6
80	473.4
90	701.0
100	1013.2

Values of the pressures at 85°C and 94°C and also the temperature at which pressure would register 350.0 millibars are required.

(a) Obtain these by simple interpolation. (b) Tabulate the logarithms of temperature t and pressure p and plot the values of $\log p$ against $\log t$. Use the graph to find the values required. (30)

Or,

For integral values of x from 0 to 10, tabulate

$$y = +\sqrt{300-x^2}$$

correct to 2 places of decimals. Plot the values of (x,y) on a graph paper and draw a freehand curve passing through the plotted points. Determine the area enclosed by this curve and the two axes. (30)

4. The following table gives the distribution of sample households according to household size :—

household size	frequency	household size	frequency
1	104	9	91
2	129	10	37
3	188	11	14
4	200	12	2
5	208	13	6
6	201	14	—
7	182	15	1
8	137		

Calculate the average and the standard deviation of household size. (25)

5. Production of 5 items of heavy miners and allied industries (in tons) are shown for the years 1956-1958. Calculate index of production for each item for both the years 1957 and 1958 with the year 1956 as base. Also obtain the averages of the indices for 1957 and 1958 respectively.

Items	1956	1957	1958
1. Sulphuric acid	165215	196062	227000
2. Superphosphate	81170	141678	181000
3. Caustic soda	30416	42418	55400
4. Cement	4928518	5601140	6380503
5. Paper and paper board (excluding newsprint)	193400	210125	250000

(15)

PART 1B : SECTION I

Time : 3 Hours

Full marks : 100

(a) Figures in the margin indicate full marks.

(b) Use of calculating machines is permitted.

1. *Ether*.

Soil temperature and germination interval (interval between sowing and appearance above ground) for wheat at 12 places are given in the following table.

(a) Calculate correct to two decimal places the coefficient of correlation between soil temperature and germination interval.

(b) Obtain also the linear regression equation of germination interval on mean soil temperature. (25)

Mean soil temperature (°F)	Interval (days)	Mean soil temperature (°F)	Interval (days)
57	10	44	19
42	26	40	18
38	41	46	10
42	29	44	31
45	27	43	29
42	27	40	33

Or,

(a) Fit a second degree parabola to the following data and estimate the value of the index for 1940. (15)

year	1931	1933	1935	1937	1939	1941	1943
Index of wholesale price	96	87	91	102	108	* 139	307

(b) Four experimenters determined the moisture content of samples of a powder, each one taking a sample from each of six consignments. Their assessments are:—

* observers	consignments					
	1	2	3	4	5	6
A	9	10	9	10	11	11
B	12	11	9	11	10	10
C	11	10	10	12	11	10
D	12	13	11	14	12	10

Is there any significant difference between consignments or between observers? (10)

2. A frequency distribution of electric lamps with regard to their length of life (in hours) is shown below:—

length of life	frequency	length of life	frequency
0—100	10	1000—1100	78
100—200	15	1100—1200	78
200—300	31	1200—1300	73
300—400	44	1300—1400	66
400—500	50	1400—1500	57
500—600	57	1500—1600	50
600—700	66	1600—1700	44
700—800	73	1700—1800	31
800—900	76	1800—1900	15
900—1000	78	1900—2000	10

(a) Calculate the β_1 and β_2 -coefficients of the distribution.

(b) Estimate the number of bulbs whose length of life fall between mean \pm standard deviation. (30)

3. The following gives the yield of grain and straw for six manurial treatments in four randomized blocks.

Carry out an analysis of covariance to examine the significance of differences between the treatments in respect of grain yield after making due adjustments for the variation in straw yield. (25)

treatments	Block 1		Block 2		Block 3		Block 4	
	straw	grain	straw	grain	straw	grain	straw	grain
A	242	620	321	646	261	681	317	644
B	267	644	382	745	201	542	316	711
C	215	523	330	713	298	686	381	688
D	212	601	292	693	265	685	255	714
E	322	664	370	693	284	666	323	516
F	200	514	261	637	259	697	361	710

4. Annual production and average prices of six crops are given below. With the year 1949 as base, calculate the index numbers of prices of crops (as a whole) for each of the years 1950 and 1951.

- (a) using the base year quantity as weights (I_1);
 (b) using the quantities of the year for which the index number is being calculated, as weights (I_2).
 (c) find also the geometric mean of the two index number I_1 and I_2 for both the years 1950 and 1951. (20)

Crops	1949		1950		1951	
	quantity	price	quantity	price	quantity	price
Rice	43	2.7	51	1.2	39	1.0
Wheat	952	2.1	843	1.4	819	0.9
Corn	2670	1.3	3071	0.6	2928	0.4
Barley	131	1.2	171	0.7	132	0.4
Potato	297	1.6	309	1.1	325	1.1
Sugar	437	1.0	48	0.5	524	0.3

PART 1B : SECTION II

Time : 3 Hours

Full marks : 100

- (a) Figures in the margin indicate full marks.
 (b) Use of calculating machines is permitted.

1. The frequency distribution of 1,060 students according to pulse beat per 60 seconds is given below :—

pulse beat per 60 seconds	number of students
43—50	3
51—58	28
59—66	131
67—74	283
75—82	351
83—90	185
91—98	64
99—106	14
107—114	1
	1060

Fit a normal curve to the data and draw the histogram and the fitted frequency curve. Test also for the goodness of fit. (40)

2. *Either,*

Hundred students were rated by their teachers as 'above average, average, and below average' in intelligence. An objective intelligence test was then given to these students and they were again classified into the above three categories, as given in the table below, on the basis of their scores in the intelligence test. Test whether there is any significant relationship between teachers' ratings and the objective test. (15)

	Teachers' Ratings			Total
	Below average	Average	Above average	
Below average	10	13	7	30
Test Average	7	24	9	40
Above average	5	10	15	30
total	22	47	31	100

Or,

The following table shows the classification of a sample of individuals in respect of eye-colour and hair-colour. Test, whether there is any association between the two categories. (15)

Eye-colour	Hair colour				
	fair	red	medium	dark	black
Blue	326	38	241	110	3
Light	688	116	584	188	4
Medium	343	84	909	412	26
Dark	98	48	403	681	85

3. The sample sizes (N), the mean values (M) and the standard deviation (σ) with respect to heights of two sets of male students are as follows :-

$$N_1 = 500 \quad M_1 = 60.51 \text{ inches} \quad \sigma_1 = 7.49 \text{ inches}$$

$$N_2 = 500 \quad M_2 = 61.37 \text{ inches} \quad \sigma_2 = 6.85 \text{ inches}$$

Is the difference between the two mean values significant? (10)

4. Find the values of

$$\sqrt{2\pi n} \cdot e^{-n(n)^n}$$

for $n = 5, 10, 15$ and 20 . (10)

5. The following two-way table shows the values of z for different pairs of values of x and y :-

y	x		
	0.7	0.8	0.9
0.3	4.2	3.8	3.0
0.4	4.9	4.7	4.2
0.5	5.0	4.0	4.7

Find, by linear interpolation, the values of z , when (i) $y = 0.304$, $x = 0.701$,
(ii) $y = 0.473$, $x = 0.825$. (10)

6. For any five of the following items write the complete name of one publication from which you can obtain the required information and indicate also the name of the publishing authority and its periodicity of publication, viz., weekly, monthly, etc. (15)

- (i) 'All-India' first estimate of cotton crop for 1957-58.
- (ii) Number of man-days lost during December 1958 due to industrial disputes in West Bengal.
- (iii) General index of industrial production in March 1959 (base 1951 = 100).
- (iv) Area irrigated in U.P. from different sources of irrigation in 1957.
- (v) Number and amount of foreign money order paid in India in 1955.
- (vi) Number of males having production of raw materials as their principal means of livelihood in Delhi State in 1951.
- (vii) Earnings from carrying rice by class I Railways in Indian Union during 1950-51.
- (viii) Total value of principal articles of merchandise imported by sea and air from foreign countries into India in March 1957.
- (ix) Production, despatches and stocks of coal in West Bengal in May 1956.
- (x) Per capita availability of mill-made cloth in India in 1958.

PART IC : SECTION I

Time : 4 Hours

Full marks : 100

- (a) Figures in the margin indicate full marks.
- (b) Use of calculating machines is permitted.

1. The following table gives percentage of labour force in population obtained in a nation-wide survey conducted in six population zones in India in two time-periods by two parties of investigators. Set up a complete analysis of variance table and test the significance of all the main effects and the first-order interactions. (30)

zone	time 1		time 2	
	party 1	party 2	party 1	party 2
north	40.3	39.0	39.1	39.9
south	43.3	43.5	42.1	42.7
east	40.0	39.0	39.0	39.0
west	43.5	43.3	42.8	40.8
central	49.9	49.5	43.4	48.7
north-west	40.3	39.1	40.3	39.0

2. Represent the following data in a tabular form with suitable headings. (20)

'It will be interesting to note that during the pre-plan period of about 5 years private enterprise in Indian shipping acquired 73 ships of 318,815 G.R.T. at a cost of Rs. 22.30 crores. The entire amount was raised by Indian ship owners from their

own resources. During the first plan period, they acquired 67 ships of 271,033 G.R.T. at a cost of Rs. 40.94 crores. The acquisition was not uniformly distributed over the entire plan period but was concentrated towards the last two years during which period 25 and 29 ships of 90,021 G.R.T. and 110,012 G.R.T. costing Rs. 15 crores and Rs. 20.25 crores respectively were acquired. During the third year of the plan, 5 ships of 21,042 G.R.T. at 3.97 crores were procured, while during the first two years the achievement was identical and at the same cost. The entire finance required during the last year and 50 per cent of the 4th year, was arranged through a loan granted by the Government and the rest was raised from their internal sources.

During the second plan period, (upto 1958-59) 9 steamers of about 50,000 G.R.T. were acquired by Indian shipping companies from their own resources, either on a self-financing basis or under the deferred payment system at a cost of about Rs. 3.75 crores. They have also placed orders for the construction of 14 ships of about 80,000 G.R.T. at a cost of 15 crores. To finance this commitment, loan of Rs. 12 crores has been assured to them, but they will have to find a further sum of Rs. 3 crores from their own resources.

Such information, as is available, throws light on the total cargo handled and it reveals that it has been steadily increasing from a level of 24 million tons during the pre-plan period to 32.79 million tons in 1958-59. At the end of the first plan period, the rise of 5 million tons had taken place at a uniform rate of one million ton every year.

—Extract from Commerce Annual Number 1958.

3. Either,

(i) Fit a third degree polynomial to the data given below and represent it graphically along with the fitted polynomial. (25)

(ii) Calculate also the reduction in residual variance in fitting a third degree curve as compared to fitting a second degree curve. (5)

household size	Average per capita monthly household expenditure (in rupees)
1	32.3
2	22.0
3	19.2
4	16.0
5	14.4
6	13.3
7	12.4
8	10.9
9	10.3
10	21.5
11	18.1
12	18.0
13	19.8
14	13.5

Or, The following table gives the age in years (x_1), height in inches (x_2) and weight in lbs. (x_3) of 12 males. Compute the three partial correlation coefficients and the multiple correlation coefficient of x_3 on x_1 and x_2 and test for their significance. (30)

x_1	x_2	x_3
26	66	112
25	72	130
33	68	136
22	69	156
22	69	156
31	67	128
23	70	146
31	66	126
23	67	126
40	69	138
38	64	110
25	66	110

4. (a) Solve the following equation graphically or otherwise

$$\log \left(\frac{x-1}{x+1} \right) = 3x, \text{ to three significant figures.} \quad (10)$$

(b) If $y = \frac{1000}{3\sqrt{2\pi}} e^{-\frac{x^2}{18}}$, find the value of y when $x = 5$. (5)

(c) Using statistical tables, find the value of

$$z \left(= \frac{1}{2} \log_e \frac{1+r}{1-r} \right), \text{ corresponding to the value of } r = 0.7038. \quad (5)$$

PART 1C : SECTION II

Time : 4 Hours

Full marks : 100

- (a) Figures in the margin indicate full marks.
- (b) Use of calculating machines is permitted.

1. Find the equation of the Pearsonian Type III curve which fits the following frequency distribution of daily barometric heights. (35)

class mark	frequency
28.35	1
28.65	2
28.75	8
28.95	30
29.15	74
29.35	166
29.55	368
29.75	509
29.95	656
30.15	680
30.35	353
30.65	140
30.75	30
30.95	5

2. The number of wagons loaded (in thousands) on class I Indian railways by months during the five years from 1954 to 1958 are given below:—

month	1954	1955	1956	1957	1958
January	618	671	729	785	812
February	578	632	710	728	743
March	623	676	756	812	821
April	579	633	703	774	766
May	567	606	674	759	739
June	553	576	635	680	680
July	588	609	636	680	694
August	566	614	664	687	695
September	556	611	626	683	674
October	573	631	656	712	680
November	605	648	691	731	688
December	656	718	764	788	799

Calculate indices of seasonal variation using 12 months moving averages. (20)

3. Eüher,

To investigate the yield rate of six varieties of seed (A,B,C,D,E and F) an experiment was conducted in a Latin Square arrangement. The layout and yields are given below:—

B	E	D	C	A	F
98	111	113	118	60	130
D	B	E	A	F	C
112	89	115	80	96	130
A	D	B	F	C	E
78	106	100	105	103	118
F	A	C	D	E	B
109	78	106	112	103	98
E	C	F	B	D	A
105	107	103	96	112	72
C	F	A	E	B	D
102	98	70	104	93	120

(i) Prepare the analysis of variance table.

(ii) Test for significance of the differences between the varieties in respect of yield.

(iii) Does variety D give more yield than variety A? (20)

Or,

(a) The table below gives the values of a function $F(x,y)$ for some specific values of x and y .

x	y			
	2	4	6	8
5	13.27	11.39	10.67	10.29
10	7.50	5.99	5.39	5.06
15	6.36	4.89	4.32	4.00
20	5.85	4.43	3.87	3.50

Find by interpolation the value of $F(x,y)$ when $x = 6$ and $y = 2$. (15)

(b) Evaluate the following determinant :— (5)

$$\begin{vmatrix} 7 & 16 & 13 \\ -8 & 4 & 13 \\ 14 & 5 & -7 \end{vmatrix}$$

4. Average monthly expenditure per person in 1951 on food items and the average prices of these items in 1951 and 1958 are given below :—

item	expenditure per person (Rs.)	price per maund (Rs.)	
		1951	1958
(1)	(2)	(3)	(4)
food grains	17.61	0.53	0.62
pulses	4.37	0.65	0.72
oils	6.30	2.50	3.12
vegetables	7.59	0.53	0.62
milk	15.17	0.75	0.87
meat and fish	7.33	2.12	2.62
fruits	2.86	2.25	2.62
salt	0.26	0.08	0.12
spices	2.06	2.75	3.75
sugar	3.60	0.80	1.06

Calculate a suitable index of food prices in 1958 with the year 1951 as base. (15)

5. From the publications made available to you, prepare a neat table showing (10)

Either,

(a) monthly indices of industrial production (base : 1951 = 100) for India during the later half of 1957 (July-December) in respect of industry groups specified below : [If figure for any month is not available put a cross mark].

(i) tobacco manufacture, (ii) manufacture of textiles, (iii) manufacture of rubber products, and (iv) basic metal products.

Or,

(b) "Economic indicators" by months for 1957 (India) specified below :—

(i) registration in employment exchange, (ii) coal raisings, (iii) output of finished steel, (iv) output of cement, (v) value of imports and (vi) value of exports.