SHIKSHA CLASSES

Subject : Algebra **Answer Paper** **Marks : 20**

Class : X **6. Statistics**

Q.1 : A) Choose the correct alternative of the following questions. **2**

1) If the numbers in data are arranged in ascending order, the number at the middle position is called as

Ans: c) Median

2) An experiment can have.

Ans: b) Many out come

B) If for the given values. **1**

c. f. = 22, L = 30 f =18, h = 10, N = 70 then find median

Ans: ∴ Given that,

cf = 22, L = 30 F= 18, h = 10 and N = 70

$$\therefore \text{Median} = L + \left[\frac{N/2 - cf}{f}\right] \times h$$

$$= 30 + (35.5 - 22) \times \frac{10}{18}$$

$$= 30 + (13.5) \times \frac{10}{18}$$

$$= 30 + 7.5$$

∴ Median = 37.5

Q.2 : A) Attempt any ONE of the following. **2**

1) The following table shows the number of students and the time they utilized daily time spent by students for their studies by direct method.

Time (hrs) No. of	0-2	2-4	4-6	6-8	8-10
Students	7	18	12	10	3

Time (hrs.)	Class Marks	Frequency	Class mark x Frequency x_i / f_i
0 – 2	1	7	$\boxed{1 \times 7} = 7$
2 – 4	3	18	$3 \times 18 = \boxed{54}$
4 – 6	5	12	$5 \times 12 = \boxed{60}$
6 – 8	7	10	$7 \times 10 = \boxed{70}$
8 – 10	9	3	$3 \times 9 = \boxed{21}$
		$N = \Sigma f_i = \boxed{50}$	$\Sigma x_i f_i = \boxed{218}$

$$\text{Mean } \bar{x} = \frac{\Sigma f_i x_i}{\Sigma f_i} = \frac{\boxed{218}}{\boxed{50}} = 4.36 \text{ hrs.}$$

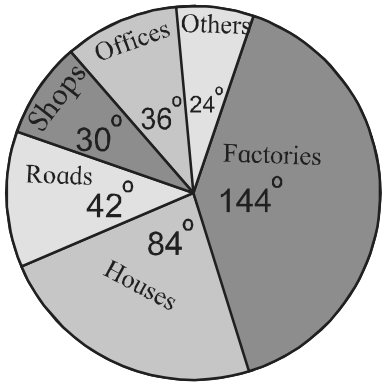
2) The following table shows the daily supply of electricity to different place in a town show the information by a pie diagram.

Places	Factories	Houses	Roads	Shops	offices	Other
Supply of electricity	24	14	7	5	6	4

Ans: 1

Supply of electricity	Unit	Measure of contral angle
Factories	24	$\frac{24}{\cancel{60}} \times \overset{6}{\cancel{360}} = 144^0$
Houses	14	$\frac{14}{\cancel{60}} \times \overset{6}{\cancel{360}} = 84^0$
Roads	7	$\frac{7}{\cancel{60}} \times \overset{6}{\cancel{360}} = 42^0$
Shops	5	$\frac{5}{\cancel{60}} \times \overset{6}{\cancel{360}} = 30^0$
Offices	6	$\frac{6}{\cancel{60}} \times \overset{6}{\cancel{360}} = 36^0$
Others	4	$\frac{4}{\cancel{60}} \times \overset{6}{\cancel{360}} = 24^0$

∴ The pie diagram



B : Attempt any ONE of the following. 2

1) The percentage of marks of 50 students in a test is given in following table. Find the mean of the percentage.

Percentage of marks	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
No. of Students	3	7	15	20	5

Class (Percentage ofmarks)	Class Marks x_i	Frequency (No. of students)f_i	Class mark x Frequency x_if_i
0-20	10	3	30
20-40	30	7	210
40-60	50	15	750
60-80	70	20	1400
80-100	90	5	450
		$N = \Sigma f_i = \boxed{50}$	$\Sigma x_if_i = \boxed{2840}$

$$\bar{x} = \frac{\Sigma f_i x_i}{\Sigma f_i}$$

$$= \frac{2840}{50} = 56.8$$

$\therefore$ The mean of percentage = 56.8.

2) The maximum temperature in °C of 30 towns in the last summer, is shown in the following table. Find mean of the maximum temperatures.

Max. temp.	24 – 28	28 – 32	32 – 36	36 – 40	40 – 44
No. of towns	4	5	7	8	6

Class (Temp °C)	Class Marks x_i	Frequency f_i	Class mark x Frequency x_if_i
24-28	26	4	104
28-32	30	5	150
32-36	34	7	238
36-40	38	8	304
40-44	42	6	252
		$N = \Sigma f_i = 30$	$\Sigma x_if_i = 1048$

$$\text{Mean} = \bar{x} = \frac{\Sigma x_i f_i}{\Sigma f_i} = \frac{1048}{30} = 34.9°C$$

Q.3 : A) Attempt any ONE of the following. 3

1) Grouped frequency distribution of supply of milk to hotels and the no. of hotels is given in the following table. Find the mode of the supply of milk.

Milk (Litre)	1 – 3	3 – 5	5 – 7	7 – 9	9 – 11	11 – 13
No. of hotels	7	5	15	20	35	18

Class	Frequency
1 – 3	7
3 – 5	3
5 – 7	15
7 – 9	20 f_0
9 – 11 Modal class	35 f_1
11 – 13	18 f_2

$\therefore$ Modal class is 9-11.

$\therefore$ $f_1 = 35,\ f_0 = 20,\ f_2 = 18$

$L = 9,\ h = 2$

$$\text{Mode} = L + \boxed{\frac{f_1 - f_0}{2f_1 - f_0 - f_2}} \times \boxed{h}$$

$$= 9 + \left[\frac{35 - 20}{2 \times 35 - 20 - 18}\right] \times 2$$

$$= 9 + \boxed{\frac{15}{32}} \times \boxed{2}$$

$$= 9 + \frac{30}{32}$$

$$= 9 + \boxed{0.9375}$$

Mode = 9.94 litre.

2) The following table shows ages of 300 patients getting medical treatment in a hospital on particular day.

Age (in years)	10-20	20-30	30-40	40-50	50-60	60-70
Number of patients	60	42	55	70	53	20

Find the median age of the patient.

Ans:

Age (in yrs)	**Number of Patients**	**C. F. (Less than type)**
10-20	60	60
20-30	42	60 + 42 = 102
30-40 Median class	55 *f*	102+55=157c.f.
40-50	70	157 + 70 = 227
50-60	53	227 + 53 = 280
60-70	20	280 + 20 = 300

N = 300, $\frac{N}{2} = 150$

C. F. which is just greater than 150, 157 i.e.

$\therefore$ 30 - 40 is the median class.

L = 30, *f* = 55 c. f. = 102 h = 10

$$\therefore \text{Median} = L + \left[\frac{\frac{N}{2} - \text{c.f.}}{f}\right] \times h$$

$$= 30 + \left[\frac{150 - 102}{55}\right] \times 10$$

$$= 30 + \left[\frac{48}{55}\right] \times 10$$

$$= 30 + \frac{480}{55}$$

= 30 + 8.73

Median = 38.73 yrs.

$\therefore$ Median age of patient is 38.73 yrs

B) Attempt any ONE of the following. 3

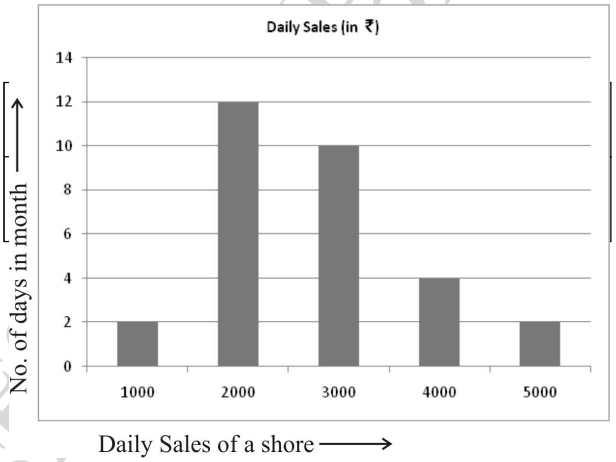
1) Draw the histogram to represent the following data.

Daily Sales of a Store (in ₹)	0-1000	1000-2000	20 00-3000	3000-4000	4000-5000
No. of days in month	2	12	10	4	2

Ans:

Scale on x - axis : 2 cm. = ₹ 1000

on y axis : 1cm = 2 days



2) The following table shows frequency table of daily wages of 50 workers in trading company. Find the mean wages of a worker, by assumed mean method.

Daily wages	**200-240**	**240-280**	**280-320**	**320-360**	**360-400**
Freq-uency	**5**	**10**	**15**	**12**	**8**

Ans: Let us assumed mean A = 300

Class (₹wage)	Class mark x_i	$d_i = x_i - A$ $d_i = x_i - 300$	Frequency (No. of workers) f_i	Frequency x Deviation $f_i x d_i$
200-240	220	–80	5	–400
240-280	260	–40	10	–400
280-320	300 A	0	15	0
320-360	340	40	12	480
360-400	380	80	8	640
Total			$\Sigma f_i = 50$	$\Sigma f_i d_i = 320$

$$\bar{d} = \frac{\Sigma f_i d_i}{\Sigma f_i} = \frac{320}{50} = 6.4$$

Mean $\bar{x} = A + \bar{d}$

$= 300 + 6.4$

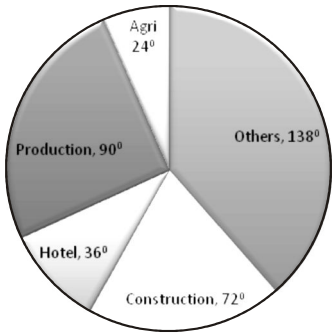
$= 306.40$

The mean of daily wages = 306.40 ₹.

Q. 4 : Attempt any ONE of the following. 4

1) As deduced from a survey, the classification of skilled workers is shown in the pie diagram.

If the no. of workers in the production sector is 4500



Answer the following questions.

i) What is the total number of skilled workers in all fields?

ii) What is the number of skilled workers in the field of constructions?

iii) How many skilled workers are in agriculture?

iv) Find the difference betⁿ the no.s of workers in the field of production and construction.

Ans: i) Suppose, the total no. of skilled workers in all fields.

∴ The central angle for y persons is = 360^0

∴ Central angle no. of persons in production field.

= No. of persons in production field $\times 360$

$\therefore 90 = \frac{4500}{y} \times 360$

$y = \frac{4500}{\cancel{90}} \times \overset{4}{\cancel{360}}$

$\therefore y = 4500 \times 4 = 18000$

∴ The total no. of skilled workers in all the fields = 18000

ii) Central angle for construction sector is 72^0

$\therefore 72 = \frac{\text{No. of persons in construction}}{18000} \times 360$

$\frac{\overset{2}{72} \times 1800\cancel{0}}{\cancel{360}_{1}} = \text{No. of persons in construction}$

∴ No. of persons in construction field = 3600

iii) The central angle for agriculture field is 24^0

$\therefore 24 = \frac{\text{No. of workers in agriculture}}{\text{Total skilled workers}} \times 360$

$\therefore 24 = \frac{\text{No. of workers in agriculture}}{18000} \times 360$

$\therefore$ No. of workers in agriculture

$= \frac{\overset{12}{\cancel{24}} \times \overset{1}{\cancel{18000}}}{\cancel{360}_{\cancel{2}}}$

$= 12 \times 100$

$= 1200$

iv) The difference betⁿ angles relating fields of production and construction

$= 90^0 - 72^0 = 18^0$

∴ The difference betⁿ the central angles

$= \frac{\text{Difference betⁿ no. of workers in the fields}}{\text{Total no. of skilled workers}} \times 360$

$\therefore 18 = \frac{\text{Difference betn the no. of workers in the fields}}{18000} \times 360$

∴ Differere betⁿ the no. of workers

$= \frac{\overset{900}{\cancel{18}} \times \cancel{18000}}{\cancel{360}_{\cancel{2}}} = 900$

2) Draw a pie diagram to represent the world population of countries given in the following table after determining the following table after determining the value of a

Country	India	China	Russia	USA	Others	Total
Percentage Popⁿ	15	20	a	a	25	100

Ans. ∴ By given table,

$15 + 20 + a + a + 25 = 100$

∴ $60 + 2a = 100$

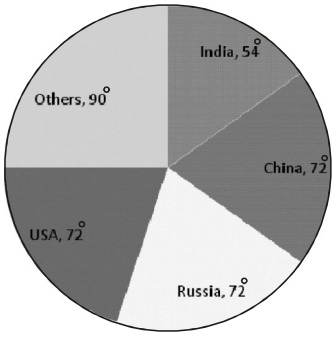
$2a = 100 - 60$

$2a = 40$

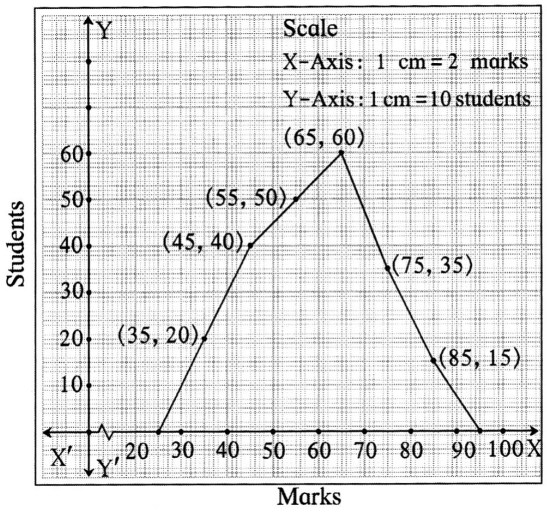
∴ $a = 20$

Country	Percentage of pop^n	Measure of central angle
India	15	$\frac{15}{100}\times 360^0 = 54^0$
China	20	$\frac{20}{100}\times 360^0 = 72^0$
Russia	20	$\frac{20}{100}\times 360^0 = 72^0$
USA	20	$\frac{20}{100}\times 360^0 = 72^0$
Others	25	$\frac{25}{100}\times 360^0 = 90^0$
Total	100	360^0

From the above table, the pie - diagram.



Q.5: 1) Observe the following frequency polygon and write the answers of the questions below it.



i) Which class has the maximum no. of students?

Ans: 60 -70

ii) Write the classes having zero requency.

Ans: 20 -30 and 90-100

iii) What is the class mark of the class having frequency of 50 students?

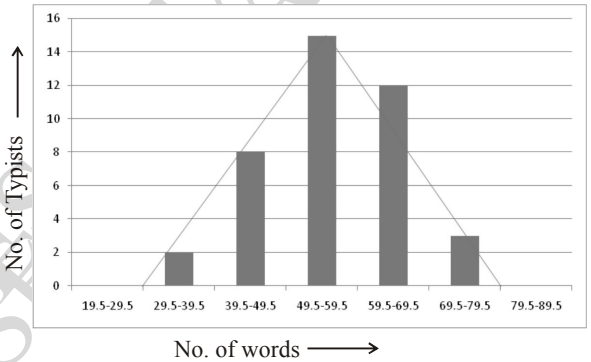
Ans: 55

2) Represent the following data using histogram and hence draw frequency polygon.

No. of words typed per minute	30 – 39	40 – 49	50 – 59	60 – 69	70 – 79
No. of typists	2	8	15	12	3

Ans:

No. of words typed per minute	19.5 – 29.5	29.5 – 39.5	39.5 – 49.5	49.5 – 59.5	59.5 – 69.5	69.5 – 79.5	79.5 – 89.5
No. of typists	0	2	8	15	12	3	0



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