Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back Exam – 2080 Mangsir/Poush

Program:	**Health All**	**Full Marks: 60**
Year/Part:	**1st Year (2016)**	**Pass Marks: 24**
Subject:	**Mathematics and Statistics**	**Time: 3 hrs.**

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Group 'A' [8×1=8]

Attempt ALL questions.

1. Rewrite the following using absolute value sign:
   $-3<x<1$
2. How many ways can 5 colours be arranged in a line from 7 different colours?
3. Find $\frac{dy}{dx}$ when $y = \frac{1}{\sqrt{2x^2+7x+5}}$.
4. Integrate: $\int cos^2x \; dx$
5. Find the value of x and y if $\begin{bmatrix} 2 & x-y \\ x+y & 4 \end{bmatrix} = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$.
6. What will be the median of a skew symmetric if mean=35 and mode=25?
7. Calculate the SD from the following data: 8, 9, 15, 23, 5, 11, 19, 10, 12
8. The population of certain city was 40,000 and died all together 35 people during that year. Find Crude Death Rate (CDR).

Group 'B' [8×2=16]

Attempt ALL questions.

9. Let $f:R\rightarrow R$ be defined by $f(x)=2x+1$ and $g:R\rightarrow R$ be defined by $g(x)=x^2+2$ then find fog(x) and gof(x).
10. Find the angle between two lines represented by $x^2-7xy+12y^2=0$.
11. Evaluate: $\lim_{x\to 0} \frac{1-cos6x}{x^2}$
12. Integrate: $\int tanx \; dx$
13. Draw the histogram and frequency polygon of the following data:

X	10-20	20-30	30-40	40-50	50-60
F	3	5	11	4	2

Cont. .....

14. Find the median from the following data:

X	10	20	30	40	50
F	13	17	12	9	5

15. Find the coefficient of correlation between x and y when Cov (x, y)=16.5, var(x)=2.89 and var(y)=100.
16. Write down the functions of statistics.

Group 'C' [9×4=36]

Attempt ALL questions.

17. Out of 500 HIV patients in their AIDS stage 325 were suffering from, Tuberculosis, 230 were suffering from Diarrhoea. If all the patients were suffering from at least one of them, find how many of them were suffering from both.

OR

If $\frac{\log x}{y-z} = \frac{\log y}{z-x} = \frac{\log z}{x-y}$ prove that $x^x y^y z^z = 1$.

18. Find the 4th term in the expansion of $\left(\frac{4x}{7} - y^3\right)^6$.

OR

A coin tossed three times. Find the probability of getting:

a. exactly two heads b. at least one heads

19. Find from first principle the derivatives of $y = \sqrt{\sin 4x}$

OR

Find local maxima and minima of $f(x)=2x^3-3x^2+36x$

20. Integrate: $\int \frac{x^2}{\sqrt{a^2-x^2}}\, dx$
21. Prove that:

$$\begin{vmatrix} 1+x & 1 & 1 \\ 1 & 1+y & 1 \\ 1 & 1 & 1+z \end{vmatrix} = xyz\left(1+\frac{1}{x}+\frac{1}{y}+\frac{1}{z}\right)$$

22. Calculate the SD and CV from the following data:

Class	10-20	20-30	30-40	40-50	50-60
Frequency	7	8	12	10	3

23. Calculate the coefficient of correlation from the following data:

X	6	2	10	4	8
Y	9	11	5	8	7

24. Calculate the general fertility rate, age specific fertility rate and total fertility rate for the following data:

Age Group	15-19	20-24	25-29	30-34	35-39	40-44	45-49
No of Women (00)	220	280	265	205	150	75	55
No. of Live Birth	750	2850	2200	1550	500	120	80

25. What do you mean by research? Write in short about characteristics of scientific method of research.

OR

What do you mean by report writing? Write steps in report writing.

Good Luck !