

GRADE XI  
**Applied Mathematics**

Model questions

विद्यार्थीले सकेसम्म आफ्नै शब्दमा उत्तर दिनुपर्नेछ । दायाँ किनारामा दिइएको अङ्कले पूर्णाङ्क जनाउँछ ।

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

Time : 3 Hrs.

Full Marks: 75

**Attempt all questions.**

**Group A (1 × 11 = 11)**

1. If a shoe manufacturing company wants to know the most demanding number of shoes, which one of the following measures represents the best central value?
 

a. Mean	c. Mode
b. Median	d. Range
2. How much 'Aana' consists in one 'Kathha'?
 

a. 10.65	b. 65.10
c. 11.65	d. 65. 11
3. If the area and the breadth of a rectangular table are  $24x^2y - 18xy^2$  and  $4x - 3y$  respectively, then the length of this table is:
 

a. $6xy$	c. $4x + 3y$
b. $4x - 3y$	d. $-6xy$
4. If the cost of 2 kg tea is the same as the cost of 3.3 kg sugar, the cost of 2.2 kg sugar is the same as the cost of 0.5 kg coffee. Then how much quantity of tea is same as 2 kg of coffee in terms of cost?
 

a. 5.3 kg	c. 3.5 kg
b. 0.75 kg	d. 7.5 kg
5. If a person has two children and there are 5 colleges in his/her town. In how many different ways the person can admit his/her children among those 5 colleges in the condition that both children do not want to admit to the same college?
 

a. 10	b. 20
c. 25	d. 5
6. A shopkeeper wants to buy stationery items costing Rs. 50 per unit and playing items costing Rs. 200 per unit. But the person has only Rs 20,000. Let x and y be the number of stationary and playing items respectively. Then, which one of the following mathematical models best describes the given condition so as to decide the maximum number of items to buy?
 

a. $50x+200y = 20000$	c. $50x+200y < 20000$
b. $50x+200y \leq 20000$	d. $50x+200y > 20000$
7. A student has a probability of getting a grade A in mathematics on a test is 0.55 and getting a grade B is 0.40. What is the probability that the person will get both grades?

- a. 0.95
- b. 0.22
- c. 0
- d. 0.73

- 8. What is the probability of getting 5 Saturdays in a month of 30 days?
  - a.  $2/7$
  - b.  $1/6$
  - c.  $5/7$
  - d.  $1/7$
- 9. How many numbers of three different digits less than 500 are formed?
  - a. 400
  - b. 288
  - c. 24
  - d. 27

10. Observe the following table carefully and select the best value in the missing place.

X	2	5	7	10
Y	10	22	30	?

- a. 44
  - b. 50
  - c. 42
  - d. 38
11. If  $x=y$  in every point  $(x,y)$  on a straight line then which of the following statement is true?
  - a. The straight line is X axis.
  - b. The straight line is Y-axis
  - c. The straight line through the origin and divides the first and third quadrants into equal two half.
  - d. The straight line through the origin and divides the second and fourth quadrants into equal two half.

**Group B (5 × 8 = 40)**

12. If consistency in the scores is the criteria for awarding the students, who should get the award based on the following performance of two students X and Y in six tests of 100 full marks? [5]

X	56	72	48	69	64	81
Y	63	74	45	57	82	63

13. If the height of a square-shaped room is 10 feet and the volume of the same room is 1440 cube feet. If the room has a door with 7 feet height whereas its breadth is half of the height. And, the room has two windows covering the area double than the area of the door. How much should a person pay for plastering on the 6 faces of the room at the rate of Rs. 20 per square feet? [5]
14. If the distance between two cities A and B is 40 Km and the distance between cities B and C is 50 km. How much time does a person need to travel from A to C through B if the person can maintain the speed of 30Km per hour in the beginning and then he can increase the speed by 10 Km more for each next 20 Km?[5]
15. Look at the following tariff rates of electricity consumption shared by the Nepal Electricity Authority.

कि.वा. घण्टा (मासिक)	५ एम्पियर		१५ एम्पियर		३० एम्पियर		६० एम्पियर	
	न्यूनतम शुल्क रु	इनर्जी शुल्क (रु प्रति कि.वा. घण्टा)	न्यूनतम शुल्क रु	इनर्जी शुल्क (रु प्रति कि.वा. घण्टा)	न्यूनतम शुल्क रु	इनर्जी शुल्क (रु प्रति कि.वा. घण्टा)	न्यूनतम शुल्क रु	इनर्जी शुल्क (रु प्रति कि.वा. घण्टा)
०-१०	३०	०	५०	४१००	७५	५१००	१२५	६१००
११-२०	३०	३१००	५०	४१००	७५	५१००	१२५	६१००
२१-३०	५०	६१५०	७५	६१५०	१००	६१५०	१२५	६१५०
३१-४०	५०	८१००	७५	८१००	१००	८१००	१२५	८१००
४१-१००	७५	९१५०	१००	९१५०	१२५	९१५०	१५०	९१५०
१०१-१५०	१००	९१५०	१२५	९१५०	१५०	९१५०	२००	९१५०
१५१-२५०	१२५	१०१००	१५०	१०१००	१७५	१०१००	२००	१०१००
२५१-४००	१५०	१११००	१७५	१११००	२००	१११००	२५०	१११००
४०० माथि	१७५	१२१००	२००	१२१००	२२५	१२१००	२७५	१२१००

If A has a meter box of 15-ampere capacity and consumes 188 units in a month and B has a meter box of 30-ampere capacity and consumes 175 units in a month. Decide which will pay more electricity bill? [5]

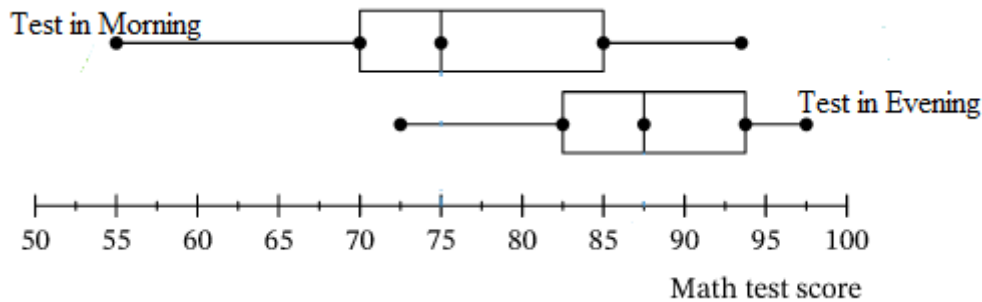
16. To prepare a team for the volleyball game, 6 persons are to be selected including 2 girls. In how many different ways such groups can be formed from 10 boys and 4 girls? [5]
17. Define independent events with an example.

A person wins the game if she/he obtains head on the coin and even number in the dice while tossing a coin and rolling a dice simultaneously. What is the probability of winning the game by the person? [2 + 3]

18. A farmer can buy two types of fertilizers. A bag of fertilizer M costs Rs. 50 and contains 6 kg of nitrogen and 3 kg of potassium. Another bag of fertilizer N costs Rs. 40 and contains 3 kg of nitrogen and 3 kg of potassium. If the farmer wants to add at least 30 kg of nitrogen and at least 18 kg of potassium to each plot of land, formulate a mathematical model for minimizing the cost of fertilizing a plot of land. Also, solve it. [5]
19. In a book, there are 825 pages and each page contains 45 lines.
- How many lines should be there on one page if the entire book should be completed in 700 pages? [2]
  - If a page consists of 50 or more lines, the cost of typing the page is Rs. 25 whereas per page typing cost is Rs 20 when the page consists of less than 50 lines. In which of the form (printing the books with 825 pages or 700 pages) will the cost be minimum? [3]

**Group C (8 × 3 = 24)**

20. The following box plots describe the scores of students in the test of mathematics taken in the evening and in the morning.



Now, compare and explain the scores of the students based on the following parameters:

- a. Median values [3]
- b. Deviation on the scores [3]
- c. Taking math tests in the morning results better grades than taking the test in the evening. Do the data support this argument?[2]

21. a. What do you mean by decision alternatives? Describe with an example. [2]
- b. Define decision-making under certainty with examples. [2]
- c. Mr. Indramani has Rs. 1,00,000 to invest in one of the three options A, B, C. The return on his investment depends on whether the economy experiences as inflation, recession or no change at all. The possible returns under each economic condition are given below:

Options	State of Nature		
	Inflation	Recession	No change
A	20000	10000	15000
B	30000	8000	10000
C	25000	12000	18000

Suggest the best option to invest using minimax and maximin criteria. [4]

22. a. What is the difference between simple and compound partnerships? [2]
- b. Two persons A and B started a business in partnership. A contributed Rs. 30,000 and B contributed Rs. 75,000. At the end of 6 months, C joined as a passive partner, who contributed Rs. 45,000. They arranged that A and B shall share equally 20% of the profits and all three will share the remaining. The profit for the first 6 months is Rs 21,000 and for the second six months Rs 27,000. How much A, B and C get from the business at the end of the year? [6]