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#### BCSE/Maths/2008

#### **Section A (2 x 10 = 20 marks)**

#### Answer all questions

#### **Question 1**

- StudentBounts.com One dimension of the product matrix of two matrices is  $5 \times 2$ . What are the dimensions of the (i) two matrices?
  - $5 \times 2, 4 \times 2$ Α. B.  $5 \times 4, 4 \times 3$ С  $2 \times 5, 5 \times 2$ D.  $5 \times 2, 2 \times 2$

Answer.....

The value of *m* in the radicals  $5\sqrt{3} \times 4\sqrt{3} + \sqrt{32} - 60 = m\sqrt{2}$  is. (ii)

> $4\sqrt{2}$ A. B. 5 C. 4  $4\sqrt{3}$ D.

Answer.....

(iii) w as the function of x in the expression 3w+8x=7 is.

A. 
$$f(x) = \frac{7 - 8x}{3}$$
  
B.  $f(w) = \frac{7 - 3w}{8}$   
C.  $f(x) = \frac{8x - 7}{3}$   
D.  $f(w) = \frac{3w + 7}{8}$   
Answer.....

Which of the following is the most efficient shape with a constant perimeter? (iv)

- Regular Hexagon A.
- Regular Octagon B.
- Regular Quadrilateral C.
- Regular Pentagon D.

Answer.....

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(v) The value of x in the quadratic equation  $5x-6=x^2$  is.

A. x = 2,3B.  $x = \frac{5}{6},1$ C. x = 5,6D.  $x = \frac{2}{3},\frac{1}{2}$ 

Answer.....

(vi) The equation of the parabola that would result from composite transformation of  $(x, y) \rightarrow (x+4, -3y+6)$  to the graph of  $y = x^2$  is.

A.  $y = 6(x-4)^2 - 3$ B.  $y = 3(x-4)^2 - 6$ C.  $y = -3(x+4)^2 + 6$ D.  $y = -3(x-4)^2 + 6$ 

Answer.....

(vii) The probability of drawing a club and then a heart from a deck of 52 cards, if the first card is replaced would be.

А.	$\frac{1}{26}$
B.	$\frac{1}{16}$
C.	$\frac{1}{4}$
D.	$\frac{1}{52}$

Answer.....

(viii) The area of the parallelogram given below is



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(ix) What is the bearing of the single vector for the trips below?



C. 230 degreesD. 310 degrees

A.

B.

Answer.....

(x) The number of lines of symmetry in a regular hexagon is.

 A.
 5

 B.
 6

 C.
 7

 D.
 8

Answer.....

#### Section B (32 marks)

#### Answer all questions

#### **Question 2**

Find the value of x, y, z in the matrices,  $\begin{bmatrix} 1 & 2 & 3 & 0 \\ -1 & x & 4 & 1 \end{bmatrix} \begin{bmatrix} y & 3 \\ 1 & 2 \\ 0 & 1 \\ -1 & 0 \end{bmatrix} = \begin{bmatrix} 6 & z \\ -2 & 7 \end{bmatrix}$ . [3]

# Question 3 Kinley invested Nu 25000 in RICBL shares with a face value of Nu 100 and sold at par. a. How many shares can he buy?

b.	If a dividend of 15% is paid, find the annual divide	nd earned by him. [1]	]

c. What will be the yield percentage on his investment? [1<sup>1</sup>/<sub>2</sub>]

#### **Question 4**

Solve the system of linear equations given below.

a. y = 4x - 1 and 2x + 3y = 11

[2]



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## Question 5

on 5 a. Sketch the graph of the inequality 3x-4y < 12 (use graph r given below)



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ii. 992 to 1 significant figure

#### **Question 7**

Show that f(x) and g(x) are equivalent, where  $f(x) = 3x^2 - 5x - 28$  and g(x) = (3x+7)(x-4)respectively. [3]



[11/2]

#### **Question 8** Create an equation with the solution, x = 2 and x = 3.

#### **Question 9**

The data below shows the ages of the siblings of students in Pemba's class.

6	9	13	18	21	14	26	30	24
26	11	7	14	16	10	23	26	20
10	17	21	22	24	24	14	22	5
26	12	23	21	20	17	18	11	9

a. Construct a Stem and Leaf plot of the data.

1.	Use the date to find the median and the mede	F11/_1
D.	Use the data to find the median and the mode.	[172]

#### Question 10

Wangmo randomly chooses an integer from 1 to 50.

	Even Even	t A: t B:	The integer is even. The integer is a multiple of 4.	
a.	What i.	t is the p Event	probability of each of the following? t A happening?	[1]
	ii.	Event	B happening?	[1]
	iii.	Event	t A and B both happening?	[1]

#### **Question 11** Find the values of x and y for the triangle given below.





[2]

#### Question 12

A ladder leaning against a wall forms a  $30^{\circ}$  angle with the wall at the top of the ladder. If the ladder reaches 3.5 metres up the wall, how long is the ladder.

### **Question 13**

Using deductive reasoning prove that  $\angle A = \angle D$  in the following triangles. [2]



#### **SECTION C** $(8 \times 6 = 48 \text{ marks})$

StudentBounty.com Under this section, there are 8 questions (question numbers 14 -21). Each question has two pairs I and II. Attempt either I or II from each question.

Question 14 (I) If  $A = \begin{bmatrix} 2 & 3 \\ 0 & -1 \end{bmatrix}$ ,  $B = \begin{bmatrix} 4 & 2 \\ 0 & 0 \end{bmatrix}$  and  $C = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ , then find (i) 2A + 3B, (ii) A(B+C). a.





i. Make an adjacency matrix for the digraph above. [1]

[3]

Make use of your adjacency matrix to find out the number of one-stop over trips between ii. each pair of vertices. [2]





#### Question 14 (II)

a. The coordinates of the three vertices of a triangle are listed in the matrix given below. [3]

$$T = \begin{bmatrix} 4 & 8 & -1 \\ 0 & 3 & 2 \end{bmatrix}$$

i. Plot the points on the grid.



iii. Plot the new coordinates on the same grid.



- b. i. Make a digraph for this adjacency matrix.
  - $\begin{array}{cccc} A & B & C \\ A & \begin{bmatrix} 1 & 0 & 1 \\ 1 & 1 & 0 \\ C & 0 & 2 & 1 \end{bmatrix}$

ii. Use the adjacency matrix to find out the two-stop over trips between A to C. [2]

#### Question 15 (I)

a. Pema is a sales person at a garment store. He is paid Nu 1500 each month plus an additional 5% commission on his sales amount. His goal is to earn a minimum of Nu 7500 each month. What should be the minimum amount of monthly sales he should make? [3]



ii. Solve for x, 
$$\frac{5\sqrt{27} - 3\sqrt{12}}{\sqrt{x}} = \sqrt{3}$$
. [11/2]

OR

#### Question 15 (II)

 a. Ugyen borrowed Nu 30,000 at a certain rate of interest compounded quarterly. The balance was Nu 27,900 after making his first repayment of Nu 3000. What was the rate of interest? [3]



b. i. Simplify,  $\frac{\sqrt{32} + \sqrt{50} - \sqrt{8} - \sqrt{72}}{\sqrt{2}}$ .

ii. Solve for x,  $(\sqrt{x} + \sqrt{22})(\sqrt{x} - \sqrt{22}) = 35$ .

[11/2]

### Question 16 (I)

- StudentBounty.com Dorji invests some amount earning at 5.2% interest and some amount earning at 5. a. interest.
  - i. Write an equation to describe the total interest.

i. Write a function that calculates the amount invested at 5.5% if you know the amount at 5.2%. [11/2]

The perimeter of a rectangle is 148 cm. The length is 12 cm greater than the width. b. What are the length and the width? [3]



b. Write an inequality to the graph given below:



[3]



- ii. Which triangle is more efficient?
- b. Two cylinders are of equal volume of 785cm<sup>3</sup>. The diameters of their bases are 10 cm and 12 cm respectively. Find the heights of the two cylinders and determine which is more efficient. [3]

[1]



<b>;;</b>	Which of the two share	as is more afficient?	Why?	[1]
п.	which of the two shap	es is more efficient?	wily?	

b. i. What is the total surface area of a cube with an edge length of 3.5 cm? [1]

ii. Determine the radius of a sphere with the same surface area as that of the cube above. [2]



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#### OR

#### Question 18 (II)

ii.

Solve |3x+1| + 4 = 10

a. The hypotenuse of a right triangle is 18 units longer than its base. The height is 3 units longer than the 3 times the base. How long is the hypotenuse? [4]

Solve the quadratic equation,  $4x^2 - 17x = 15$ b. [2]

#### Question 19 (I)

Use the stem and Leaf plot given below to answer the questions that follow. Vehicle speed on Japanese highways (Km/hr) [3] a. STEM LEAF 2 8 8 5 5 8 7 8 0 2 6 8 6 6 8 2 3 4 5 7 9 2 8 9 1 8 8 9 6 2 2 4 7 10 0 8

8

9

i. How many vehicles had their speeds measured?

1

1

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- How many vehicles were travelling under 90 Km per hour? ii.
- StudentBounts.com If the maximum speed limit was 90 Km/hr, how many vehicles were exceeding iii. the limit?
- What is the range of speed? iv.
- What is the median speed? v.
- The table below shows the age of some people and the number of hours they spend b. in physical activity each week. [3]

Age	20	22	30	30	34	26	26	18	36	36	28	30	40	35
Hours	15	11	6	7	6	14	8.5	16	3	6	11	9	3	4

i. Create a scatter plot of the data.

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#### ii. What type of correlation is shown?

iii. Estimate the value of the correlation coefficient.

#### OR

#### Question 19 (II)

studentBounts.com A manufacturer of batteries for lap top computers tested a sample of lap tops to see a. how long the charges in the batteries would last. Here are the results of the test. [3]

Battery life (in minute)	Frequency
260-270	2
270-280	3
280-290	5
290-300	7
300-310	5
310-320	4

Create a histogram and a frequency polygon i.



#### What is the distribution from the shape of the frequency polygon? ii.





- ii. Which scatter plot shows negative correlation?
- iii. Which scatter plot shows no correlation?
- iv. Which scatter plot shows a weak negative correlation?
- v. Which scatter plot shows strong positive correlation?

[3]

### Question 20 (I)

StudentBounty.com From the top of a cliff, the angle of depression towards a car is  $30^{\circ}$ . If the cliff is 60 metres high, how far is the car from the base of the cliff? [4] a.

What is the value of x? b.





ii. Represent the trip from A to D by a single vector, and find its bearing and distance.





ii. What would be its Cosine and Cotangent values? [1]

[2]

#### Question 21 (I)

on 21 (I) Draw a triangle, and construct two circles in such way that one of the circles touchevertices and the other circle touches all its edges. a.

b. How many planes of symmetry does a regular pentagon based prism have? How many such planes of symmetry would a sphere have? [3]

#### OR

Question 21 (I) Draw any triangle, and construct its centroid. a.

Which has got more axes of rotation, a sphere or a cylinder? [11/2] b. i. How many lines of symmetry does a circle have? iii. [11/2]

[3]



For Rough Work



For Rough Work