INSTITUTE OF MATHEMATICS AND APPLICATIONS

ENTRANCE TEST FOR
M.SC. COMPUTATIONAL FINANCE - 2006

(Answer as many as you can)

Write your answers in the space provided on the right side of the question (below the word marks)

ate : 24.9.2006
ime : 10:00 A.M. - 12:00 (Noon) Total Marks : 100

ame of the Candidate: .....

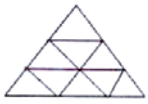
gnature of the Candidate

Total Marks Obtained

.....

Signature of the Examiner

1.	Read the following passage and answer the question based on that passage only.	**8 Marks**	**Marks awarded**
	In recent years it has become clear that man's use of fossil fuels is likely to have a major impact on the world's climate. As a result of this, increased concentrations of 'greenhouse' gases such as carbon dioxide and methane will lead to global warming - an overall small increase in average temperatures whose impact is difficult to predict. Whilst some scientists predict melting of the polar ice caps, and so a rise in sea levels, others think this will be balanced by increased precipitation at the poles		
	Tick the right answer using the above passage.		
	(a) If we go on using fossil fuels at the present rate, we must expect climatic change.	True | False | Can't Tell	
	(b) Depletion of the Ozone layer will result in global warming.	True | False | Can't Tell	
	(c) Scientists are all agreed that the use of fossil fuels will eventually lead to a rise in sea levels	True | False | Can't Tell	
	(d) Burning of fossil fuels increases the concentration of methane in the atmosphere.	True | False | Can't Tell	
2.	Two quantities A and B appear in each of the following from α to δ. Based on that, tick the right answer and cross the wrong answer against the assertions (a), (b), (c), (d).	**8 Marks**	
	(α) A: Sum of the positive divisors of 19 B: Product of the positive divisors of 19 (β) A: Average of all positive multiples of 5 less than 26. B: Average of all positive multiples of 7 less than 26 (γ) Given c and d positive numbers satisfying $\frac{1}{c} = 1 + \frac{1}{d}$ A: d B: c (δ) A: Minimum number of 5 paise stamps to be used to paste 60 paise on an envelope. B: Minimum number of 5 paise and 7 paise stamps to be used to paste 75 paise on an envelope.		
	(a) quantity A is an all cases greater than quantity B		
	(b) quantity B is in all cases greater than quantity A.		
	(c) Not all A's are greater than all B's.		
	(d) None of the above.		

3.	If ABC stands for 'Green field project', DEA stands for 'leaf is green', BEF stands for 'Field is gray' and AFG stands for 'green gray mixture'.	**4 Marks**	
	Then the symbolic notation for 'mixture is green' is		
	The symbolic notation for 'leaf is gray' is		
4.	A multiplication problem is given below where A, B, C, D are all different. A B A × A D C D	**6 Marks**	
	Tick the correct statement and cross incorrect statement below.		
	(a) B < 5		
	(b) B > D		
	(c) D > A		
5.	What number comes next in the following sequence?	**2 Marks**	
	16, 8, 4, 2, 1, 0.5, 0.25, …		
6.	If SCHOOL is written as HCSLOO and SQUARE as UQSERA, then	**4 Marks**	
	SUMMER can be written as		
	WINTER can be written as		
7.	A fashionable lady had 15 pairs of shoes all tucked in a box in a jumbled way. How many must she pick up to ensure that she has at least one pair to wear?	**2 Marks**	
8.	A pipe 'A' can fill a cistern in 2 hours and a pipe 'B' can fill in 3 hours. The pipe 'C' can empty it in 5 hours. If all the three pipes are opened for an empty cistern, how many hours are needed to fill up the cistern?	**4 Marks**	
9.	A person deposited Rs 100/- on first of January each year for four years at 5% compounded annually. How much will he get at the end of five years?	**6 Marks**	
10.	The number of triangles in the figure is 	**4 Marks**	
11.	A group of men and women were in a club meeting. When 15 men left, there remained two women for each man left. After that 45 women left leaving five men for each woman. The number of men in the original group was ?	**4 Marks**	

12.	The angle between the hour hand and the minute hand at 2:15 p.m. in degrees equals	**4 Marks**	
13.	Tick the correct answer in the box. If $\sin^6 x + \cos^6 x + 3\sin^2 x \cos^2 x = y$, then	**4 Marks**	
	$y = 4$		
	$y = 3$		
	$y = 2$		
	$y = 1$		
14.	A cylindrical container has radius 8 inches and height 6 inches. How many times the radius be increased to keep the volume of the container same when the height is halved.	**2 Marks**	
15.	A ball bounces back to half of its original height, each time it hits a smooth surface. The distance traveled by the ball till it comes to rest is	**4 Marks**	
16.	There are 100 members in a club. The club arranged a ping-pong tournament where each one was to play. He who lost was eliminated. Assume there are no draws. The number of games to be played to declare the ultimate winner is	**4 Marks**	
17.	$\log_{\sqrt{2}} 16$ equals (a) 4, (b) $2\sqrt{2}$ (c) 8 (d) $8\sqrt{2}$ Insert the correct answer as (a), (b), (c) or (d) in the box	**4 Marks**	
18.	Suppose there are 3 horses A_1, A_2, A_3 in a race with probabilities of winning p_1, p_2, p_3 respectively. A_3 felt sick and did not join the race. What is the probability of A_2 winning the race ? (a) $\frac{p_2}{1-p_3}$ (b) $\frac{p_1+p_2}{1-p_3}$ (c) $\frac{p_3}{1-p_3}$ (d) None of these Write the correct answer (a), (b), (c) or (d) in the box	**4 Marks**	
19.	Once three children were examined. None of them had written his name on the answer script. The examiner returned the scripts randomly. What is the probability that none of them got their script ? (a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{1}{6}$ (d) $\frac{5}{6}$ Insert the correct answer as (a), (b), (c) or (d) in the box	**4 Marks**	
20.	In how many ways 7 books can be arranged on shelf so that two particular books are never placed together.	**4 Marks**	

21.	If $x\Delta y = \frac{x}{y}(y-x)$. then $\frac{1}{3}\Delta\left(\frac{4}{3}\Delta\frac{2}{3}\right) =$ (a) -2 (b) $-\frac{1}{6}$ (c) $\frac{5}{12}$ (d) $\frac{4}{9}$ (e) $\frac{1}{2}$ Insert the correct answer as (a), (b), (c) , (d) or (e) in the box	**6 Marks**	
22.	Which of the following functions is differentiable once but not differentiable twice at the origin (a) $\lvert x\rvert^2$ (b) $x \sin x$ (c) $x\lvert x\rvert$ (d) $x e^x$ Insert the correct answer as (a) , (b), (c) or (d) in the box	**4 Marks**	
23.	$e^{\frac{2}{\log_a e}}$ equals (a) e^2 (b) $\log_a e$ (c) a^2 (d) e^a Insert the correct answer as (a), (b), (c) or (d) in the box	**4 Marks**	