ST. ANTHONY'S COLLEGE, SHILLONG

ENTRANCE TEST FOR ADMISSION INTO GRADUATE PROFESSIONAL COURSES 2007

Computer Science

DATE : **10 May 2007**
TIME : **2:30 pm**
DURATION : **2½ hours**

INSTRUCTIONS

☞ This test has two parts. All the questions are to be answered in the question paper itself.

☞ Part A consists of 16 questions on Mathematical Aptitude carrying a total of 40 marks. These are multiple choice type questions, and you will have to select the correct option. THIS SECTION HAS NEGATIVE MARKING. Part A is further sub-divided into 3 Modules. Each correct answer will be awarded 2 marks in Module I, 3 marks in Module II and 4 marks in Module III. For each wrong answer, 0.5 marks will be deducted in Module I, 0.75 mark in Module II, and 1 mark in Module III.

☞ Part B consists of 15 questions on Logical Ability carrying a total of 60 marks. Each correct and complete answer carries a weightage of 4 Marks. There will be NO NEGATIVE marking in this section.

☞ Write the Roll Number given on your Admit Card in the space provided in the question paper.

☞ The required rough work may be done on the space provided at the bottom of the pages and at the end of this question paper

☞ Please preserve your admit cards. They will be required at the time of admission.

☞ The admit card numbers of those shortlisted for admission on the basis of the entrance test will be published on the college notice boards and on the college web site on 16 May, 2007. The final admission will be done on a first come, first served basis, after the marksheets of the Class XII examinations of the Meghalaya Board of School Education are available, provided the eligibility criteria as laid down in the prospectus are fulfilled.

Part A: Mathematical Aptitude (40 Marks)

Cross (×) the appropriate option given for each question

Module I
(Each correct answer will be awarded 2 marks,
while 0.5 mark will be deducted for every wrong answer)

1. If ω is a cube root of unity, then a root of the following equation

    is

    ☐ $x=1$ ☐ $x=\omega$ ☐   ☐ $x=0$

2. If $\vec{a}\times\vec{b}=\vec{b}\times\vec{c}=\vec{c}\times\vec{a}$, then
    ☐ abc   ☐ -1   ☐ 0   ☐ 2

3. If   are the roots of $ax^2+bx+c=0$, then $\alpha\beta^2+\alpha^2\beta+\alpha\beta$ equals

    ☐ $\dfrac{c(a-b)}{a^2}$ ☐ 0   ☐   ☐ None of these options

4. A student is to answer 10 out of 13 questions in an examination such that he must choose at least 4 from the first five questions. The number of choices available to him is
    ☐ 346   ☐ 140   ☐ 196   ☐ 280

5. If   and the angle between $\overline{a}$ and   is $\dfrac{\pi}{6}$, then   equals

    ☐ 48   ☐ 16   ☐ $\overline{a}$ ☐ None of these options

6. Let R = {(1,3),(4,2), (2,4), (2,3), (3,1)} be a relation on the set A = {1,2,3,4}. The relation R is
    ☐ reflexive   ☐ transitive   ☐ not symmetric   ☐ a function

7. The eccentricity of an ellipse, with its centre at the origin, is 2. If one of the directrices is $x=4$ then the equation of the ellipse is

    ☐ $4x^2+3y^2=1$ ☐ $3x^2+4y^2=12$ ☐ $4x^2+3y^2=12$ ☐ $3x^2+4y^2=1$

8. If $Cos\,\alpha, Cos\,\beta, Cos\,\gamma$ are the direction cosines of a line, then the value of $Sin^2\alpha + Sin^2\beta + Sin^2\gamma$ is
    ☐ 1   ☐ 2   ☐ 3   ☐ 4

9. $\displaystyle\int \dfrac{dx}{1+e^{-x}}$ is equal to

    ☐ $\log k(1+e^x)$ ☐ $\log k(1+e^{-x})$ ☐ $\log ke^x$ ☐ $\dfrac{1}{(1+e^{-x})^2}$

SPACE FOR ROUGH WORK

Module II
**(Each correct answer will be awarded 3 marks,
while 0.75 mark will be deducted for every wrong answer)**

10. The coefficient of the middle term in the binomial expansion in powers of x of   and of $(1-\alpha x)^6$ is the same if α equals

    ☐   ☐ $\dfrac{10}{3}$ ☐ $\dfrac{-3}{10}$ ☐

11. If   are three non-coplaner vectors, then   equals

    ☐ $3\overline{u}.\overline{v}\times\overline{w}$ ☐ 0   ☐ $\overline{u}.\overline{v}\times\overline{w}$ ☐

12. If the function   where $a>0$, attains its maximum and minimum at

    p and   respectively such that   , then a equals

    ☐   ☐ 3   ☐ 1   ☐ 2

13. The probability that A speaks truth is $\dfrac{4}{5}$, while this probability for B is $\dfrac{3}{4}$. The probability that they contradict each other when asked to speak on a fact is

    ☐ $\dfrac{4}{5}$ ☐ $\dfrac{1}{5}$ ☐ $\dfrac{7}{20}$ ☐ $\dfrac{3}{20}$

14. The two lines $x = ay + b, z = cy + d$ and $x = a'y + b', z = c'y + d'$ will be perpendicular if and only if

    ☐ $aa' + cc' + 1 = 0$ ☐ $aa' + bb' + cc' + 1 = 0$
    ☐ $aa' + bb' + cc' = 0$ ☐ $(a + a')(b + b')(c + c') = 0$

15. Let $f(x) = 4$ and $f'(x) = 4$. Then $\displaystyle\lim_{x \to 2} \dfrac{xf(2) - 2f(x)}{x - 2}$ is given by

    ☐ 2   ☐ -2   ☐ -4   ☐ 3

SPACE FOR ROUGH WORK

Module III
(A correct answer will be awarded 4marks,
while 1 mark will be deducted for a wrong answer)

16. The equation of the straight line passing through the point (4,3) and making intercepts on the co-ordinate axes whose sum is -1 is

☐ $\dfrac{x}{2} - \dfrac{y}{3} = 1$ and $\dfrac{x}{-2} + \dfrac{y}{1} = 1$ ☐ $\dfrac{x}{2} - \dfrac{y}{3} = -1$ and $\dfrac{x}{-2} + \dfrac{y}{1} = -1$

☐ $\dfrac{x}{2} + \dfrac{y}{3} = 1$ and $\dfrac{x}{2} + \dfrac{y}{1} = 1$ ☐ $\dfrac{x}{2} + \dfrac{y}{3} = -1$ and $\dfrac{x}{-2} + \dfrac{y}{1} = -1$

Part B: Logical Reasoning

(60 Marks)

Write the steps to arrive at the correct answer to the following questions. The answer alone is not sufficient. Each correct complete answer will carry 4 marks. There is NO NEGATIVE MARKING for this part.

17. Study the following sequence of letter-symbol-digits

    M Q 2 J % K L 9 7 E # B G > 4 O 3 I F N 6 C I R $ 5 V.

   What should come in place of ? in the following sequence?

    JQL, E9G, O>F, ?

18. Find the missing number in the following sequence   2350, 3207, 4271, ?, 6912

SPACE FOR ROUGH WORK

19. Suppose Mr. A is walking in the East direction. After walking 3 Km, he turns right by 45 degrees and walks 2.82 Km. Then, he turns left by 45 degrees and walks 2Km. Then, he turns left by 90 degrees and walks 1Km. In which direction is he walking and how far is he from the starting point? ($\sqrt{2} = 1.41$)

20. What will be the next figure in the following sequence?
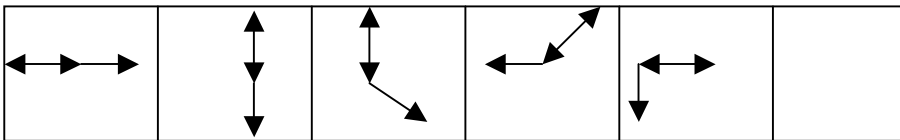
Directions for questions 21 and 22: A marketing company requires a qualified engineer with a management degree. The candidate must

    i)   be a B.Tech graduate with at least 55% marks.

    ii) Hold an MBA degree with a minimum of 50% marks.

    iii) Have secured at least 55% marks in the written in the Higher Secondary Examination. This condition will be relaxed up to 5% if the candidate has two years' experience of working with a reputed company.

    iv) Should have at least one year's experience as an engineer.

    v)   If he fulfills all other conditions except (iv) above but has an additional diploma on Computers or I.T. , his case is to be referred to the General Manager.

    vi) If he fulfills all other criteria but has a Marketing degree instead of the condition given at (iii) above his case is to be referred to the Managing Director.

    vii) The age should not exceed 30 for any candidate.

    viii) First class is equivalent to 60% or higher in an examination.

Based on the conditions given above and the information contained in the following questions, you have to take a decision regarding each case without making any subjective preference or assumptions. Your decision will be one of the following:

    a) Selected

    b) Not to be selected

    c) Cannot decide, if data is insufficient

    d) Referred to the General manager

    e) Referred to the Managing Director

SPACE FOR ROUGH WORK

Give justification for your answer.

21. Krishna Iyer is 25. He is a B.Tech in Mech. Engg. from Amity with 62% marks and did an additional diploma in I.T. concurrently. An MBA with first class from IIM, Banagalore, he has no experience of working as yet.

22. Roop Kumar passed his higher secondary examination with a first class in 1996 at the age of 17. He completed his B.Tech in Instrumentation with 53% marks. He did his MBA securing 58% marks. He has been working as production manager in ABC Industries for the last two and a half years.

Directions for questions 23 and 24: An electronic machine, when fed with random numbers rearranges them in a particular order following certain rules sequentially. The step-wise process of rearrangement of a given output of numbers is given below-

Input:	67	43	58	96	87	37	16	09
Step I	96	67	43	58	87	37	16	09
Step II	96	87	67	43	58	37	16	09
Step III	96	87	67	58	43	37	16	09

And for the given input, step III is the last step.

23. For the input

    08   11   81   97   76   65

    find the series at the fourth step.

24. If the input is

    72   86   97   27   52   04

    and the step is

    97   86   72   27   52   04

    what is the number of this step?

Directions for questions 25 and 26: Abdul, John and Shelly go for dinner to China Town, a famous restaurant at Police Bazaar. Each orders either Chicken Chow or Vegetable Fried Rice.

    i)   If Abdul orders Chicken Chow, then John orders what Shelly has ordered.
    ii)   If John orders Chicken Chow, then Abdul orders the dish that Shelly doesn't order.
    iii) If Shelly orders Vegetable Fried Rice, then Abdul orders the dish that John ordered.

25.   Who among the three always orders the same dish?

26.   If Shelly orders Vegetable Fried Rice, what is the dish ordered by John?

Directions for questions 27 and 28:

- There is a family of six members A, B, C, D, E and F.
- There are two married couples in the family and the family members represent three generations.
- Each member has a distinct choice of colour amongst green, yellow, black, red, white and pink
- No lady member likes either green or white.
- C, who likes black colour is the daughter-in-law of E.
- B is the brother of F and son of D and likes pink.
- A is the grandmother of F, and F does not like red.
- The husband has a choice of green colour, his wife likes yellow.

SPACE FOR ROUGH WORK

27.   Which is the colour preference of A?

28.   How many male members are there in the family? Name them.

Directions for questions 29 and 30:
- Eleven students A, B, C, D, E, F, G, H, I, J and K are sitting in the first row of the class facing the teacher.
- D who is to the immediate left of F is second to the right of C.
- A is second to the right of E, who is at one of the ends.
- J is the immediate neighbor of A and B and third to the left of G.
- H is to the immediate left of D and third to the right of I.

29.   Who is sitting in the middle of the row?

30.   Who are the group of friends sitting to the right of G.

31.   A ← B, means store the value of B into A and A ← A+B, means add the values of A and B and store the result into A in that order. If initial values of A and B are 10 and 15 respectively, then what will be the final value of A and B after the following steps?

$$A \leftarrow (A \times 2) + 5$$
$$B \leftarrow (B \times 7) - A$$
$$A \leftarrow B - A$$
$$B \leftarrow A + B$$

Here $+$, $-$ and $\times$ have their usual meaning. The operations enclosed in parentheses are executed first.

SPACE FOR ROUGH WORK