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End Semester Examination of Semester–I, 2014
Subject : MATHEMATICS (PG)
Paper : 106 (Programming in C) (Theory)
Full Marks : 24
Time : 1 Hr 15 Mins

The figures in the margin indicate the marks corresponding to the question

Candidates are requested to give their answers in their own word as far as practicable.

Illustrate the answers whenever necessary

Group A

(Answer **any two** questions) : 6X2=12

1. a) i) What are pointers? Why are they needed? Explain with an example.

ii) What is the output of the program segment

```
int main()
{
int a[ ] = { 1, 2, 3, 4, 5};
int i, s = 0;
for (i = 0; i < 5; ++i)
if ((a[i]%2) == 0)
s+ = a[i];
printf ("%d", s);
return 0;
}
```

4+2

1. b) i) Distinguish between array and structure. Give an example.

   ii) Explain the following :

   a) Pointer to a structure.

   b) Array of pointers to structures. 2+(2+2)

   c) What is a self-referential structure? For what kinds of applications is it useful? Write a program in C to find the product of two complex numbers defying a structure of complex number. 6

   d) What is meant by dynamic memory allocation? Explain with the difference between *malloc(), calloc()* and *realloc()* in terms of the functions they perform. Discuss. 6

(Answer **any two** questions) : 2x2=4

2. a) Differentiate between fseek() and ftell().

   b) Highlight the difference between Union and Structure data structures.

   c) i) What is the relationship between a stream pointer and a buffer area.

   ii) What is the difference between fgets() and gets().

   d) How is a pointer variable declared illustrate with an example.

Group B

3. Answer **any one** : 1x2=2

a) Write the expression to compute the following function :

$$\sin\left(\frac{\pi}{6}\right),\ \cos(\pi),\ \tan\left(\frac{\pi}{2}\right),\ \sinh^2\frac{\pi}{2}+\cosh^2\frac{\pi}{2}$$

b) i) How will you convert an octal number into binary number in MATLAB?

ii) How two or more elements can be accessed in MATLAB?

4. Answer **any one** : 1x6=6

a) Let $A=\begin{pmatrix}2 & 6\\ 3 & 9\end{pmatrix}$, $B=\begin{pmatrix}1 & 2\\ 3 & 4\end{pmatrix}$, $C=\begin{pmatrix}-5 & 5\\ 5 & 3\end{pmatrix}$

Write the instructions for the followings :

i) Create the matrix G by putting the matrices A, B and C on its diagonal.

ii) Delete the Past row and last column of the matrix.

iii) What do you get if you type G(13) and hit return?

iv) Extract the first 4 x 4 submatrix from G.

b) Explain relational and logical operators with example in MATLAB.