NETAJI SUBHAS OPEN UNIVERSITY

স্নাতকোত্তর পাঠক্রম **(P. G.)**

অনুশীলন পত্র **(Assignment) :** জুন, ২০২০/ ডিসেম্বর, ২০২০ **(June-2020/Dec.-2020)**

MATHEMATICS

Paper - 4B : Computer Programming & Its Application To Numerical Analysis

পূর্ণমান : ৫০ **QUESTION PAPER CUM ANSWER BOOKLET** মানের গুরুত্ব : ২০%

(Full Marks : 50) (Weightage of Marks : 20%)

পরিমিত ও যথাযথ উত্তরের জন্য বিশেষ মূল্য দেওয়া হবে। অশুদ্ধ বানান, অপরিচ্ছন্নতা এবং অপরিষ্কার হস্তাক্ষরের ক্ষেত্রে নম্বর কেটে নেওয়া হবে। উপান্তে প্রশ্নের মূল্যমান সূচিত আছে।

Special credit will be given for precise and correct answer. Marks will be deducted for spelling mistakes, untidiness and illegible handwriting. The figures in the margin indicate full marks.

Name (in Block Letter) : .....

Enrolment No. | | | | | | | | | | | | |

Study Centre Name : ..... Code : .....

To be filled by the Candidate	Serial No. of question answered														**TOTAL**
For Evaluator's only	Marks awarded														

Q.P. Code : **PA/4/IVB**

PG-Sc.-AP-17104

Signature of Evaluator with Date

NETAJI SUBHAS OPEN UNIVERSITY

স্নাতকোত্তর পাঠক্রম **(P. G.)**

STUDENT'S COPY

অনুশীলন পত্র **(Assignment) :** জুন, ২০২০/ ডিসেম্বর, ২০২০ **(June-2020/Dec.-2020)**

MATHEMATICS

Paper - 4B : Computer Programming & Its Application To Numerical Analysis

Name (in Block Letter) : .....

Enrolment No. | | | | | | | | | | | | |

Study Centre Name : ..... Code : .....

Q.P. Code : **PA/4/IVB**

PG-Sc.-AP-17104

Received Answer Booklet
Signature with seal by the Study-Centre

জরুরি নির্দেশ / Important Instruction

আগামী শিক্ষাবর্ষান্ত পরীক্ষায় **(T.E. Exam.)** নতুন ব্যবস্থা অর্থাৎ প্রশ্নসহ উত্তর পুস্তিকা **(QPAB)** প্রবর্তন করা হবে। এই নতুন ব্যবস্থার সঙ্গে পরীক্ষার্থীদের অভ্যস্ত করার জন্য বর্তমান অনুশীলন পত্রে নির্দেশ অনুযায়ী প্রতিটি প্রশ্নের উত্তর নির্দিষ্ট স্থানেই দিতে হবে।

New system *i.e.* Question Paper Cum Answer Booklet (QPAB) will be introduced in the coming Term End Examination. To get the candidates acquainted with the new system, assignment answer is to be given in the specified space according to the instructions.

Detail schedule for submission of assignment for the PG Term End Examination June-2020/Dec.-2020

1.	Date of Publication	: 20/06/2020
2.	Last date of Submission of answer script by the student to the study centre	: 19/07/2020
3.	Last date of Submission of marks by the examiner to the study centre	: 16/08/2020
4.	Date of evaluated answer scripts distribution by the study centre to the students (Students are advised to check their assignment marks on the evaluated answer scripts and marks lists in the study centre notice board. If there is any mismatch / any other problems of marks obtained and marks in the list, the students should report to their study centre Co-ordinator on spot for correction. The study centre is advised to send the corrected marks, if any, to the COE office within five days. No changed / correction of assignment marks will be accepted after the said five days.)	: 23/08/2020
5.	Last date of submission of marks by the study centre to the Department of C.O.E. on or before	: 31/08/2020

এখানে কিছু লিখবেন না

Do Not Write Anything Here

Answer Question No. 1 and any *four* from the rest.

1. Answer any *five* questions : $2 \times 5 = 10$

a) What are the differences between `"a"` and `'a'` in C language ?

b) Which one of the following statements is not equivalent to the other two (assuming that loop bodies are the same) ?

i) `for (i=0; i<10; i++) {body}`

ii) `for (i=0; i<10; ++i) {body}`

iii) `for (i=0; i++<10;) {body}.`

c) What is the output of the program segment ?

```
int i=3, j=4, k=5;
printf ("%d\n", i<j || ++j<k);
printf ("%d%d%d", i,j,k);
```

d) How are 'stack' and 'queue' different ?

e) Find out the errors (if any) :

i) `if(x ≤ y) max == y;`

ii) `for( ; i>0; --i);`

f) What is meant by the address of memory cell ? How are addresses usually numbered ?

g) What output does the following for statement produce ?

```
for (i=10; i>=1; i/=2)
   printf ("%d", i++);
```

h) Explain '%f' format specification.

First Answer :

Second Answer :

Third Answer :

Fourth Answer :

Fifth Answer :

2. a) Write a C program to display the following output : 5

```
*
* *
* * *
* * * *
* * * * *
```

b) Explain 'switch' statement in C. 2

c) Explain why the output of the following 'for' statement produces an infinite loop. 3

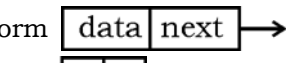
```
for (i=10; i>1; i=i/2)
     printf ("%d\n", i++);
```

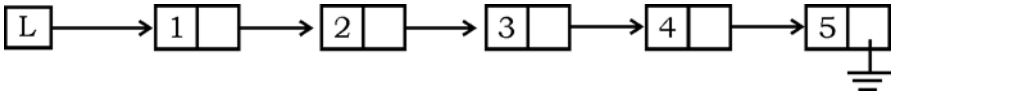
3. a) Rewrite the following function to use pointer arithmetic instead of array subscripting (In other words, eliminate the variable *i* and all uses of the [ ] operator.). Make as few changes as possible. 3

```
void store-zeros (int a[ ] , int n)
{
     int i ;
     for ( i=0; i<n; i++ )
           a [i] =0;
}
```

b) Suppose that high, low and middle are all pointer variables of the same type, and that low and high point to elements of an array. Why is the following statement illegal, and how could it be fixed ? 1 + 2

```
middle = ( low + high )/2;
```

c) Consider the following linked list L that has node of the form 



What does the following function print if we pass the linked list as input argument ? **4**

```
void func (struct node *L)
{
   if (L ! = NULL)
      {
          func(L → next);
          printf("%d",L → data);
       }
}
```

4. a) Find below a program in C. Determine the output after executing the program.

```
void main ( )
{
    int a = 5,b,*p,*q;
        p = &a;
        b = *p/2+10;
        q = p;
    printf ("a=%d,b=%d,*p=%d,*q=%d",a,b,*p,*q);
}
```

Also explain how the arithmetic expression **`*p/2+10`** is processed. 4

b) Translate each 'infix' expression into corresponding 'postfix' expression.

i) $A + B * C - (D + E) * C$

ii) $(A + B \uparrow D)/(E - F) + G$ 2 + 2

c) What are P and NPC problems ? 2

5. a) Suppose two linked list L_1 and L_2 are given. Write a procedure to concatenate these two list. 4

b) Find below the algorithmic steps of 'Babylonian Method' for finding square root of a positive real number *S*.

i) Guess any positive number X_0.

ii) Apply the formula $X_1 = (X_0 + S / X_0)/2$. The no. X is better approximation of $\sqrt{S}$.

iii) Apply the formula $X_{n+1} = (X_n + S / X_n)/2$ until $|X_{n+1} - X_n|$ becomes smaller than 0·001.

Write a recursive function in C for above method and find out the value of $\sqrt{8}$ using this. 4 + 2

6. a) The parenthesis must appear in balanced fashion in any valid arithmetic expression. Balanced parenthesis means that each opening symbol has a corresponding closing symbol and the pairs of parenthesis are properly nested. Consider following two arithmetic expressions :

i) $[(x + y) * \{(a - b) * c\} - d] \rightarrow$ Balanced

ii) $(x + y) * [\{(a - b) + c) \rightarrow$ Not balanced.

Write a program in C for balanced parenthesis problem. Assume that '(', '{', '[' are opening parenthesis and ')', '}', ']' are closing parenthesis. You can use stack data structure. 6

b) Explain 'break' and 'continue' statements in C with an example. 2 + 2

7. a) Let 'DOUBLE' be the following macro :

```
# define DOUBLE(x)2*x
```

Find out the value of DOUBLE (1+2). Justify why the result is not 6. Rectify the macro definition so that DOUBLE (1+2) prints 6. 1 + 2 + 1

b) Explain following statements in C with an example :

i) nested if

ii) multi-alternative if. 2 + 2

c) Find out suitable values of c_1, c_2 and n_0 such that $2n + 5 = \theta(n)$. (c_1, c_2 and n_0 have their usual meanings as in the definition of $\theta(n)$). 2

First Answer :

Second Answer :

Third Answer :

Fourth Answer :