

**2020**  
**MATHEMATICS HONOURS**  
**Paper: SEC B**  
**Internal Assessment**  
**Full Marks: 10**

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Notations and symbols have their usual meaning.

**Answer all questions:**

2×5

1. Which one of the following is the correct output of the command  
 $15 + 2 ** 4 + 36 - 48 / 8 * 174 + 3 ^ 4 * 14 - 57 / 18 * 14 + 3 ** 4 / 17 + 16 - 47 + 20 ** 2$  ?  
 a) 313.5686  
 b) 478.4314  
 c) 486.4314  
 d) 482.4314
  
2. Which one of the following is the correct outcome of  
**for(i in 10:12) {print("marks of student i=", 2\*i)}?**  
 a) [1] marks of student 10= 20  
    [1] marks of student 11= 22  
    [1] marks of student 12= 24  
 b) [1] marks of student i= 20  
    [1] marks of student i= 22  
    [1] marks of student i= 24  
 c) [1] marks of student i= 2\*10  
    [1] marks of student i= 2\*11  
    [1] marks of student i= 2\*12  
 d) [1] "marks of student i="
   
[1] "marks of student i="
   
Error
  
3. Which one of the following is the correct outcome of the following while loop?  
**x <- 3**  
**while (x < 15) {x <- 5\*x-10; if (x == 20) break; print(5\*x); }**  
 a) [1] 25  
    [1] 75

b) [1] 5  
[1] 25  
[1] 50  
[1] 75

c) [1] 15  
[1] 30  
[1] 45  
[1] 60  
[1] 75

d) [1] 5  
[1] 25  
[1] 50  
[1] 75  
[1] 15

4. Which of the following is the correct output of the command  
**abs(seq(to=5, length=5, by=2) + seq(from=5, length=5, by=2))**  
when executed in R console?

- a) 2 6 10 14 18
- b) 18 14 10 6 2
- c) 6 8 10 12 14
- d) 14 12 10 8 6

5. Let **X <- matrix(nrow=5, ncol=3, data=40:54, byrow=F)**. Which one of the following provides the correct multiplication on based on **X** and **t(X)**?

- a) **t(X)%%X**
- b) **t(X)%\*%X**
- c) **X%%t(X)**
- d) **X%.\*t(X)**

**2020**  
**MATHEMATICS HONOURS**  
**Paper: SEC B**  
**Theory Examination**  
**Full Marks: 40**

The figures in the margin indicate full marks.

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**Answer any FOUR questions:**

10×4

1. (a) R is both Open Source Programming language and Object Oriented Programming language-justify or nullify. 4  
(b) What is the importance of library in R? How library is installed in R? 2+1  
(c) (c) Describe logical operator and assignment operator in R with example. 3
2. Write a R program to display the Fibonacci sequence up to a given term taking input from user using recursion. 10
3. Write a R program to list all the prime numbers (if any) in an interval specified by the user. 10
4. Write a R program to find the inverse of a matrix if it exists. 10
5. Write a R program to plot the function  $f(x) = |x^{3/2} - x^2| + \left(\frac{3}{7}\right)^x$  along with its tangent at  $x=0.5$ . 10