NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI-15
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
II YEAR B.TECH , CYCLE TEST 1
CSPE43 ADVANCED DATA STRUCTURES AND ALGORITHMS

DATE: 03-03-2021   **Duration: 1 Hr 30 Mins**   **Max Marks: 25**

Instructions:

1. Answer ALL questions. Each question carries 4 marks, except the 3rd question. It carries 5 marks

2. Write your roll number, your name, page number on each page.

3. Create a PDF file for your answer book and name it as yourrollno_CT1 (eg. 111222333_CT1.pdf)

4. Submit your pdf file: https://forms.gle/eux2xNp8BCKFuCbm6

5. Do the problems clearly (**neat handwriting and without any strikethroughs**) with all required intermediate steps. This should be accompanied with **proper instructions**. Simply writing the answer without any(or less) instructions will not be considered for the evaluation.

6. Your pdf file can have maximum of **16 pages**. Answers from 17th pages (if any) will not be evaluated.

7. Mails after 12.45pm will not be considered (whatever the reason).

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1. Insert the following elements into the max-min heap. From the resultant heap, delete the elements one by one in the order: 100, 70 and 40.

    1,4,-5,6,7,9,3,40,20,70 100

2. Insert the following elements into the binomial heap and perform the extract min-key operation on the resultant heap.

   G, B, D, Q, A, K, F, H, O, J, T and E

3. Insert the first 15 prime numbers into the Fibonacci heap and apply Extract min key operation for 5 times. After that, insert the next 5 prime numbers in the resultant heap.

4. Insert the following elements into the Min HBLT and from that resultant heap, remove *a*.

   g,b,d,q,a,k,f,h,o,j,t,e,w,y,z

5. Insert the following elements into the Deap and from that remove the following elements in order 100,70 and 40.

6. Insert the numbers from 1 to 10 into the splay tree. From the resultant tree, search for the following elements in order: 5,11,7,1.

7. Insert the following numbers into the B-Tree of order 5:
   3,14,7,1,8,5,11,17,13,6,23,12,20,26,4,16,18,24,25,19 and from the resultant tree delete the following keys in order, 8,20,18,5.

8. Insert the following elements B+Tree of order 3
   1,4,7,10,17,21,31,25,42,20,43,48 and from the resultant tree delete the following elements in order 10,21,31,20.