KING SAUD UNIVERSITY

COLLEGE OF COMPUTER & INFORMATION SCIENCES
DEPT OF COMPUTER SCIENCE

CSC281 Discrete Mathematics for CS Students

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1. **[Marks 10]**
   Fill-in the missing numbers in the following row in Pascal's triangle,

   1 7 ___ 35 ___ ___ 7 1

2. **[Marks 15]**
   How many distinct words can you make by re-arranging the letters in the word "ABBAS".

3. **[Marks 15]**
   Compute $25^{666} \bmod 61$. Show all the steps.

4. **[Marks 15]**
   Use induction to show that $2^n < n!$ for all $n \geq 4$.

5. **[Marks 15]**
   Find the coefficient of x^{10} in the expansion of $(2 + 3x^2)^{15}$.

6. **[Marks 15]**
   Show that if any 14 integers are selected from the set *A* = {1, 2, 3, …, 25}, there are at least two whose sum is 26. **HINT**: Use pigeonhole principle.

7. **[Marks 20=6+7+7]**
   How many bit strings of length 8 contains (no need to calculate):
   - **a.** Exactly 3 zeros.
   - **b.** Exactly 3 zeros where one of the zeros must be at the rightmost bit.
   - **c.** Odd number of zeros.