1. The weight/allocation vector \( w \) in a portfolio is a probability vector.
   (a) True
   (b) False

2. For a quadratic programming problem, with affine constraints any KKT point is global minimizer.
   (a) True
   (b) False

3. For portfolio optimization problem, if we allow short selling, then variance-covariance matrix is assumed to be positive definite.
   (a) True
   (b) False

4. If variance-covariance matrix in portfolio optimization problem is positive semidefinite, then there could exist weight vector such that risk is zero.
   (a) True
   (b) False

5. For some meaningful investment, you need to invest in at least two different assets.
   (a) True
   (b) False

6. The total money \( R \) is always ........ function of \( w_i \) (weights for asset i).
   (a) Increasing
   (b) Linear
   (c) Decreasing
   (d) None of these
7. Let \( r = (r_1, r_2, ..., r_n) \) with \( \text{Var}(r_i) = \sigma^2 \), \( \forall i \) and Correlation coefficient of \( r_i \) and \( r_j \) is \( 0.1 \sigma^2 \), \( \forall i \neq j \), then \( \text{Var}(r) \) is

(a) \( \frac{(0.7)\sigma^2}{n} + (0.3)\sigma^2 \)
(b) \( \frac{\sigma^2}{n} + \sigma^2 \)
(c) \( \frac{\sigma^2}{n} + (0.1)\sigma^2 \)
(d) \( \frac{(0.9)\sigma^2}{n} + (0.1)\sigma^2 \)

8. Consider the problem
\[
\text{maximize : } \mu \cdot \rho(w) - \frac{1}{2} \langle w, \Sigma w \rangle
\]
subjected to
\[
\sum_{i=1}^{n} w_i = 1,
\]
where \( \mu \) is constant, \( w \) is weight vectors, \( \Sigma \) is variance-covariance matrix and \( \rho \) is reward function, then this problem is

(a) Linear programming problem
(b) Quadratic programming problem
(c) Non-linear programming problem
(d) None of these

9. Two assets are said to be perfectly correlated if correlation coefficient of assets is

(a) 1
(b) -1
(c) 0
(d) 0.5

10. If two assets in a portfolio are perfectly correlated, then there will be

(a) No short-selling
(b) Zero risk
(c) Short-selling with zero risk
(d) None of these

Answers
1. b
2. a
3. a
4. a
5. a
6. b
7. d
8. b
9. a
10. b