Speed It Up (Finance)

(350 points available)

QUESTIONS

1. A financial analyst is planning to move to a new house and to take a mortgage to buy it. The house costs $1,000,000. The bank offers a mortgage on the following conditions:
    i. At least 10% downpayment (i.e., $100,000 should be paid by the analyst upfront and the loan amount will then be $900,000)
    ii. 1.9% annual interest rate (assume 30/360 convention, i.e., the monthly interest rate is equal to 1/12 of annual interest rate)
    iii. 40-year term with monthly repayments
    iv. Annuity repayment schedule (i.e., equal monthly payments)
    v. The monthly payment should be no more than 30% of the analyst's monthly salary

    In addition to having the required savings for the downpayment, what is the minimum annual salary the analyst should earn to afford the house? Disregard bonuses - assume that annual salary is equal to 12 monthly salaries – **50 Points**

    a. $96,419
    b. $106,826
    c. $106,963
    d. $107,132
    e. $109,185
    f. $110,745

2. After moving into the new house, the analyst signs a 3-year agreement for waste disposal with the following conditions:
    i. The agreement is effective from January 1, 2021, until December 31, 2023.
    ii. A garbage truck arrives twice a month on every second and fourth Monday of each month.
    iii. In most cases, this means a two-week interval. However, in some cases, when there are five Mondays in a month, this would mean a three-week interval.
    iv. In such cases, the analyst would like to order additional waste disposal.

    How many times during the life of the contract will the analyst have to order extra waste disposal? – **50 Points**

    a. 10
    b. 11
    c. 12
    d. 13

e. 14
f. 15

3. A group of friends is playing a board game named Catan. Under the rules of the game, a player might receive resources (e.g., wood, clay, etc.) each turn. Each turn 2 dices are rolled and the sum of points rolled is calculated.

   If a player has a city next to a cell that is labeled with the same number as the sum of points rolled, then the player receives the resources provided by the cell.

   Player 1 has built 2 cities. One of them is located next to cells numbered 3, 6 and 10. The other city is located next to cells numbered 5, 6 and 9. What is the probability that a player gets any resources next turn? – **50 Points**

   a. 44.96%
   b. 47.24%
   c. 50.00%
   d. 51.21%
   e. 52.80%
   f. 63.89%

4. A company has just bought new manufacturing equipment:
   i. The acquisition price is $100,000
   ii. The purchase was completed and the equipment was installed and launched on December 18th, 2020
   iii. The equipment will be depreciated under the straight line principle
   iv. Its useful life is assumed to be 10 years
   v. Depreciation calculations start one month after the acquisition (i.e., from January 2021)

   What is the remaining book value of the equipment at the end of September 2027? – **50 Points**

   a. $30,833
   b. $32,500
   c. $33,333
   d. $35,000
   e. $35,833
   f. $36,667

5. There is a traffic light near John's school. John has noticed the following:
   i. The traffic light blinks yellow throughout the night
   ii. Exactly at 7 AM the traffic light switches to red for pedestrians
   iii. Red light is on for pedestrians for exactly 2 minutes
   iv. After that, the green light switches on for 15 seconds
   v. Then the green light starts blinking for another 10 seconds

vi. The cycle repeats itself up until 10 PM when the blinking yellow lights switch on for the night

What light will be on for pedestrians at 2:43:41 PM when John approaches the traffic light on his way back from school? – **50 Points**

a. Red
b. Green
c. Blinking Green
d. Yellow
e. Blinking Yellow
f. Blue

6. You invest $1,000,000 in an interest-bearing account under the following conditions:
    i. The investment is made on January 1, 2021, for a minimum period of 10 years
    ii. The interest for the investment is 5.00% per year in Year 1, 5.25% in Year 2, 5.50% in Year 3 and so on (every year the interest rate grows by 0.25%)
    iii. The interest for each year is calculated on the last day of the year
    iv. The interest does not get paid out but instead compounds into the principal of the investment

    What will be the value of the investment after 10 years? – **50 Points**

    a. $1,689,197
    b. $1,725,774
    c. $1,811,664
    d. $1,862,349
    e. $1,900,811
    f. $1,999,547

7. You are valuing a company that you consider adding to your stock portfolio. Here is the key data on the company:
    i. The company has just paid its annual dividends of $2.54 per share
    ii. The company's dividends per share are expected to grow in line with the general economy by 2.00% per year
    iii. You have estimated the company's discount rate at 8.48%

    What is the intrinsic value of the company's share using the Gordon Growth Model? – **50 Points**

    a. $38.84
    b. $39.20
    c. $39.98
    d. $40.01
    e. $40.64
    f. $41.00