# CA Foundation Sampurna September 2024

## Mathematics of Finance

**Previous Year Question**

**1.** An investor is saving to pay off an obligation of ₹15,250 which will be due in seven years, if the investor is earning 7.5% simple interest rate per annum, he must deposit ₹ _____ to meet the obligation. (June 2022)

(a) ₹8000

(b) ₹ 9000

(c) ₹ 10,000

(d) ₹11,000

**2.** The annual rate of simple interest is 12.5%. In how many years does the principal double? (June 2022)

(a) 11 years

(b) 9 years

(c) 8 years

(d) 7 years

**3.** An investment is earning compound interest, ₹100 invested in the year 2 accumulated to ₹105 by year 4. If ₹500 invested in the year 5, will become ₹ ……. by year 10. (June 2022)

(a) ₹364.80

(b) ₹564.80

(c) ₹464.80

(c) ₹664.80

**4.** There is 60% increase in an amount in 6 years at simple interest. What will be the compound interest of ₹12,000 after 3 years at the same rate? (June 2022)

(a) ₹3972

(b) ₹2160

(c) ₹ 3120

(d) ₹3742

**5.** The present value of ₹2000 after 8 years at the rate of 6% per annum is …… [Given; $(1.06)^8 = 1.59385$ ]

(June 2022)

(a) ₹1054

(b) ₹1254

(c) ₹ 3054

(d) ₹2054

**6.** ₹800 is invested at the end of each month in an account of ₹1000 made annually for 7 years at interest rate 14% compounded annually. Given that $(1.14)^7 = 2.5023$ (June 2022)

(a) ₹10,730.71

(b) ₹ 5365.35

(c) ₹8756

(d) ₹ 9892.34

**7.** Assuming that the discount rate is 7% p.a. How much would you pay to receive ₹200 growing at 5% annually forever? (June 2022)

(a) ₹2500

(b) ₹5000

(c) ₹7500

(d) ₹10,000

**8.** ₹2500 is paid every year for 10 years to pay off a loan. What is the loan amount if the interest rate is 14% p.a. compounded annually? (June 2022)

(a) ₹15,847.90

(b) ₹13,040.27

(c) ₹14,674.21

(d) ₹16,345.11

**9.** Raj made an investment of ₹15,000 in a scheme and at the time of maturity the amount was ₹25,000. If Compound Annual Growth Rate (CAGR) for this investment is 8.88%. Calculate the approximate number of years for which he has invested the amount. (June 2022)

(a) 6

(b) 7.7

(c) 5.5

(d) 7

**10.** Madhu took a loan of ₹50,000 from *XYZ* bank. The rate of interest is 10% per annum. The first instalment will be paid at the end of year 5. Determine the amount (in ₹) of equal instalments, if Madhu wishes to repay the amount in five instalments.

(a) ₹19,510

(b) ₹19,430

(c) ₹19,310

(d) ₹19,630

**11.** Ramesh invests ₹20,000 per year in a stock index fund, which earns 9% per year for the next ten years. What would be the closest value of the accumulated value of the investment upon payment of the last installment? Given, $(1.09)^{10} = 2.36736$ (June 2022)

(a) ₹3,88,764.968

(b) ₹3,03,858.594

(c) ₹2,68,728.484

(d) ₹4,08,718.364

**12.** 10 years ago the earning per share (EPS) of ABC Ltd. was Rs 5 share. Its EPS for this year is RS 22. Compute at what rate, EPS of the company grows annually? (Dec 2022)

(a) 15.97%

(b) 16.77%

(c) 18.64%

(d) 14.79%

**13.** A machine worth ₹4,90,740 is depreciated at 15% on its opening value each year. When its value would reduce to ₹2,000,750 ? (Dec 2022)

(a) 5 years 5 months

(b) 5 years 6 months

(c) 5 years 7 months

(d) 5 years 8 months

**14.** If ₹64 amount to ₹83.20 in 2 years, what will ₹86 amount to in 4 years at the same rate per cent per annum?

(Dec 2022)

(a) ₹127.60

(b) ₹147.60

(c) ₹145.34

(d) ₹117.60

**15.** The effective annual rate of interest corresponding to a normal rate of 6% per annum payable half yearly is:

(Dec 2022)

(a) 6.06%

(b) 6.07%

(c) 6.08%

(d) 6.09%

**16.** 10 years ago, the Earning per share (EPS) of ABC Ltd. was ₹5 share. Its EPS for this year is ₹22. Compute at what rate EPS of the company grow annually? (Dec 2022)

(a) 15.97%

(b) 16.77%

(c) 18.64%

(d) 14.79%

**17.** Mr. Prakash invested money in two schemes 'A' and ' $B$ ' offering compound interest at the rate of 8% and 9% per annum respectively. If the total amount of interest accrued through these two schemes together in two years was ₹4818.30 and total amount invested was ₹27,000. What was the amount invested in scheme ' $A$ '?

(Dec 2022)

(a) ₹12,000

(b) ₹12,500

(c) ₹13,000

(d) ₹13,500

**18.** A sum of money invested of compound interest doubles itself in four years. In how many years it becomes 32 times of itself at the same rate of compound interest? (Dec 2022)

(a) 12 years

(b) 16 years

(c) 20 years

(d) 24 years

**19.** The difference between compound interest and simple interest on an amount of ₹15,000 for 2 years is ₹ 96 . What is the rate of interest per annum? (Dec 2022)

(a) 9%

(b) 8%

(c) 11%

(d) 10%

**20.** A sum of money doubles itself in 4 years at a certain compound interest rate. In how many years this sum will become 8 times at the same compound interest rate? (Dec 2022)

(a) 12 years

(b) 14 years

(c) 16 years

(d) 18 years

**21.** A farmer borrowed ₹3600 at the rate of 15% simple interest per annum. At the end of 4 years, he cleared this account by paying ₹ 4000 and a cow. The cost of the cow is; (Dec 2022)

(a) ₹1000

(b) ₹1200

(c) ₹1550

(d) ₹1760

**22.** A company created a sinking fund of ₹2,00,000 in a bank account for 15 years bank offers interest rate 6% per annum the yearly payment to be paid by company is approximately is (If need, use $(1.06)^{14} = 2.209$ )

(Dec 2022)

(a) ₹8,945

(b) ₹8,145

(c) ₹ 9,345

(d) ₹ 9,645

**23.** How much amount is required to be invested every year so as to accumulate ₹5,00,000 at the end of 12 years if interest is compounded annually at 10% ? (where, $A(12,0.1) = 21.384284$ ) (Dec 2022)

(a) ₹ 23381.65

(b) ₹ 24385.85

(c) ₹26381.65

(d) ₹28362.75

**24.** Raju invests ₹20,000 every year in a deposit scheme starting from today for next 12 years. Assuming that interest rate on this deposit is 7% per annum compounded annually. What will be the future value of this annuity? Given that, $(1 + 0.07)^{12} = 2.25219159$ (Dec 2022)

(a) ₹ 5,40,526

(b) ₹ 3,82,813

(c) ₹6,43,483

(d) ₹3,57,769

**25.** Mr A invested ₹10,000 every year for next 3 years at the interest rate of 8 per cent per annum compounded annually. What is the future value of the annuity? (Dec 2022)

(a) ₹32,644

(b) (a) 32,464

(c) ₹ 34,426

(d) ₹36,442

**26.** ₹5,000 is invested every month end in an account paying interest at the rate of 12% per annum compounded monthly. What is the future value of this annuity just after making 11th payment? (Dec 2022)

(Given that, $(1.01)^{11} = 1.1156$ )

(a) ₹ 57,800

(b) ₹56,100

(c) ₹ 56,800

(d) ₹57,100

**27.** Sinking fund factor is the reciprocal of (Dec 2022)

(a) Present value interest factor of a single cash flow

(b) Present value interest factor of an annuity

(c) Future value interest factor of an annuity

(d) Future value interest factor of a single cash flow

**28.** Suppose you have decided to make a Systematic Investment Plan (SIP) in a mutual fund with ₹1,00,000 every year from today for next 10 years where you get return at the rate of 10% per annum compounded annually. What is the future value of this annuity? (Given that, $(1.1)^{10} = 2.59374$ ) (June 2023)

(a) ₹17,35,114

(b) ₹17,53,411

(c) ₹17,35,411

(d) ₹17,53,114

**29.** Ms. Paul invested ₹1,00,000 in a mutual fund scheme in January 2018. After one year in January, 2019 she got a divided amounting to ₹10,000 for first year, ₹12,000 for second year, ₹16,000 for third year, ₹18,000 for fourth year and ₹21,000 for fifth year in January 2023. What is Compounded Annual Growth Rate (CAGR) of dividend return? Given; $(1.2038)^4 = 2.1$ ) (June 2023)

(a) 20.38%

(b) 18.59%

(c) 16.36%

(d) 15.89%

**30.** A company want to replace its existing tool room machine at the end of 10 years, the expected cost of the machine would be ₹10,00,000. If management of the company creates a sinking fund, how much provision needs to be made out of revenue each year which can earn at the rate of 10% compounded annually? Given $A(10,0.10 = 15.937425)$ (June 2023)

(a) ₹ 74,625

(b) ₹72,514

(c) ₹62,745

(d) ₹67,245

**31.** A car is available for ₹4,98,200 cash payment or ₹60,000 cash down payment followed by three equal annual instalments. If the rate of interest charged is 14% per annum compounded yearly, then total interest charged in the instalment plan is. (Given $P(3,0.14 = 2.32163)$ (June 2023)

(a) ₹ 1,46,314

(b) ₹ 1,46,137

(c) ₹ 1,28,040

(d) ₹ 1,58,040

**32.** Govinda's mother decides to gift him ₹50,000 every year starting from today for the next five years. Govinda deposits this amount in a bank as and when he receives and gets 10% per annum interest rate, compounded annually. What is the present value of this annuity? (June 2023)

(a) ₹ 2,80,493.5

(b) ₹2,08,493.5

(c) ₹2,08,943.5

(d) ₹ 2,58,493.5

**33.** If the discount rate is 10% per annum, how much amount would you pay to receive ₹2,500 growing at 8% annually forever? (June 2023)

(a) ₹1,25,000

(b) ₹2,50,000

(c) ₹1,50,000

(d) ₹2,00,000

**34.** Mr Shahad got his retirement benefits amounting to ₹50,00,000. He want to receive a fixed monthly sum of amount for his rest of life, starting after one month and thereafter he want to pass on the same to future generations. He expects to earn an interest of 9% compounded annually. He expects to earn an interest of 9% compounded annually. Determine how much perpetuity amount he will receive every month? (June 2023)

(a) ₹39,500

(b) ₹ 38,500

(c) ₹ 37,500

(d) ₹ 36,600

**35.** Jonny wants to have ₹2,00,000 in his saving account after three years. The rate of interest offered by bank is 8% per annum compounded annually. How much should he invest today to achieve his target amount? (June 2023)

(a) ₹1,47,489.10

(b) ₹1,58,766.44

(c) ₹1,71,035.59

(d) ₹1,84,417.96

**36.** Mr. Ram invested a total of ₹1,00,000 in two different banks for a fixed period. The first bank yields an interest of 9% per annum and second, 11% per annum. If the total interest at the end of one year is 9.75% per annum, then the amount invested in these banks are respectively. (Dec 2023)

(a) ₹52,500; ₹47,500

(b) ₹62,500; ₹37,500

(c) ₹ 57,500; ₹42,500

(d) ₹67,500; ₹32,500

**37.** Manoj invests ₹12,000 at 6% per annum simple interest to obtain a total amount of ₹14,880. What is the time for which the amount was invested? (Dec 2023)

(a) 3 years

(b) 4 years

(c) 2 years

(d) 5 years

**38.** A machine costing 1,00,000 has useful life of 10 years. If the rate of depreciation is 12%. What is the value of the machine at the end of its life? [Given $(0.88)^{10} = 0.27850$ ] (Dec 2023)

(a) 25,850

(b) 26,850

(c) 27,850

(d) 28,850

**39.** Mr XYZ invested ₹60,000 in a nationalized bank in the form of fixed deposit at the rate of 7.5% per annum simple interest rate. He received ₹73,500 after the end of the term of fixed deposit. Calculate the period for which ₹60,000 was invested in fixed deposit. (Dec 2023)

(a) 3 years

(b) 3.5 years

(c) 4 years

(d) 4.5 years

**40.** The nominal rate of interest is 10% per annum. The interest is compounded quarterly. The effective rate of interest per annum will be:

(a) 10%

(b) 10.10%

(c) 10.25%

(d) 10.38%

**41.** A machine depreciates at $10\%$ of its value at the beginning of a year. The cost and scrap value realised at the time of sale being ₹$23{,}240$ and ₹$9{,}000$ respectively. Approximately, for how many years the machine is put to use? (Dec 2023)

(a) 7

(b) 8

(c) 9

(d) 10

**42.** The population of a town increases every year by $2\%$ of the population at the beginning of that year. The approximate number of years, by which the total increase of population will be $40\%$ is …….

[Given; $(1.02)^8 = 1.17166$ ] (Dec 2023)

(a) 15

(b) 17

(c) 19

(d) 20

**43.** The compound interest on ₹$15{,}625$ at 9 months at $16\%$ per annum compounded quarterly is: (Dec 2023)

(a) ₹1851

(b) ₹1941

(c) ₹1951

(D) ₹1961

**44.** Mr. X makes a deposit of ₹$50{,}000$ in a bank for a period of $2\frac{1}{2}$ years. If the rate of interest is $12\%$ per annum compounded half yearly, then the maturity value of the money deposited by Mr$X$ is; (Dec 2023)

[where, $(1.06)^5 = 1.3382$ ]

(a) ₹$66910$

(b) ₹ 66123

(c) ₹$67925$

(d) ₹66550

**45.** What is the effective rate of interest when principal amount of ₹50,000 deposited in a nationalized bank for one year, corresponding to a nominal rate of interest 8% per annum compounded quarterly. [Given, $(1.02)^4 = 1.0824$ ] (Dec 2023)

(a) 10.38%

(b) 8.08%

(c) 8.16%

(d) 8.24%

**46.** Calculate the present value of ₹2000 to be required after 10 years compounded annually at 5% per annum. [Given, $(1.05)^{10} = 1.62889$] (Dec 20

(a) ₹1227.82

(b) ₹1282.48

(c) ₹1328.35

(d) ₹1822.65

**47.** How much amount is required to be invested every year so as to accumulate ₹ 30,000 at the end of 10 years if the interest compounded annually at 10%. [Given $A(10,0.1) = 15.9374$ ] (Dec 2023)

(a) ₹1882.36

(b) ₹1828.30

(c) ₹1832.65

(d) ₹1853.65

**48.** Mr. X invests in an annuity immediately that promises annual payments of ₹50,000 for the next 16 years. If the interest rate is 6% compounded annually then the approximate present value of annuity is: [where, $(1.06)^{15} = 2.3965$ ] (Dec 2023)

(a) ₹5,51,217.75

(b) ₹ 5,75,900.00

(c) ₹ 5,05,288.08

(d) ₹ 5,35,612.45

**49.** If the initial investment of ₹4,00,000 become ₹6,00,000 in 24 months, then the Compound Annual Growth Rate (CAGR) is: (Dec 2023)

(a) 30.33%

(b) 22.4%

(c) 19.46%

(d) 14.47%

**50.** Compute the compound interest on ₹6000 for $\frac{11}{4}$ years at 8% p.a. interest compounded quarterly. (Dec 2023)

(a) ₹642

(b) ₹630.78

(c) ₹ 634.68

(d) ₹ 624.48

**51.** What will be future value of an annuity ₹2500 made annually for 12 years at an interest rate of 5% compounded annually? $\left[(1.05)^{12} = 1.7958\right]$ (Dec 2023)

(a) ₹37588.58

(b) ₹39790.00

(c) ₹40873.13

(d) ₹42603.68

**52.** A person wants to open a shop have two options to acquire a commercial space either by leasing for 10 years at annual rent of ₹2,00,000 or by purchasing the space for ₹12,00,000. If person can borrow money at 14% compounded per annum, which alternate is most suitable? (Given $P(10,0.14 = 5.21611)$ (Dec 2023)

(a) Leasing

(b) Purchase

(c) Can't say

(d) Data insufficient

**53.** Suppose Mr. *X* invested ₹5000 every year starting from today in mutual fund for next 10 years. Assuming that average return compounded annually is at 18% per annum. What is the future value? (Dec 2023)

(a) ₹1,83,677.68

(b) ₹1,38,678.85

(c) ₹1,83,776.53

(d) ₹1,38,774.55

## Answer key

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| c | c | a | a | b | a |
| **7** | **8** | **9** | **10** | **11** | **12** |
| d | b | a | c | b | a |
| **13** | **14** | **15** | **16** | **17** | **18** |
| b | c | d | a | a | c |
| **19** | **20** | **21** | **22** | **23** | **24** |
| b | a | d | a | a | b |
| **25** | **26** | **27** | **28** | **29** | **30** |
| b | a | a | d | a | c |
| **31** | **32** | **33** | **34** | **35** | **36** |
| c | b | a | c | b | b |
| **37** | **38** | **39** | **40** | **41** | **42** |
| b | c | a | d | c | b |
| **43** | **44** | **45** | **46** | **47** | **48** |
| c | a | d | a | a | d |
| **49** | **50** | **51** | **52** | **53** | |
| b | d | b | a | d | |