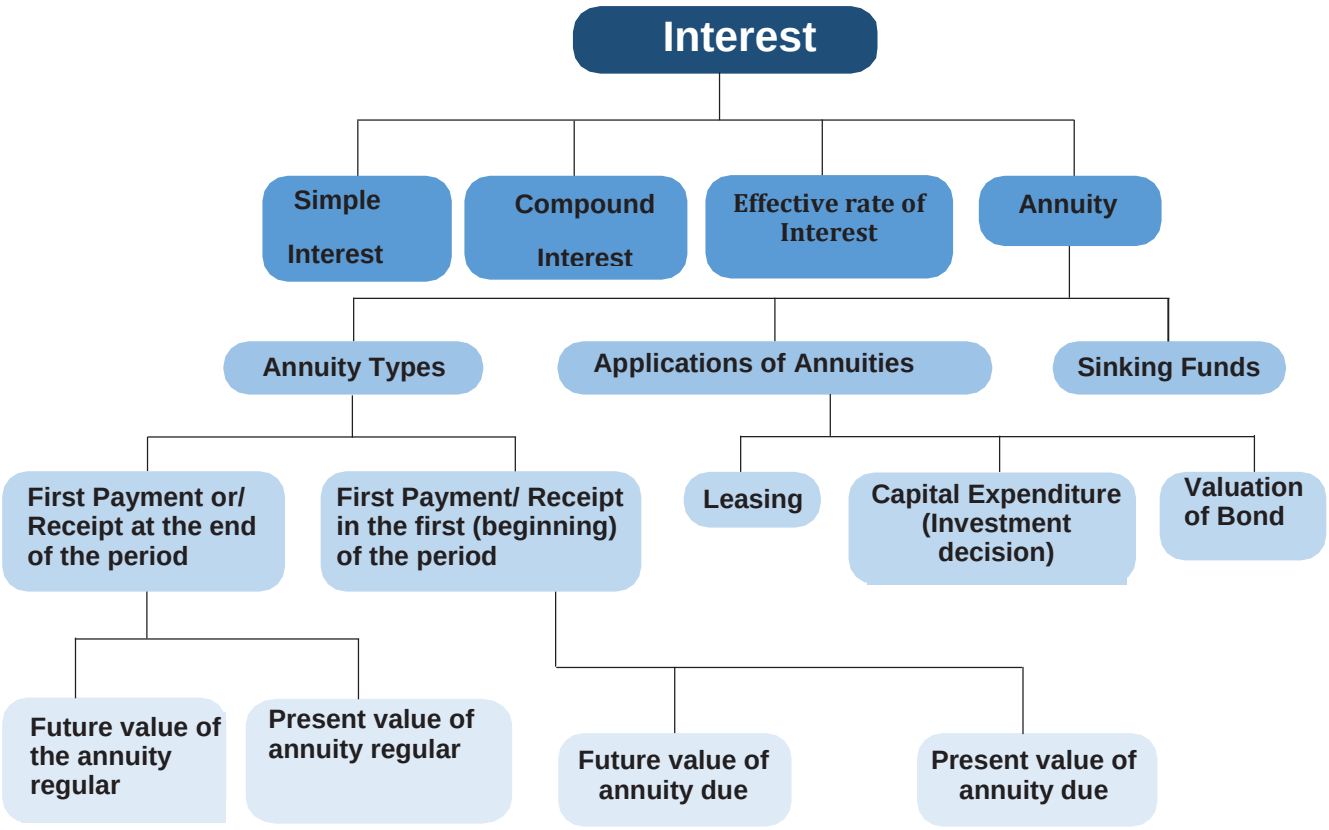
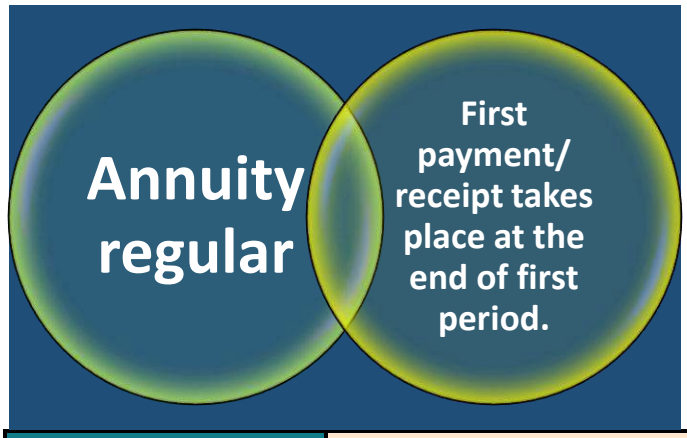
CHAPTER - 4
TIME VALUE OF MONEY

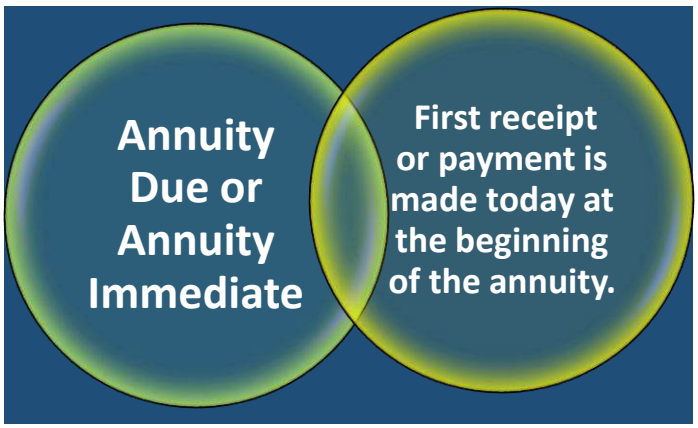


TIME VALUE OF MONEY	Time value of money means that the value of a unity of money is different in different time periods. The sum of money received in future is less valuable than it is today. In other words, the present worth of money received after some time will be less than a money received today.
INTERSEST	Interest is the price paid by a borrower for the use of a lender's money. If you borrow (or lend) some money from (or to) a person for a particular period, you would pay (or receive) more money than your initial borrowing (or lending).
	The interest computed on the principal for the entire period of borrowing.

SIMPLE INTEREST	**I = Pit** **A = P + I** **I = A – P** **Here,** A = Accumulated amount (final value Of an investment) P = Principal (initial Value of an investment) i = Annual interest rate in decimal. I = Amount of interest t = Time in years
COMPOUND INTEREST	The interest that accrues when earnings for each specified period of time added to the principal thus increasing the principal base on which subsequent interest is computed. Formula for compound interest: $A_n = P\ (1+i)^n$ Where, i = Annual rate of interest n = Number of conversion periods per year **Interest = A_n – P = P (1 + i)^n – P** n is total conversions i.e. t x no. of conversions per year
EFFECTIVE RATE OF INTEREST	The effective interest rate can be computed directly by following formula: $E = (1 + i)^n - P$ Where E is the effective interest rate i = actual interest rate in decimal n = number of conversation period
FUTURE VALUE	Future value of a single cash flow can be computed by above formula. Replace A by future value (F) and P by single cash flow (C.F.) therefore $F = C.F.\ (1 + i)^n$
ANNUITY	Annuity can be defined as a sequence of periodic payments (or receipts) regularly over a specified period of time.

TYPES OF ANNUITY





FUTURE VALUE OF AN ANNUITY DUE/ANNUITY IMMEDIATE	Future value of an Annuity due/Annuity immediate = Future value of annuity regular x (1+1) where i is the interest rate is decimal. The present value P of the amount an due at the end of n period at the rate of i per interest period may be obtained by solving for P the below given equation $\mathbf{A_n = P(1 + i)^n}$
PRESENT VALUE OF ANNUITY DUE OR ANNUITY IMMEDIATE	Present value of annuity due/immediate for n years is the same as an annuity regular for (n-1) years plus an initial receipt or payment in beginning of the period. Calculating the present value of annuity due involves two steps. • **Step 1: Compute the present value of annuity as if it were an annuity regular for one period short.** • **Step 2: Add initial cash payment/ receipt to the step 1 value.**
SINKING FUND	It is the fund credited for a specified purpose by way of sequence of periodic payments over a time period at a specified interest rate. Interest is compounded at the end of every period. Size of the sinking fund deposit is computed from A = P.A(n, i) **where** **A is the amount to be saved the periodic payment, in the payment period.**

ANNUITY APPLICATIONS		
	Leasing	Leasing is a financial arrangement under which the owner of the asset (lessor) allows the user of the asset (lessee) to use the asset for a defined period of time (lease period) for a consideration (lease rental) payable over a given period of time. This is a kind of taking an asset on rent
	Capital Expenditure	Capital expenditure means purchasing on asset (which results in outflows of money) today in anticipation of benefits (cash inflow) which would flow across the life of the investment
	Valuation of bond	A bond is a debt security in which the issuer owes the holder a debt and is obliged to repay the principal and interest. Bonds are generally issued for a fixed term longer than one year.

Question 1

How much interest will be earned on '2000 at 6 % simple interest for 2 years?

(a) 250 (b) 240

(c) 260 (d) 270

Answer: b

Explanation:

Required interest amount is given by

$I = P \times i \times t$

$= 2000 \times \frac{6}{100} \times 2$

$= 240$

Question 2

Sonata deposited 50,000 in a bank for two years with the interest rate of 5.5% p.a. how much interest would she earn?

(a) 550 (b) 55000

(c) 55` (d) 5500

Answer: d

Explanation:

Required interest amount is given by

$I = P \times i \times t$

$50000 \times \frac{5.5}{100} \times 2$

$= 5500$

Question 3

Sachin deposited 1, 00,000 in is bank for 2 years at simple interest rate of 6%. How much interest would he earn? How much would be the final value of deposit?

(a) 11200 (b) 112000

(c) 124000 (d) 12400

Answer: b

Explanation:

i. required interest amount is given by

$I = P \times it$

$100000 \times \frac{6}{100} \times 2$

$= 12,000$

ii. Final value of deposit is given by

$= A = P + I$

$= (1, 00,000 + 12,000)$

$= 1, 12,000$

Question 4

Rohika invested 70,000 in a bank at the rate of 6.5% p.a. simple interest rate. He received 85,925 after the end of term. Find out the period for which sum was invested by Rahul.

(a) 3.5 years (b) 35 years

(c) 0.35 years (d) 36 years

Answer: a

Explanation:

We know $A = P (1 + it)$

I.e. $85925 = 70000(1+\frac{6.5}{100} \times t)$

$\frac{85925}{70000} = \frac{100+6.5t}{100}$

$\frac{85925 \times 100}{70000} - 100 = 6.5t$

$22.75 = 6.5t$

$t = 3.5$

$=$ time $= 3.5$ years

Question 5

Kanti Devi deposited some amount in a bank for 7 ½ years at the rate of 6% p.a. simple interest. Kanti Devi received '1, 01,500 at the end of the term. Compute initial deposit of kanti Devi initial deposit of kanti Devi

(a) 70000 (b) 7000

(c) 70 (d) 700000

Answer: a

Explanation:

We know, A = P (1+it)

i.e. 101500 = P $(1 + \frac{6}{100} \times \frac{15}{2})$

1, 01,500 = P$\left[1 + \frac{45}{100}\right]$

P = $\frac{101500 \times 100}{145}$

= 70,000

Initial deposit of kanti Devi = 70,000

Question 6

Shila has a sum of 46,875 was lent out at simple interest at the end of 1 year 8 months the total amount was 50,000. Find the rate of interest percent per annum.

(a) 0.4% (b) 4 %

(c) 40% (d) 0.04%

Answer: b

Explanation:

We know A = P (1 + it)

i.e.50, 000 = 46875$(1+ i \times 1\frac{8}{12})$

i = 0.04;

Rate = 4%

Question 7

What sum money will produce Heena 28,600 as an interest in 3 years and 3 months at 2.5% p.a. simple interest?

(a) 35200 (b) 352000

(c) 32500 (d) 325000

Answer: b

Explanation:

We know I = P × i × t

i.e. 28,600 = P × $\frac{2.5}{100} \times 3\frac{3}{12}$

28600 = $\frac{2.5}{100}$p × $\frac{13}{4}$

28600 = $\frac{32.5}{400}$p

$P = \frac{28600 \times 400}{32.5}$

=352000

3, 52,000 will produce 28,600 interests in 3 years and 3 months at 2.5%p.a. simple interest.

Question 8

In what time vansh will do 85,000 amount to 1, 57,675 at 4.5% p.a.?

(a) 9 years (b) 91 years

(c) 19 years (d) 1 year

Answer: c

Explanation:

We know

A = P (1 + it)

$157675 = 85000(1+\frac{4.5}{100} \times t)$

$\frac{157675}{85000} = \frac{100+4.5t}{100}$

$4.5t = (\frac{157675}{85000} \times 100) - 100$

$t = \frac{85.5}{4.5}$ = t = 19

In 19 years 85,000 will amount to 1, 57,675 at 4.5% p.a. simple interest rate.

Question 9

A sum of money doubles itself in 10 years. The number of years it would triple itself is:

(a) 25 years (b) 20 years

(c) 15 years (d) 18 years

Answer: b

Explanation:

Let the sum of money invested be P.

Then, amount = 2P

A = P (1+it)

$2p = p\ (1 + r \times \frac{10}{100})$

$2 = \frac{100+10r}{100}$

10r=100

R=10%p.a.

Now, year be 20 years

Question 10

A company establishes a sinking fund to provide for the payment of 2, 00,000 debt maturing in 20 years. Contribution to the fund is to be

made at the end of every year. Find the amount of each annual deposit if interest is 5% per annum

(a) 6142 (b) 6049
(c) 6052 (d) 6159

Answer: b

Explanation:

Let the annual deposit be A

F.Y. =0 $[(1 +i) -1]^n$

2, 00,000 = $[(1+0.05)^{20} – 1]$

10,000 = a (1. 6533)

A = $\frac{10000}{1.6533}$

A = 6049

Question 11

A machine worth 4, 90,740 is depreciated at 15% on its opening value each year. When its value would reduce to 2, 00,000:

(a) 5 years (b) 5 years 7 months
(c) 5 years 5 months (d) None

Answer: a

Explanation:

Amount = 2, 00,000

In case of depreciation A = $P (1 – i)^t$

2, 00,000 = 4, 90,740 $(1- 0.15)^t$

0.4075 = $(0.85)^t$

$(0.85)^{.5.5} = (0.85)^t$

n = 5.5 or 5 years 6 months (approx.)

Question 12

A sum amount to 1,331 at a principal of 1,000 at 10% compounded annually; Find the time.

(a) 3.31 years (b) 4 years
(c) 3 years (d) 2 years

Answer: c

Explanation:

P = 1,000

A = 1,331

i = 0.10

Time = n years

A = $P (1+i)^t$

1331 = 1000 $(1 + 0.10)^t$

1.331 = $(1.10)^t$

$(1.10)^3 = (1.10)^t$

n = 3

Therefore, Rs. 1,000 amounts to 1,331 at 10% p.a. C.I. in 3 year's

Question 13

If a sum triples in 15 years at simple rate of interest, the rate of interest per annum will be

(a) 13.0% (b) 13.3%

(c) 1.33% (d) 13.66%

Answer: b

Explanation:

Let Principal P = P

Amount A = 3P

T = 15 years

S.I. = A-P

= 3P – P

= 2P

$R = \frac{S.I. \times 100}{P \times T}$

$R = \frac{2P \times 100}{P \times 15 \text{ Yrs.}}$

$R = \frac{40}{3}$

= 13.33%

Question 14

In what time will a sum of money double its y at 6.25 Simple interest?

(a) 5 years (b) 12 years

(c) 8 years (d) 16 years

Answer: d

Explanation:

Let $R = \frac{625}{100}$. According to the question,

Amount = 2 (Principle)

A = 2P

S.I. = A – P

= 2P – P

= P

$S.I. = \frac{P \times R \times T}{100}$

$P = \frac{P \times 625 \times T}{100 \times 100}$

$T = \frac{p \times 100 \times 100}{p \times 625}$

T = 16 Years

Question 15

What principal will amount to 370 in 6 years at 8% p.a. at simple interest?

(a) 210 (b) 250

(c) 260 (d) 25

Answer: b

Explanation:

Given Amount (A) = 370, T = 6 yrs, R = 8% p.a.

Let P = x

SI = $\frac{PRT}{100}$

= $\frac{8\times6\times X}{100}$

S. I. = $\frac{48X}{100}$

A = P+S.I.

A = X + $\frac{48X}{100}$

370 = $\frac{148X}{100}$

X = $\frac{370\times100}{148}$

= 250

Question 16

2,000 is invested at annual rate o interest of 10%. What is the amount after two years if compounding is quarterly?

(a) 2420 (b) 2431

(c) 2436.80 (d) 2440.58

Answer: c

Explanation:

n = 4 × 2 = 8

i = $\frac{0.1}{4}$ = 0.025

A_8 = 2,000 $(1+0.025)^8$

= 2,000 × 1.2184

= 2,436.80

Question 17

Determine the compound amount and compound interest on 1000 at 6% compounded semi-annually for 6 years. Given that $(1+i)^n$ = 1.42576 for i = 3% and n = 2

(a) 425.76 (b) 425.67

(c) 851.52 (d) 851.25

Answer: a

Solution:

Given:

Principal, P = Rs. 1,000

Rate of Interest = 6%
Time, = 6 years
And $(1 + i)^n$ = 1.42576 for i = 3% and n = 12
We k now compound amount, A = P $(1 + i)^n$
Since, the interest is compounded semi-annually for 6 years
Here, i = $\frac{6}{2}$% = 3% and n = 6 × 2 = 12

Compound Amount

$A = P(1 + i)^n$

= Rs. 1,000 $(1 + 3\%)^{12}$

= Rs. 1,000 × 1.42576

= Rs. 1,425.76

Compound Interest = Rs. (1,425.76 – 1,000)

= Rs. 425.76

Question 18

2000 is invested at annual rate of interest of 10%. What is the amount after two years if compounding is done monthly?

(a) 2420 (b) 2431
(c) 2436.80 (d) 244.058

Answer: d

Explanation:

$A_n = P (1 + i)^n$
n =12 × 2 = 24, i= 0.1/12 = 0.00833
A_{24} = 2, 00 $(1+ 0.00833)^{24}$
= 2.00 × 1.22029
= 2.44.058

Question 19

Which is a better investment 3% per year compounded monthly or 3.2% per year simple interest? Given that $(1+0.0025)^{12} = 1.0304$

(a) 3.04% (b) 3.4%
(c) 3.004% (d) 4.03%

Answer: a

Explanation:

i= 3/12 =0.25% = 0.0025
n=12
$E = (1+i)^n - 1$
$= (1 + 00025)^{12} - 1$
= 1.0304 – 1 = 0.0304

= 3.04%
Effective rate of interest (E) being less than 3.2%. The simple interest 3.2% per year is the better investment.

Question 20

Bichara invest 3000 in a two-year investment that pays you 12% per annum. Calculate the future value of the investment.

(a) 3,763.20 (b) 376.320
(c) 37632.00 (d) 37.6320

Answer: a

Explanation:

We know $F = C.F. (1 + i)^n$
Where F = Future value
C.F. = Cash flow = 3,000
i = rate of interest = 0.12
n= time period = 2
$F = 3,000(1+0.12)^2$
= 3,000 × 1.2544
= 3,763.20

Question 21

Ascertain the compound value and compound interest of an amount of '75,000 at 8 percent compounded semiannually for 5 years.

(a) 30615 (b) 36051
(c) 36501 (d) 36015

Answer: d

Explanation:

Computation of compound value and compound interest
Semiannual rate of interest (i) = 8/2 = 4%
n = 5 × 2 = 10, P = 75,000
Compound value = $P (1+i)^n$
$= 75,000(1+4\ \%)^{10}$
= 75, 000 × 1.4802
= 1, 11,015
Compound interest = 1, 11,015 – 75,000 = 36,015.

Question 22

A doctor is planning to buy an X – Ray machine for his hospital. He has two options. He can either purchase it by making cash payment of 5 lakhs or 6'15,000 are to be paid in six equal annual installments. Which option do you suggest to the doctor assuming the rate of return

is 12 percent? Present value of annuity of Rs. 1 at 12 percent rate of discount for six years is 4.111

(a) 421378 (b) 412378
(c) 487321 (d) 421387

Answer: a

Explanation:

Option I:

Cash down payment = 5, 00,000

Option II:

Annual installment Basis

Annual installment = $615000 \times \frac{1}{6} = 102500$

Present value of 1 to 6 installments @ 12%

= 1, 02,500 × 4.111

= 4, 21,378

Question 23

Calculate if '10,000 is invested at interest rate of 12% per annum, what is the amount after 3 years if the compounding of interest is done half yearly?

(a) 14049.28 (b) 14185.19
(c) 14857.61 (d) 14094.28

Answer: b

Explanation:

$10,000 \left[1 + \frac{12}{100 \times 2}\right]^{3\times2}$

$10,000\ (1 + 0.06)^6$

= 10,000 × 1.418519

= 14,185.19

Question 24

Present value '' is the current value of a '' Future Amount ''. The statement is correct or not?

(a) Correct (b) incorrect
(c) Not sure (d) None

Answer: a

Explanation:

Present value ''is the current value of a ''Future Amount''. It can also be defined as the amount to be invested today (present value) at a given rate over specified period to equal the ''Future Amount''.

Question 25

Simple interest may be defined as interest that is calculated as a simple percentage of the restricted amount is true or false?

(a) True (b) False
(c) Partial (d) None

Answer: b

Explanation:

Simple interest may be defined as interest that is calculated as a simple percentage of the original principal amount.

Question 26

Time value of money indicates that

(a) A unit of money obtained today is worth more than a unit of money obtained in future

(b) A unit of money obtained today is worth less than a unit of money obtained in obtained in future

(c) There is no difference in the value of money obtained today and tomorrow

(d) None of these

Answer: a

Explanation:

A unit of money obtained today is worth more than a unit of money obtained in future.

Question 27

Time value of money supports the comparison of cash flows recorded at different time period by

(a) Discounting all cash flows to a common point of time

(b) Compounding all cash flows to a common point of time

(c) Using either a or b

(d) None of the above

Answer: c

Explanation:

Time value of money supports the comparison of cash flows recorded at, different time period by discounting and compounding all cash flows to a common point of time.

Question 28

Accounting financial management → liquidity decisions

(a) True (b) False
(c) Partial (d) None

Answer: b

Explanation:

False

It should be → the controller's responsibilities are primarily – in nature, while the treasure's responsibilities are primarily related to this.

Question 29

Richa borrowed a sum of Rs. 4800 from Ankita as a loan. She promised Ankita that she will pay it back in two equal installments. If the rate of interest be 5% per annum compounded annually, find the amount of each installment.

(a) 14049.28 (b) 2581.46
(c) 24857.61 (d) 14094.28

Answer: b

Explanation:

Given that principal value = 4800
Rate = 5%
Two equal installments annually = 2 years
Applying the formula, $P = X/ (1+r/100)^n$ .....X/ (1+r/100)
So, we have here two equal installments.
$P=X/ (1+r/100)^2 + X/ (1+r/100)$
$4800=X/ (1+5/100)^2 + X/ (1+5/100)$
On simplifying
We have x= Rs. 2581.46
So, the amount of each installment is Rs. 2581.46

Question 30

A builder borrows Rs. 2550 to be paid back with compound interest at the rate of 4% per annum by the end of 2 years in two equal yearly installments. How much will each installment be?

(a) Rs. 1352 (b) Rs. 1377
(c) Rs. 1275 (d) Rs. 1283

Answer: a

Explanation:

Amount = Rs. 2550
Rate = 4% per annum
Time = 2 years
Applying the formula
$P= X/ (1+r/100)^{n+}$ .....X/ (1+r/100)
Here we have two equal installments, so

$$P = \frac{1}{\left|1+\frac{r}{100}\right|^2} + \frac{x}{\left|1+\frac{4}{100}\right|}$$

= Rs. 1352

Question 31

A man buys a scooter on making a cash down payment of Rs. 16224 and promises to pay two more yearly installment of equivalent

amount in next two years. If the rate of interest is 4% per annum, compounded yearly, the cash value of the scooter, is

(a) Rs. 40000 (b) Rs. 46824
(c) Rs. 46000 (d) Rs. 50000

Answer: b

Explanation:

Concept used in this question is: you need to calculate principal for every year unlike simple interest where principal used to be same for every year.
Let principal (present worth) for first year be P_1 and that for two years be P_2

$16224 = P_1\left[1 + \frac{4}{100}\right]$

$P_1 = \frac{16224 \times 25}{26}$ = Rs. 15600

Again, $16224 = P_2\left[1 + \frac{4}{100}\right]^2$

$P_2 = \frac{16224 \times 625}{676}$ = Rs. 15000

The total payment will be (cash down payment + installment paid)
Cash value of the scooter
= Rs. (16224 + 15600 + 15000) = Rs. 46824.

Question 32

The populations of Chandigarh is increase at a rate of 1% for first year, it decrease at the rate of 4% for the second year and for third year it again increase at the rate of 5%. Then what will be the population of Chandigarh are 50000.

(a) Rs. 51006 (b) Rs. 50904
(c) Rs. 50836 (d) Rs. 51125

Answer: b

Explanation:

Since the rate growth of population is increasing first and then decreasing for the second year and again it increases for third year, then the population after T years will be

$50{,}000 \times \left[1 + \frac{1}{100}\right]^1 \times \left[1 - \frac{4}{100}\right]^1 \times \left[1 + \frac{5}{100}\right]^1 = 50904$

Question 33

A person bought a new machine. The value of the machine is Rs. 10000. If rate of depreciation is 5 % per annum, then what will be the value of the machine after 2 years?

(a) Rs. 9025 (b) Rs. 9044
(c) Rs. 9110 (d) Rs. 9080

Answer: a

Explanation:

Here P = Rs. 10000

Rate of depreciation = 5%

T = 2 years

Therefore, the value after 2 years will be = P (1 – R/100) ^{t}

$= 10{,}000\left[1-\frac{5}{100}\right]^2$

= Rs. 9025.

Question 34

A sum of Rs. 6600 was taken as a loan. This is to be repaid in two equal annual installments. If the rate of interest be 20% compounded annually then the value of each installment is

(a) Rs. 4320 (b) Rs.4400

(c) Rs. 2220 (d) Rs. 4420

Answer: a

Explanation:

Present worth of Rs. X due T years hence is given by

Present worth (PW) = $\frac{X}{\left(1+\frac{R}{100}\right)^2} = 6600$

$\frac{X}{\left(\frac{6}{5}\right)}+\frac{X}{\left(\frac{6}{5}\right)^2} = 6600$

$\frac{5X}{6}+\frac{25X}{36} = 6600$

$\frac{55X}{36} = 6600.$

$X = \frac{6600\times36}{55} = 4320$

Question 35

Simple interest on a sum at 5% per annum for 2 years is Rs. 60. The compound interest on the same sum for the same period is

(a) Rs. 62.4 (b) Rs. 61.5

(c) Rs. 62 (d) Rs. 60.5

Answer: b

Explanation:

Principal = $\frac{100\times SI}{RT}$ = Rs. 600

Compound interest = $P\left(1+\frac{R}{100}\right)^T$ -P

$= 600\left(1+\frac{5}{100}\right)^2 - 600$

= 661.5 – 600 = Rs. 61.5

Question 36

What will be the amount if a sum of Rs. 10000 is placed at compound interest for 3 year while rate of interest for the first, second and third years is 2, 5 and 10 percent, respectively?

(a) 11781 (b) 11244
(c) 11231 (d) 11658

Answer: a

Explanation:

When rates are different for different years, say R_1%, R_2% and R_3% FOR 1ST, 2ND and 3rd year respectively.

$A = P\left(1+\frac{R_1}{100}\right)\left(1+\frac{R_2}{100}\right)\left(1+\frac{R_3}{100}\right)$

Amount after 3 years = $10000\left(1+\frac{2}{100}\right)\left(1+\frac{5}{100}\right)\left(1+\frac{10}{100}\right)$

$= 10000\left(\frac{102}{100}\right)\left(\frac{105}{100}\right)\left(\frac{110}{100}\right)$

$\frac{102\times105\times11\times}{10}$ = Rs. 11781

Question 37

An electronic type writer worth Rs. 12000 deprecates @ 10% P.A. ultimately it was sold for Rs. 200. Estimate its effective life during which it was in use?

(a) 389 (b) 38.9
(c) 3.89 (d) None

Answer: b

Explanation:

$200=12000\times (90/100)^n$

$1/60 = (9/10)^n$

Apply log both sides, we get

Log (1/60) = n × log (9/10)

-1.7781 = n×-0.0457

38.9 = n

Value of type writer becomes 200 after 38.9 years.

Question 38

An annuity with an extended life is classified as

(a) extended life (b) perpetuity
(c) deferred perpetuity (d) due perpetuity

Answer: b

Explanation:

Perpetuity is a type of annuity that receives an infinite amount of periodic payments. An annuity is a financial instrument that pays consistent periodic payment. As with any annuity, the perpetuity value formula sums the present value of future cash flows.

Question 39

Periodic rate if it is multiplied with per year number of compounding periods is called

(a) extrinsic rate of return (b) intrinsic rate of return
(c) annual rate of return (d) nominal annual rate

Answer: d

Explanation:

An interest rate is called **nominal** if the frequency o compounding (e.g. a month) is not identical to the basic time unit in which the **nominal rate** is quoted (normally a year).

Question 40

A deposit of Rs. 100 is placed into a college fund at the beginning of every month for 10 years. The fund Earns 9% annual interest, compounded monthly, and paid at end of the month. How much is in the account right after the last deposit?

(a) 193751.43 (b) 11244.43
(c) 11231.67 (d) 61658.67

Answer: a

Explanation:

The value of the initial deposit is Rs. 100, so $a_1 = 100$. A total of 120 monthly deposits are made in the 10 years, so n = 120. To find r, divide the annual interest rate by 12 to find the monthly interest rate and add 1 to represent the new monthly deposit.

$r = 1 + \frac{0.09}{12} = 1.0075$

Substitute $a_1=100$, r = 1.0075

, and n = 120 into the formula for the sum of the first n terms of a geometric series, and simplify to find the value of the annuity.

$S_{120} = \frac{100(1-1.0075^{120}}{1-1.0075}$

= 19351.73

Question 41

Relationship between annual nominal rate of interest and annual effective rat6e of interest, if frequency of compounding is greater than one:

(a) Effective rate>Nominal rate (b) Effective rate < Nominal rate
(c) Effective rate = Nominal rate (d) None of the above

Answer: a

Explanation:

Effective rate > Nominal rate

PAST EXAMINATION QUESTIONS:

MAY 2018

Question 1

Mr. X invests Rs. 10,000 every year starting from today for next: 10 years suppose interest rate is 8% per annual compounded annually. Calculate future value of the annuity.

(a) Rs.1,56,454.88 (b) Rs. 1,56,554.88
(c) Rs. 1,44,865.625 (d) None

Answer: a

Explanation:

Annual Installment (A) = 10,000 A=?
R = 8% p.a.c.i n = 10 years

Future value of Annuity due

$A_{n,I} = \frac{A}{I}[(1+i)^n - 1](1+i)$

$\frac{10,000}{0.08}[(1+0.08)^{10} - 1](1+0.08)$

$\frac{10,000}{0.08}[(1.08)^{10} - 1](1+0.08)$

1, 56454.88

Question 2

How much amount is required to be invested every year so as to accumulate Rs. 3, 00, 000 at the end of 10 years, if interest is compounded annually at 10%?

(a) Rs. 18,823.65 (b) Rs. 18,000
(c) Rs. 18,828.65 (d) Rs. 18,882.65

Answer: a

Explanation:

Annuity (annual installment) = A

Future value $A_{n,I}$ = 3, 00,000

R = 10%, n = 10 years

$i = \frac{R}{100} = \frac{10}{100} = 0.1$

$A_{n,i} = \frac{A}{I}[(1+i)^n - 1]$

$3,00,000 = \frac{A}{0.1}[(1+0.1)^{10} - 1]$

$= \frac{A}{0.1}[2.59374 - 1]$

$\frac{A}{0.1} \times 1.59374$

3, 00,000 = A × 15.9374

A = $\frac{3,00,000}{15.9374}$ = Rs. 18,823.65

Question 3

If Rs. 1,000 be invested at interest rate of 5% and the interest is added to the principal every 10 years, then the number of years in which it will amount to Rs. 2,000 is

(a) $16\frac{2}{3}$ years (b) $6\frac{1}{4}$years

(c) 16 years (d) $6\frac{2}{3}$ years

Answer: a

Explanation:

P =1,000, R = 5%p.a.s.i., T = 10 years

SI= $\frac{PRT}{100} = \frac{1000\times5\times10}{100}$= 500

Amount after 10 years

A=P + S. I. = 1,000 + 500 = 1,500

Now after 10 years P = 1,500, R = 5% k = 2,000, T=?

S.I. = A-P

= 2,000 – 1,500

= 500

T = $\frac{SI}{P \times R} = \frac{500\times100}{1500\times5} = \frac{20}{3} = 6\frac{2}{3}$ Years

Total time taken = 10 years + $6\frac{2}{3}$ years

=$16\frac{2}{3}$

Question 4

A person borrows Rs. 5,000 for 2 years at 4% per annual simple interest. He immediately lends to another person at $6\frac{1}{4}$%. Per annual for 2 years find his gain in the transaction for year:

(a) 112.50 (b) 225

(c) 125 (d) 107.50

Answer: b

Explanation:

Case – 1

P = 5,000

R = 4% p.a.s.i

T = 2 years

SI = $\frac{PRT}{100} = \frac{5000\times4\times2}{100}$ = 400

Case – 2

P = 5,000

R = $6\frac{1}{4}$ % = $\frac{25}{4}$% p.a.s.i.

T = 2 Years

SI = $\frac{PRT}{100} = \frac{5000\times25}{100\times24}\times 2 = 625$

His gain = 625 – 400 = 225

Question 5

If an amount is kept at S.I. it earns an interest of Rs. 600 in first two years but when kept at compound interest it earns an interest of 660 for the same period, then the rate of interest and principal amount respectively are

(a) 20%., Rs. 1,200 (b) 20%, Rs. 1,500

(c) 10%, Rs. 1,200 (d) 10%, Rs. 1,500

Answer: b

Explanation:

Case – 1

Let P = X, R = R, T = 2, S.I. = 600

SI = $\frac{PRT}{100}$ =

600 = $\frac{XR2}{100}$

XR= $\frac{600\times100}{2}$

XR =30,000

X = $\frac{30,000}{R}$ ----- (1)

Case – 2

P = X, R, T = 2, C.I = 660

C.I. = P [$(1+\frac{R}{100})^2 - 1$]

$600\left[\frac{30,000}{R}\right]\left[\left(1+\frac{R}{100}\right)^2 - (1)^2\right]$

$600\left[\frac{30,000}{R}\right]\left[\left(1+\frac{R}{100}+1\right)\left(1+\frac{R}{100}\right)-1\right]$

$600\left[\frac{30,000}{R}\right]\left[\left(2+\frac{R}{100}+1\right)\left(1+\frac{R}{100}\right)-1\right]$

$\left[\frac{600}{300}\right] = 2 + \left[\left(\frac{R}{100}\right)\right]$

$\frac{R}{100} = \frac{600}{300} - 2$

$\frac{R}{100} = \frac{600\times600}{300}$

$\frac{R}{100} = \frac{60}{300}$

R = $\frac{60\times100}{300}$ = 20%

Putting R = 20% in

$X = \frac{30,000}{20}$

X = Rs. 1,500

Hence:

P = x= Rs. 1500

R = 20%p.a.

Question 6

The future value of an annuity Rs. 1,000. Made annually for 5 year the interest of 14% compounded annually is:

(a) 5610 (b) 6610

(c) 6160 (d) 5160

Answer: b

Explanation:

Given, Annuity (A) = t 1,000

R = 14%

$i = \frac{14}{100} = 0.14$

Future value n = 5

$A_{n,i} = \frac{A}{I}[(1+i)^n - 1]$

$\frac{1000}{0.14}[(1+0.14)^5 - 1]$

$\frac{1000}{0.14}[1.92541 - 1]$

$\frac{1000}{0.14}[0.692541]$

Rs. 6,610

NOV 2018

Question 1

If Rs. 10,000 is invested at 8% per year compound quarterly, then the value of the investment after 2 years is [given $(1 + 0.2)^8 = 1.171$]

(a) 11,716.59 (b) 10,716.59

(c) 117.1659 (d) None

Answer: a

Explanation:

Given P = 10,000, $R = \frac{8\%}{4}$

R = 2% Quarterly

T = 2×4 = 8Quarter

Value of investment after 'T, years

$A = P\left[1 + \frac{R}{100}\right]^T$

$10,000\left[1 + \frac{2}{100}\right]^8$

$10,000(1+0.02)^8$
$10,000\times (1.02)^8$
$10,000\times 1.171659$
11,716.59

Question 2

A bank pays 10% rate of interest; interest being calculated half yearly. A sum of Rs. 400 is deposited in the bank. The amount at the end of 1 year will be

(a) 440 (b) 439
(c) 441 (d) 442

Answer: a

Explanation:

Given principal (P) = 400
R = 10%p.a.
T = 1 year
Amount after T years

$A = P\left[1+\frac{R}{100}\right]^T$

$= 400\left[1+\frac{10}{100}\right]^1$

$= 400(1.1)$
$= 440$

Question 3

A Certain money doubles itself in 10 years. When deposited on simple interest. It would triple itself in_____

(a) 20 Years (b) 15 years
(c) 25 years (d) 30 years

Answer: a

Explanation:

Case – 1

Let Principal (P) = 100, Amount (A) = 200, R =? T = 10 Years
S. I. = A – P
= 200 – 100
= 100

$R = \frac{SI\times 100}{P\times T}$

$= \frac{100\times 100}{100\times 10}$

R = 10%

Case – II

Let Principal (P) = 100
Amount (A) = 300
(T) = 10 Years

S.I. = A-P
= 300 – 100 = 200
T = $\frac{SI \times 100}{P \times R}$
$\frac{200 \times 100}{100 \times 10}$ = 20 Years
SHORTCUT

A		B		c
100	10 Years	200	10 years	300

Question4

A man deposited t 8,000 in a bank for 3 years at 5% per annum compound interest, after 3 years he will get

(a) 8,800 (b) 9,261
(c) 9,200 (d) 9,000

Answer: b

Explanation:

Given
P = 8000
R = 5% p.a.
T = 3 years
$A = P\left[1 + \frac{R}{100}\right]^T$
$= 8000\left[1 + \frac{5}{100}\right]^3$
$= 8000(1.05)^3$
= 8,000×1.05×1.05×1.05
= 9261

Question5

If in two years' time a principal of Rs. 100 amounts to Rs. 121 when the interest at the rate of r% is compounded annually, then the value of r will be

(a) 10.5 (b) 10%
(c) 15 (d) 14

Answer: b

Explanation:

Given,
Principal (P) = Rs. 100
Amount (A) = Rs. 121
Rate R = r% p.a.
Time T = 2 year
The amount after ''T'' year
$A = P\left[1 + \frac{R}{100}\right]^T$

$121 = 100\left[1 + \frac{r}{100}\right]^2$

$\frac{121}{100} = \left[1 + \frac{r}{100}\right]^2$

$\left(\frac{11}{10}\right)^2 = \left[1 + \frac{r}{100}\right]^2$

On comparing

$\frac{11}{10} = 1 + \frac{r}{100}$

$\frac{11}{10} - 1 = \frac{r}{100}$

$\frac{1}{10} = \frac{r}{100}$

$r = \frac{100}{10}$

r= 10%

Question6

A certain sum of money Q was deposited for 5 year and 4 months 4.5% simple interest and amounted to Rs 248, and then the value of Q is

(a) 200 (b) 210

(c) 220 (d) 240

Answer: a

Explanation:

Given Principal (P)

R = x

T = 4.5%

= 5 years 4 month

= 5 years + $\frac{4}{12}$ years

= 5 years + $\frac{1}{3}$ years

= $5\frac{1}{3}$ years

= $\frac{16}{3}$ years

Amount after T years

A = P + S.I.

$A = P + \frac{PRT}{100}$

$A = X + \frac{X \times 45 \times 16}{1000 \times 3}$

$248 = X + \frac{24X}{100}$

$124X = 24800$

$X = \frac{24800}{124} = 200$

Question 7

A man invests an amount of Rs. 15,860 in the names of his three sons A,B and C in such a way that they get the same amount after 2,3 and 4 years respectively. If the rate of interest is 5%, then the ratio of amount invested in the name of A, B and C is A.

(a) 6: 4: 3 (b) 3: 4: 6
(c) 30: 12: 5 (d) None

Answer: a

Explanation:

Total amount invested = {15,860
Amount Invested into three persons (son's) A, B, C.
Let
Amount Invest in the Name of A = Rs. X
Amount Invest in the Name of B = Rs. Y
Amount Invest in the Name of C = Rs. Z
Then
Case – 1 For A
P = Rs. X, A = 5% T = 2 years

$(S.I.)_1 = \frac{p_1 R_1 T_1}{100} = \frac{X \times 5 \times 2}{100} = \frac{10X}{100}$

Case – 2 for B
P_2 = Rs. Y, R_2 = 5%, T_2 = 3 years

$(S.I.)_2 = \frac{P_2 R_2 T_2}{100} = \frac{Y \times 5 \times 3}{100} = \frac{15Y}{100}$

Case – 3 for C
P_3 = t z, R_3 = 5%, T_3 = 4 years

$(S.I.)_3 = \frac{P_3 R_3 T_3}{100} = \frac{Z \times 5 \times 4}{100} = \frac{20Z}{100}$

Given $(S.I.)_1 = (S.I.)_2 = (S.I.)_3$

$\frac{10X}{100} = \frac{15Y}{100} = \frac{20Z}{100}$

10X = 15Y = 20Z = K
10X = K, 15Y = K, 20Z = K

$X = \frac{k}{10}$, $y = \frac{k}{15}$, $z = \frac{k}{20}$

$X: y: z = \frac{k}{10} : \frac{k}{15} : \frac{k}{20}$

$\frac{1}{10} : \frac{1}{15} : \frac{1}{20} = 60 \times \frac{1}{10} : 60 \times \frac{1}{15} : 60 \times \frac{1}{20}$

6:4:3

Question 8

If the difference between the compound interest compounded annually and simple interest on a certain amount at 10% per annum for two years is 372, then the principal amount is

(a) 37,200 (b) 37,000
(c) 37,500 (d) None of the above

Answer: a

Explanation:

For two year C.I. - S.I. = $P\left(\frac{R}{100}\right)^2$

$372 = P\left(\frac{10}{100}\right)^2$

$372\ P\ (0.1)^2$

$P = \frac{372}{(0.1)^2} = \frac{372}{001} \times \quad 100$

$= 37,200$

Question 9

What is the net present value of piece of property which would be valued at 2 lakh at end of 2 years? (Annual rate of increase = 5%)

(a) 1.81 lakh (b) 2.01 lakh

(c) 2.00 lakh (d) None of the above

Answer: a

Explanation:

Let, Present value (P) = P

A = Rs. 2, 00,000

A = 5%

$A = P\left[1 + \frac{R}{100}\right]^T$

$2, 00,000 = P\left[1 + \frac{5}{100}\right]^2$

$2, 00,000 = P\ (1.05)^2$

$P = \frac{2,00,000}{(1.05)^2} = \frac{2,00,000}{1.1025}$

$= 1, 81,405.896$

$= 1.81$lakhs

Question 10

The effective rate of interest for one-year deposit corresponding to a nominal 7% rate of interest per annum convertible quarterly is:

(a) 7% (b) 7.5%

(c) 7.4% (d) 7.18%

Answer: (D)

Explanation:

Given R = $\frac{7}{4}$% Quarterly = 1.75%

T = 1 x 4 Quarterly

= 4 Quarterly

Effective Rate (E) = $\left[\left(1 + \frac{R}{100}\right)^T - 1\right] \times 100\%$

$\left[\left(1+\frac{1.75}{100}\right)^4-1\right]\times 100\%$
$[(1+0.0175)^4-1]\times 100\%$
$[(1.0175)^4]\times 100\%$
$[1.07185-1]\times 100\%$
$0.0718\times 100\%$
$= 7.18\%$

Question 11

How much will Rs. 25,000 amount to in 2 years at Compound interest if the rates for the successive years are 4% and 5% per year.

(a) 27,300 (b) 27,000
(c) 27,500 (d) None

Answer: a

Explanation:

Given principal (P) = 25000
$R_1 = 4\%$
$R_2 = 5\%$
T = 2 years

Amount after 'Rs' years

$A = P\left[1+\frac{R_1}{100}\right]^1\left[1+\frac{R_2}{100}\right]^1$
$A = 25000\left[1+\frac{4}{100}\right]^1\left[1+\frac{5}{100}\right]^1$
$= 25000\left(1+\frac{1}{25}\right)\left(1+\frac{1}{20}\right)$
$= 25000\left(\frac{26}{25}\right)\times\left(\frac{21}{20}\right)$
$= 27300$

Question 12

Rs.8000 /- at 10% per annum interest compounded half yearly will become at the end of one year.

(a) Rs. 8800 (b) Rs. 8820
(c) Rs. 8900 (d) Rs. 9600

Answer: b

Explanation:

Given P = 8000, $R = \frac{10}{2}\% = 5\%$, T = 1×2h.y, T = 2

$A = P\left[1+\frac{R}{100}\right]^T$
$= 8000\left[1+\frac{5}{100}\right]^2$
$= 8000\left[\frac{21}{20}\right]^2$

$= 8000 \times \frac{21}{20} \times \frac{21}{20}$

$= 20 \times 21 \times 21$

$= 8820$

Question13

The value of furniture depreciates by 10% a year, it the present value of the furniture in an office is Rs. 21,870, calculated the value of furniture 3 year ago

(a) 30,000/- (b) 35,000/-

(c) 40,000/- (d) 50,000/-

Answer: a

Explanation:

Present value of furniture (A) = 21,870/-

Rate of Depreciation (R) = 10%

Time T = 3 year ago

Value of furniture 3 year ago = P

Scrap value after T years

$A = P\left[1 - \frac{R}{100}\right]^T$

$21,870 = P\left[1 - \frac{10}{100}\right]^3$

$21,870 = P\ (0.9)^3$

$P = \frac{21,870}{0.729} = 30,000$

MAY 2019

Question1

A sum was invested for 3 years as per C.I and the rate of interest for first year is 9%, 2nd year is 6% and 3rd year is 3% p.a. respectively. Find the sum if the amount in three years is '550?

(a) Rs. 250 (b) Rs. 300

(c) Rs. 462.16 (d) Rs. 350

Answer: c

Explanation:

Assuming (C) as option 1st year

$A = P\ (1+i)^n$

$A = 462.16(1+0.09)^2$

$= 462.16(1.09)$

503.7544

2ND year

$A = 503.75(1+0.06)^1$

$= 503.75(1.06)$

533.975

149.99 Or 150
By taking 462.16 as our principal amount is matched as 550/-

Question 2

If pi^2 =Rs.96 and R = 8% compounded annually then P = -------.

(a) 14,000 (b) 15,000
(c) 16,000 (d) 17,000

Answer: b

Explanation:

Pi^2 = Rs.96
R = 8%
$P \times (8\%)^2 = 96$
$P \times 64\% = 96$
$P = \frac{96}{64\%}$
$P = \frac{96}{0.64}$
$P = \frac{96 \times 100 \times 100}{8 \times 6}$
P = 15000

Question 3

P = '5,000 R = 15% T= $4\frac{1}{2}$ using I = $\frac{PRT}{100}$ then I will be

(a) 3,375 (b) 3,300
(c) 3,735 (d) None of these

Answer: a

Explanation:

$I = \frac{PTR}{100}$
$= 5000 \times \frac{4.5}{\alpha} \times \frac{15}{100}$
= 3375

Question 4

A sum of money amounts to 6,200 in 2 years and 7,400 in 3 years and as per S.I. then the principal is.

(a) 3,000 (b) 3,500
(c) 3,800 (d) None of these

Answer: c

Explanation:

$A_2 = 6200 \rightarrow P + P \times R \times T = 6200$
$A_3 = 7400 \rightarrow P\,[1 + 2R] = 6200$
$P + P \times R \times T = 7400$
$P\,[1 + 3R] = 7400$

P = 3800

Question 5

The effective rate of interest does not depend upon

(a) Amount of Principal (b) Amount of interest

(c) Number of Conversion periods (d) None of these

Answer: a

Explanation:

The Effective Rate of interest does not depend upon amount of principal

Question 6

In simple interest if the principal is '2,000 and the rate and time are the Roots of the equations $x^2 - 11x + 30 = 0$ then the simple interest is ---------

(a) 500 (b) 600

(c) 700 (d) 800

Answer: b

Explanation:

P = 2000

R? T?

$X^2 - 11X + 30 = 0$

$X^2 - 6X - 5X + 30 = 0$

X[X-6]-5 [X-6] = 0

(X-5) = 0 X = 5

(X-6)=0 X = 6

R = 5 , T = 6

$\frac{P \times R \times T}{100} = 2000 \times \frac{5}{100} \times 6$

= 600

Question7

The certain sum of money became '692/- in 2 yrs and '800/- in 5 years then the principal Amount is -------

(a) 520 (b) 620

(c) 720 (d) 820

Answer: b

Explanation:

2^{nd} year = 692, 5^{th} year = 800

Taking out difference

5^{th} year -2^{nd} year = 800-692

3yr = 108

Int. for 1 year = $\frac{108}{3} = 36$

Now to calc. principle

=692-2 × Int
=692-2 × 36
= 692-72 = 620

Question 8

Determine the present value of perpetuity of Rs. 50,000 per month @ Rate of interest 12% p.a. is -------

(a) Rs. 45,00,000 (b) 50,00,000
(c) Rs. 55,00,000 (d) 60,00,000

Answer: b

Explanation:

Answer is b
I = (r/100)÷time
PVA =p/i
i = (12/100)÷ 12 months = 0.01
PVA = 50,000/0.01 = 50,00,000

Question 9

A person wants to lease out a machine costing Rs. 5, 00,000 for a 10 year period. It has fixed a rental of Rs. 51,272 per annum payable annually starting from the end of first year. Suppose rate of interest is 10% per annum, compounded annually on which money can be invested. To whom this agreement is favorable?

(a) Favour for lessee (b) Favour for lessor
(c) Not for both (d) Can't be determined

Answer: a

Explanation:

The Calculating Present value for lease

$A = P\left[\frac{(1+i)^{-n}-1}{i}\right]$

$A = 21{,}272\left[\frac{(1+0.1)^{-10}-1}{0.1}\right]$

$= 51{,}272\left[\frac{(1.1)^{-10}-1}{0.1}\right]$

A = 315,044

Now by lessee total cost incurred today will be 3, 15,044 & cost of machine is 5, 00,000

So we will prefer lessee

Question10

Let a person invest a fixed sum at the end of each month in an account paying interest 12% per year compounded monthly. It the future value of this annuity after the 12th payment is Rs. 55,000 then the amount invested every month is?

(a) Rs. 4, 837 (b) Rs. 4,637
(c) Rs. 4,337 (d) Rs. 3337

Answer: c

Explanation:

$FV = C \times \left[\frac{(1+i)^n - 1}{i}\right]$

$55000 = C \times \left[\frac{(1+0.01)^{12} - 1}{0.12}\right]$

$= 4337$

Question 11

A machine depreciates in value each year at 10% of its previous value and the end of 4th year value is Rs. 131220. Find the original value:

(a) Rs. 2,00,000 (b) Rs. 2,02,000
(c) Rs. 2,01,000 (d) Rs. 2,03,000

Answer: a

Explanation:

Let value of the machine at the start was 100. Now, depreciate the value by 10% and 5% alternatively.

100 == 10% ==> 90 ==5% == 85.5 == 10% ==> 76.96 ==5% ==> 73.10 (at the end of 4th year.)

Now, comparing,

73.10 = 146205

1 = 146205/73.10

100 = (146205×100)/73.10 = 2, 00,006. (Approx).

So, value at the start = Rs. 200000

NOV 2019

Question1

A man invests Rs. 12,000 at 10% p.a. and another sum of money at 20% p.a. for one year. The total investment earns at 14% p.a. simple interest the total investment is:

(a) Rs 8,000 (b) Rs. 20,000
(c) Rs. 14,000 (d) Rs. 16,000

Answer: (b)

Explanation:

Let the another sum of money be x

So total investment Rs. (12,000 + x)

$SI = \frac{P \times R \times T}{100}$

According to question

$\frac{12,000\times10\times1}{100}+\frac{x\times20\times1}{100}=(12,000+x)\times\frac{14}{100}\times1$

1, 20,000 + 20x = 1, 68,000 + 14x

6x = Rs. 48,000

X = Rs. 8,000

So total investment

= Rs. (12,000 + x)

= Rs. (12,000 + 8000)

= Rs. 20,000

Question 2

Let the two rates of interest be r_1%, r_2%

(a) 0.4 (b) 4

(c) 0.004 (d) 18

Answer: (a)

Explanation:

SI = $\frac{P\times R\times T}{100}$

According to question

$(SI)_1-(SI)_2=18$

$1500\times\frac{r_1}{(100)}\times3-1500\times\frac{r_2}{(100)}\times3=8$

$\frac{4500}{(100)}(r_1-r_2)=18$

$(r_1-r_2)=0.4$

So, the difference in their rates is 0.4.

Question 3

Find the effective rate of interest on payable half yearly at 5% p.a.

(a) 5.06% (b) 4%

(c) 0.4% (d) 3%

Answer: (a)

Explanation:

Here, R = 5% T = 1 yr

Since interest is payable half yearly

R = $\frac{5}{2}$% and T = 1 × 2 = 2 Year

$=\left[\left(1+\frac{R}{100}\right)^T-1\right]\times100$

$=\left[\left(1+\frac{5}{2\times100}\right)^2-1\right]\times100$

$= [(1.025)^2 - 1] \times 100$

$= [0.050625] \times 100$

= 5.0625%

= 5.06% (Approx.)

Question 4

Find the effective rate of interest at 10% p.a. when interest is payable quarterly.

(a) 10.38% (b) 5%
(c) 5.04% (d) 4%

Answer: (a)

Explanation:

Here; R = 10% T = 1 year

Since interest is payable quarterly

R = $\frac{10\%}{4}$ T = 1 x 4 years

= $\left[\left(1+\frac{r}{100}\right)^{T}-1\right]\times 100$

= $\left[\left(1+\frac{10}{4\times 100}\right)^{4}-1\right]\times 100$

= $[(1.025)^4 - 1] \times 100$

= 10.38%

Question 5

What will be the population after 3 years when present populations is Rs. 25,000 and populations increase at the rate of 3% in 1 year, at 4% in II year, and at 5% in III year?

(a) Rs. 28,119 (b) Rs. 29,118
(c) Rs. 27,000 (d) Rs. 30,000

Answer: (a)

Explanation:

When population increase at the rate of r_1% in 1st year, r_2 % in IInd year and r_3% in IIIrd year.

Population after' years is given by

A = P $(1+\frac{r_1}{100})(1+\frac{r_2}{100})(1+\frac{r_3}{100})$

Here, P = 25,000

r_1= 3%, r_2 = 4% r_3 = 5%

Population after 3 years = 25,000 $(1+\frac{r}{100})(1+\frac{r}{100})(1+\frac{r}{100})$

= 28119

Question6

The value of scooter is Rs. 10,000 find its value after 7 years if rate of depreciation is 10% p.a.

(a) 4,782.96 (b) 4,278.69
(c) 42,079 (d) 42,000

Answer: a

Explanation:

We know

$A = P\left(1 - \frac{R}{100}\right)^T$

Where, A scrap value

P Present value

R Rate of depreciation

T time

Here P = 10,000, R = 10%, T = 7 years

$A = 10{,}000\left(1 - \frac{10}{100}\right)^7$

A = 4782.96

So value of scooter is 4782.96 after 7 years

Question 7

SI = 0.125P at 10% p.a. Find time.

(a) 1.25 years (b) 25 years

(c) 0.25 years (d) None

Answer: (a)

Explanation:

We know,

$SI = \frac{p \times R \times T}{100}$

Here, SI = 0.125P R = 10%

Put these values in the above formula

$0.125\ P = P \times \frac{10}{100} \times T$

$T = \frac{0.125P \times 100}{10 \times P}$

$= 10 \times 0.125$

T = 1.25 Years

Question 8

Scrap value of a machine valued at 10, 00,000, after 10 years within depreciation at 10% p.a.

(a) 348678.44 (b) 33,84,679.45

(c) 4,00,000 (d) 3,00,000

Answer: (a)

Explanation:

We Know,

$A = P\left(1 - \frac{R}{100}\right)^T$

Where A => Scrap value after't' years.

P => Present value R => Rate of depreciation

Here, P = Rs. 10, 00,000, R = 10%, T = 10 Years

A = 10, 00,000 $\left(1-\frac{10}{100}\right)^{10}$ = 348678.44

So value of machine after 10 year will be 348678.44

Question 9

The difference between CI and SI for 2 years is 21. If rate of Interest 5% find principal

(a) Rs. 8400 (b) Rs.4800

(c) Rs. 8,000 (d) Rs. 8,200

Answer:(a)

Explanation:

CI = P $\left[\left(1+\frac{R}{100}\right)^{T}-1\right]$ SI=$\frac{P\times R\times T}{100}$

CI = P $\left[\left(1+\frac{R}{100}\right)^{2}-1\right]$ SI=$\frac{P\times 5\times 2}{100}$

CI= P |1.1025 − 1|

CI= P (0.1025)

21= 0.0025 P

P = Rs. $\frac{21}{0.0025}$ = Rs. 8400

So principal is 8400

Question 10

Present value of a scooter is Rs. 7,290 if its value decreases every year by 10% then its value before 3 years is equal to:

(a) 10,000 (b) 10,500

(c) 20,000 (d) 20,500

Answer:(a)

Explanation:

Let the value of the scooter be Rs. X before 3 years

Before three years, A (scrap value after 3 year) = Rs. 7,290

R = 10% (dep rate)

T = 3 years

A = P $\left(1-\frac{R}{100}\right)^{T}$

7,290 = P $\left(1-\frac{R}{100}\right)^{3}$

P = Rs. 10,000

DEC 2020

Question 1

On what sum will the compound interest at 5% p.a for 2 years compounded annually be Rs.3, 280

(a) Rs. 16,000 (b) Rs. 32,000
(c) Rs. 48,000 (d) Rs. 64,000

Answer: b

Explanation:

Let the sum be Rs. X

We Know that:

$$= P\left(1+\frac{R}{100}\right)^n - P$$

$$= P\left(1+\frac{R}{100}\right)^n - 1$$

$$3280 = x\left[\left(1+\frac{R}{100}\right)^n - 1\right]$$

$$3280 = x[1.05^2 - 1]$$

$$x = \frac{3280}{0.1025}$$

$$x = 32{,}000$$

Question 2

What sum of money will produce Rs.42, 800 as an interest in 3 years and 3 months at 2.5% p.a simple interest?

(a) Rs.3,78,000 (b) Rs.5,26,769
(c) Rs.4,22,000 (d) Rs.2,24,000

Answer: b

Explanation:

We know I=P×it

$$42{,}800 = P \times \frac{2.5}{100} \times 3\frac{3}{12}$$

P = 5, 26,769

Question 3

An amount P becomes Rs.5, 100.5 and Rs.5,203 after second and fourth years respectively, at r% of interest per annum compounded annually. Thus, values of P and r are

(a) Rs.5,000 and 1 (b) Rs.4,000 and 1.5
(c) Rs.6,000 and 2 (c) Rs.5,500 and 3

Answer: a

Explanation:

By option a

5000 as P & 1% = r

For 2 year

5000 +1%+1% = 5100.5

For 4 year

5000+1%+1% +1% +1% = 5203

Question 4

A certain sum invested at 4% per annum compounded semi-annually amounts to Rs.1, 20,000 at the end of one year. Find the sum

(a) 1,10,120 (b) 1,15,340
(c) 1,12,812 (d) 1,13,113

Answer: b

Explanation:

An= 1,20,000
n=2×1 = 2
i= 4×1/2% = 2%=0.02
P(in Rs)= ?
We have An = $P(1+0.02)^2$
$1,20,000 = P(1.02)^2$
=1,15,340

Question 5

Rs. 2,500 is paid every year for 10 years to pay off a loan. What is the loan amount if interest rate be 14% per annum compounded annually?

(a) 13,040.27 (b) 15,847.90
(c) 14,674.21 (d) 16,345.11

Answer: a

Explanation:

V=A.P.(n,i)
Here A=Rs.25,00
n=10
i=0.14
V=2,500×P(10,0.14)
=2,500×5.21611=Rs. 13,040.27
Therefore the loan amount is RS. 13,040.27

Question 6

The ratio of principal and the compound interest value for three years (compounded annually) is 216: 127. The rate of interest is

(a) 0.1567 (b) 0.1777
(c) 0.1667 (d) 0.1588

Answer: c

Explanation:

Le the principal be P, then
Compound interest, CI :
$\frac{p}{CI} = \frac{216}{127}$

$\Rightarrow CI = \frac{127}{216}P$

$CI = P\left[1 + \frac{R}{100}\right]^T - P$

$\Rightarrow \frac{127}{216}P = P\left[1 + \frac{R}{100}\right]^3 - P$

$\rightarrow \frac{127}{216} = \left(1 + \frac{R}{100}\right)^3 - 1$

$\rightarrow \frac{127}{216} + 1 = \left(1 + \frac{R}{100}\right)^3$

$\rightarrow \frac{343}{216} = \left(1 + \frac{R}{100}\right)^3$

$\rightarrow 1 + \frac{R}{100} = \left(\frac{343}{216}\right)^{\frac{1}{3}}$

$\rightarrow 1 + \frac{R}{100} = \frac{7}{6}$

$\rightarrow \frac{R}{100} = \frac{7}{6} - 1$

$\rightarrow R = \frac{1}{6} \times 100$

$\rightarrow R = 16.67\% = 0.1667$

Hence, 16.67% (Option C) is correct.

Question 7

Find the present value of Rs.1, 00,000 be required after 5 years if the rate of interest is 9% given that (1.09)5 = 1.5386

(a) 78,995.98 (b) 64,994.20

(c) 88,992.43 (d) 93,902.12

Answer: b

Explanation:

Here i = 0.09 = 9%

n= 5

A_n= 10,000

Required present value = $\frac{A_n}{(1+i)^n}$

$= \frac{1,00,000}{(1+0.09)^5}$

Rs. 64,994.20

Question 8

Suppose you deposit Rs.900 per month into an account that pays 14.8% interest compounded monthly. How much money will you get after 9 months?

(a) Rs.8,511 (b) Rs.9,000

(c) Rs.9,200 (d) Rs.1,000

Answer: a

Explanation:

Here, P = Rs. 900 , R= 14.8% and T = $\frac{9}{12}$ = ¾

$A = P\left(1+\frac{R}{100}\right)^{3/4}$

$A = P\left(1+\frac{14.8}{100}\right)^{3/4}$

A = 8,511

Question 9

An amount is lent at a nominal rate of 4.5% per annum compounded quarterly. What would be the gain in rupees over when compounded annually?

(a) 0.56 (b) 0.45

(c) 0.76 (d) 0.85

Answer: c

Explanation:

Let the principal be Rs. 1 and rate is 4.5% per annum

Compounded Annually:-

$A = P\left(1+\frac{r}{100}\right)^{n}$

Compounded Quarterly:-

$A = P\left(1+\frac{r}{100}\right)^{4n}$

$A = 1\left(1+\frac{4.5}{100}\right)^{1} = \frac{104.5}{100} = 1.04500$

$A = 1\left(1+\frac{4.5}{100}\right)^{4} = \frac{104.5}{100} = 1.04500$

Gain = 0.00076

Now, gain for Rs. 1 = 0.00076

Gain for Rs. 1000 = 0.76

Question 10

Determine the present value of perpetuity Rs.10 per month for infinite period at an effective rate of interest of 14% p.a.?

(a) Rs.657 (b) Rs.757
(c) Rs.857 (d) Rs.957

Answer: c

Explanation:

i=$\frac{(r/100)}{T}$

PVA= $\frac{10}{0.01166}$

i=$\frac{(14/100)}{12}$

=857

Question 11

Which of the following statement is true?

(a) F.V of ordinary annuity < F.V of annuity due (b) F.V of ordinary annuity > F.V of annuity due
(c) P.V of ordinary annuity > P.V of annuity due (d) None of these

Answer: a

Explanation:

F.V of ordinary annuity < F.V of annuity due

JAN 2021

Question 1

A certain sum amounted to Rs. 575 at 5% in a tie which Rs. 750 amounted to Rs. 840 at 4% if the rate of interest is simple, find the sum.

(a) Rs. 525 (b) Rs. 550
(c) Rs. 515 (d) Rs. 500

Answer: d

Explanation:

Time = $\frac{90\times100}{750\times4} = 3\ year$

Sum = $\frac{100 \times A}{100 + rt}$

$\frac{100 \times 575}{100 + 3 \times 5} = 500$

There is a direct relationship between the principal and the amount and is given by SUM = (100*Amount)/(100+rt)

Question 2

Find the amount of compound interest, if an amount of Rs. 50,000 is deposited

in a bank for one year at the rate of 8% per annum compounded semiannually.

(a) Rs. 3,080 (b) Rs. 4,080
(c) Rs. 5,456 (d) Rs. 7,856

Answer: b

Explanation:

It is given that
Principal (P) = 50000
Rate of interest (r) = 8% p.a. = 4% semi-annually
Period (n)= $\frac{1}{2}$ years = 2 semi-annually
We know that
Amount = $P(1+r/100)^n$
Substituting the values
= $50000(1+4/100)^2$
By further calculation
= $50000(26/25)^2$
= $50000 \times \frac{26}{25} \times \frac{26}{25}$
= 54,080
Here
Compound interest = A - P
Substituting the values
= 54,080−50000
= 4,080

Question 3

The population of a town increases by 2% of the population of the beginning of that year. The number of years by which the total increase in population would be 40% is

(a) 7 years (b) 10 years
(c) 17 years (approx.) (d) 19 years (approx...)

Answer: c

Explanation:

lets assume that the initial population was P
now after a year population will be
= $P\left[1 + \frac{2}{100}\right]$
=P(102/100)
=1.02P
Similarly after 2 years population will be
=1.02 x 1.02 x P
So after n number of years population will be
=P x (1.02^n)
now this population should be equal to P+40%P, so

$1.4P=P \times (1.02^n)$
$1.4=1.02^n$
$1.02^{17}=1.02^n$
so n=17
that means after 17 years the total increase in the population will be 40% of that of initial population.

Question 4

Find the future value of annuity of Rs. 1,000 made annually for 7 years at interest rate of 14% compounded annually [Given that $1.14^7 = 2.5023$)

(a) Rs. 10,730.7 (b) Rs. 5,365.35
(c) Rs. 8,756 (d) Rs. 9,892.34

Answer: a

Explanation:

Annual Payment A= Rs. 1000
n= 7
i= 14% = 0.14

$$A(7, 0.14) = 1000 \left[\frac{(1+1.014)^7-1}{0.14}\right] = 10,730.7$$

Question 5

Two equal amounts of money an deposited in two banks each at 15% p.a. fix 3.5 years in the bank and fix 5 years in the either. The difference between the interest amounts from the banks in Rs. 144 find the sum.

(a) Rs. 620 (b) Rs. 640
(c) Rs. 820 (d) Rs. 840

Answer: b

Explanation:

$$\frac{144 \times 100}{(5-3.5) \times 15} = 640$$

Question 6

The simple Interest on a sum at 4% p.a. for two years is Rs. 80. Find the compound interest on the same sum for the same period.

(a) Rs. 81.6 (b) Rs. 80.8
(c) Rs. 83.2 (d) Rs. 82.3

Answer: a

Explanation:

$SI = \frac{PTR}{100} = \frac{80\times100}{8} = 1000$
In CI with rate of interest = 4% and time = 2years
Amount = $1000 \times \frac{104}{100} \times \frac{104}{100} = 1081.6$

CI = A - P = 1081.6-1000 = 81.6

Question 7

Which is a better investment 9% p.a. compounded quarterly or 9.1% p.a. simple interest?

(a) 9% compounded (b) 9.1% S.I
(c) Both are same (d) Cannot be said

Answer: a

Explanation:

The better investment in the sense of more interest will be 9.0% compounded quarterly.

The formulas are

1. Future value = Principal x $(1 + i)^t$ when the interest is compounded annually, and investment will be multiplied by $(1 + I)^t$, but in this case, t = 1, so the multiplier will be 1 + .0925 = 1.0925.

Question8

The effective rate of interest corresponding to nominal rate of 7% p.a. compounded quarterly is.

(a) 7.5% (b) 7.6%
(c) 7.7% (d) 7.18%

Answer: d

Explanation:

r = 7% p.a i.e 1.75% per quarter(7/4).

So 1+reff = $(1.0175)^4$ = 1.071859

implies reff = 7.1859

Question 9

Assuming that the discount rate is 7% p.a. how much would you pay to receive Rs. 200, growing at 5% annually forever?

(a) Rs. 2,500 (b) Rs. 5,000
(c) Rs. 7,500 (d) Rs. 10,000

Answer: d

Explanation:

$$\frac{200}{0.07 - 0.05} = \frac{200}{0.02} = 10{,}000$$

Question 10

A man invested one-third of his capital at 7% one-fourth at 8% and the remainder at 10% if the annual income is Rs. 5610, the capital is

(a) Rs. 4,400 (b) Rs. 5,500
(c) Rs. 6,600 (d) Rs. 5,800

Answer: c

Explanation:

Let the total capital be x. Then

$\left(\frac{x}{3}\times\frac{7}{100}\times 1\right)+\left(\frac{x}{4}\times\frac{8}{100}\times 1\right)+\left(\frac{5x}{12}\times\frac{10}{100}\times 1\right)=5610$

$=\frac{7x}{300}+\frac{x}{50}+\frac{x}{24}=5610$

$= 51x = (5610 \times 600)$

$x = \left(\frac{5610\times 600}{51}\right)$

Question 11

A sum of money is lent at compound interest rate 20% p.a. two years. It would fetch Rs. 482 more if the interest is compounded half-yearly. Then the sum is.

(a) Rs. 19,800 (b) Rs. 19,900

(c) Rs. 20,000 (d) Rs. 20,100

Answer: c

Explanation:

Let the sum of money lent out be Rs. x

In the 1st case:

$A_1 = Rs\ x\left(1+\frac{20}{100}\right)^2 = Rs.\frac{36x}{25}\ \therefore A = P\left(1+\frac{r}{100}\right)^n$

$A_2 = Rs\ x\left(1+\frac{20}{100\times 2}\right)^{2\times 2} = Rs.\frac{14641x}{10000}\ \therefore A = P\left(1+\frac{r}{2\times 100}\right)^{n\times 2}$ (half yearly)

According to the question

$\frac{14641x}{10000}-\frac{36x}{25}=482$

$=\frac{14641x-14400x}{10000}=482$

$= 241x = 4820000$

$= x = 20000$

∴The sum of money lent out = Rs.20,000

Question 12

Rs. 800 is invested at the end of each month in an account paying interest 5% per year compounded monthly. What is the future value of his annually after tenth payment?

(Given that $1.005^{10} = 1.0511$)

(a) Rs. 4,444 (b) Rs. 8,756

(c) Rs. 3,491 (d) Rs. 8,176

Answer: d

Explanation:

A = Rs. 800

n= 10

i= 5%p.a. = 5/12 = $\frac{5}{1200}$ → 0.00416

Future value of annuity after 10 months is given by

A(n,i) = A $\left[\frac{1+i)^n-1}{i}\right]$

A (10,0.4167)= 800 $\left[\frac{1+0.00416)^{10}-1}{0.00416}\right]$

= Rs. 8,176

Question 13

When 'i' denote the actual rate of interest in decimal, and n denote the number of conversion periods, the formula for computing the effective rate of interest E is given by.

(a) $(1+i)^n$ (b) $(1+i)^n-1$

(c) $1-(1+i)^n$ (d) $(1+i)^{-n}$

Answer: b

Explanation:

$(1+i)^n-1$

Question 14

The present value of an Annuity immediate is the same as

(a) Annuity regular for (n – 1) years plus the initial receipt in the beginning of the period.

(b) Annuity regular for (n – 1) years initial receipt in the beginning of the period.

(c) Annuity regular for (n + 1) years.

(d) Annuity regular for (n + 1) years plus the initial receipt in the beginning of the period.

Answer: a

Explanation:

Annuity regular for (n – 1) years plus the initial receipt in the beginning of the period.

JULY 2021

Question 1

A sum of ₹ 7500 amounts to ₹ 9075 at 10% p.a., interest being compounded yearly in a certain time. The simple interest (in ₹) on the same sum for the same time and the same rate is

(a) 1000 (b) 1250

(c) 1800 (d) 1500

Answer: Options (d)

Assuming throw trick

7500 + 10% + 10% = 9075
Means 7500 took 2 years to be 9075

$$\frac{7500 \times 2 \times 10}{100} = 1500$$

Question 2

A loan of ₹ 1, 02,000 is to be paid back in two equal annual instalments. If the rate of interest is 4% p.a., compounded annually, then the total interest charged (in ₹) under this instalment plan is

(a) 6160 (b) 8120
(c) 5980 (d) 7560

Answer: Options (a)

First let's call every instalment
(1.04) ÷ = 4 GT ÷ = 1, 02,000 = each instalment is 54,080
2 Instalments is 54,080 × 2 = 1, 08,160
Net Instalment Paid = 1, 08,160 – 1, 02,000 = 6160

Question 3

If the desired future value after 5 years with 18% interest rate is ₹ 1,50,000, then the present value (in ₹) is (Given that $(1.18)^5 = 2.2877$)

(a) 63,712 (b) 65,568
(c) 53,712 (d) 41,712

Answer: Options (b)

65,568 + 18% + 18% + 18% + 18% + 18% = 1, 50,000 (approx.)

Question 23

What is the Compound interest (in ₹) on a sum of ₹ 12,600 for 1 ½ years at 20% per annum if the interest is compounded half yearly? (Nearest to a Rupee)

(a) 4271 (b) 4171
(c) 4711 (d) 4117

Answer: Options (b)

Explanation:

Given
P = 12600
n = $1\frac{1}{2}$ Years = 3 Years
r = $\frac{20}{2}$ = 10 %

We know that

$$A = P\left(1 + \frac{r}{100}\right)^n$$

$= 12{,}600\left(1+\frac{10}{100}\right)^3$

$= 12{,}600 \times \frac{11}{10} \times \frac{11}{10} \times \frac{11}{10}$

$= 126 \times \frac{1331}{10}$

$= \frac{167706}{10}$

A = 16770.6

Now,

CI = A – P

= 16770.6 – 12600

= 4171 (Approx.)

Question 4

A sum of ₹ x amounts to ₹ 27,900 in 3 years and to ₹ 41,850 in 6 years at a certain rate percent per annum, when the interest is compounded yearly. The value of is

(a) 16080 (b) 18600

(c) 18060 (d) 16800

Answer: Options (b)

Explanation:

Let the principal b r x and after three years, it becomes Rs. 27,900 and after 6 years it becomes 41,850

➔ $\frac{27{,}900}{x} = \frac{41{,}850}{27{,}900}$

➔ $X = \frac{27{,}900 \times 27{,}900}{41{,}850}$

➔ X = 81,600

Question 5

If the normal rate of growth is 17% and inflation is 9% for the five years. Let P be the Gross Domestic Product (GPD) amount at the present year then the projected real GDP after 6 years is

(a) 1.587 P (b) 1.921 P

(c) 1.403 P (d) 2.15 P

Answer: Options (a)

Explanation:

Growth is 17%
Inflation is 9%
Net Growth = 8%
Taking P = 100, T = 6 year, R = 8%
100 + 8% + 8% + 8% + 8% + 8% + 8% = 158.687
1.587 P = 100
1.587 × 100 = 158.7 (Approx.)

Question 6

If a person bought a house by paying ₹ 45,00,000 down payment and ₹ 80,000 at the end of each year till the perpetuity assuming the rate of interest as 16%, the present value of house (in ₹) is given as

(a) 47,00,000 (b) 45,00,000
(c) 57,80,000 (d) 50,00,000

Answer: Options (d)

$\frac{80,000}{0.16}$ = [Perpetuity Firmula]
= 5, 00,000 is to be deposited today
45, 00,000 + 5, 00,000 = 50, 00,000

Question 7

Let the operating profit of a manufacturer for five years given as:

Year	1	2	3	4	5	6
Operating profit {in lakh ₹}	90	100	106.4	107.14	120.24	157.35

Then the operating profit of Compound Annual Growth Rate (CAGR) for year 6 with respect to years 2 is given at

(a) 9% (b) 12%
(c) 11% (d) 13%

Answer: Options (b)

For CAGR we use very easy CI formula
90 + 12% + 12% + 12% + 12% 12% = 158.61
(Approx. 15.7)

Question 8

If discount rate is 14% per annum, then how much a company has to pay to receive ₹ 280 growing at 9% annually forever.

(a) ₹ 5,600 (b) ₹ 2,800
(c) ₹ 1,400 (d) ₹ 4,200

Answer: Options (a)

$$\frac{R}{i-g} = \frac{280}{0.14-0.09} = \frac{280}{0.05} = 5600$$

Question 9

The effective rate of return for 24% per annum convertible monthly is given as

(a) 24% (b) 26.82%
(c) 18% (d) 24.24%

Answer: Options (b)

ER from Tricks

100 + 2% + 2% + 2% + 2% + 2% + 2% + 2% + 2% +2% + 2% + 2% + 2% => 26.82%

Question 10

If the cost of capital be 12% per annum, then the net present value (in nearest₹) from the given cash flow is given as

Year	1	2	3	4
Operating profit {in thousand ₹}	(100)	60	40	50

(a) 31048 (b) 34185
(c) 51048 (d) 24187

Note: Correct Ans. is Rs. 21,048/- by taking the nearest value option D is preferable

Answer: Options (d)

Question 11

A certain sum amounts to ₹ 15748 in 3 years at simple interest at r% p.a. The same sum amounts to ₹ 16,510 at (r+2) % p.a. simple interest in the same time. What is the value of r?

(a) 10% (b) 8%
(c) 12% (d) 6%

Answer: Options (b)

Question 12

What is difference (in ₹) between the simple interest and the compound interest on a sum of ₹ 8,000 for $2\frac{2}{5}$ years at the rate of 10% p.a., when the interest is compounded yearly?

(a) 135.75 (b) 129.50
(c) 151.75 (d) 147.20

Answer: Options (d)

Question 13

The future value of annuity of ₹ 2,000 for 5 years at 5% compounded annually is given (in nearest ₹) as

(a) 51051 (b) 02021

(c) 15624 (d) 61254

Note: Correct Ans is Rs. 11,051/- by taking the nearest value option C is Preferable

Answer: Options (c)

DEC 2021

Question 1

Mr. X wants to accumulate Rs. 50,000 at the end of 10 years. Then how much amount is required to invested every year if interest is compounded annually at 10%? (Given that P(10,0.10) = 15.9374298)

(a) Rs. 3,13,726.87 (b) 4,13,726.87

(c) Rs. 3,53,726.87 (d) 4,53,726.87

Answer: a

Explanation:

Given FVAR = Rs 50,00,000; t= 10 years; i= 0.10; NOCPPY= 1; A=?

$$FVAR = A\left[\frac{\left(1+\frac{i}{NOCPPY}\right)^{tx\ NOCPPY}-1}{\frac{i}{NOCPPY}}\right]$$

$$A=\left[\frac{\left(1+\frac{FVAR}{NOCPPY}\right)^{tx\ NOCPPY}-1}{\frac{i}{NOCPPY}}\right]$$

$$A\frac{50,00,000}{\left[\frac{\left(1+\frac{0.10}{1}\right)^{10\times1}-1}{\frac{0.10}{1}}\right]}$$

$$A=\frac{50,00,000}{15.9374298}=3,13,726.87$$

Question 2

Rahul invested Rs 70,000 in a bank at the rate of 6.5% p.a. simple interest rate. He received Rs.85,925 after the end of term. Find out the period for which sum was invested by Rahul.

(a) 2 years (b) 3 years

(c) 3.5 yeras (d) 2.5 years

Answer: c

Explanation:

Here, Principle (P) = 70,000

Rate (R) 6.5% p.a.

Amount (A) = 85,925, T= ?

S.I. A-P

= 85,925 – 70,000

= 15,925

$T = \frac{S.I. \times 100}{P \times R} = \frac{15{,}925 \times 1000}{7000 \times 6.5}$

=3.5 year.

Question 3

A company needs Rs. 10,000 in five years to replace as equipment. How much (inRs) should be invested now at an interest rate of 8% p.a. is order to provide for this equipment?

(a) 6000 (b) 6805

(c) 10,000 (d) 11000

Answer:

Explanation:

We have A= Rs10,000; t = 5 years; i= 0.08; NOCPPY = 1; P=?

$$A = P\left(1 + \frac{i}{NOCPPY}\right)^{t \times NOCPPY}$$

$$P = \left[\frac{A}{\left(1+\frac{i}{NOCPPY}\right)^{t \times NOCPPY}}\right]$$

$$= \left[\frac{10{,}000}{\left(1+\frac{0.08}{1}\right)^{5 \times 1}}\right] = 6{,}805$$

Question 4

R needs money to pay Rs. 5,00,000 in 10 years. He invested a sum in a scheme at 9% rate of interest compounded half yearly. How much amount he invested? ($1.046^{20} = 2.41171$)

(a) 3,07,321 (b) 2,70,321

(c) 2,07,321 (d) 3,40,321

Answer: c

Explanation:

$A = P\left(1 + \frac{I}{NOCPPY}\right)^{t \times NOCPPY}$

$= P = \frac{5,00,000}{\left(1+\frac{0.09}{2}\right)^{10\times2}}$

$= P = \frac{5,00,000}{(1.045)^{20}}$

$=P = \frac{5,00,000}{2.41171}$

$=P = 2,07,321$

Question 5

An amount is lent at R% simple interest for R years and the simple interest amount was one- fourth of the principal amount. Then R is _____

(a) 5 (b) 6

(c) 5 ½ (d) 6 ½

Answer: a

Explanation:

We know that I = Pot

Given: $I = \frac{P}{4}; i = \frac{R}{100}; t = R$

$I = Pit$

$\frac{P}{4} = P \times \frac{R}{100} \times R$

$\frac{1}{4} = \frac{R^2}{100}$

$100 = 4R^2$

$R^2 = \frac{100}{4} = 25$

$R = \sqrt{25} = 5$

Question 6

A sum of money is put at 20% compound interest rate p.a. At which year the aggregated amount just exceeds the double of the original sum?

(a) 6 (b) 5

(c) 4 (d) 3

Answer: c

Explanation:
i=0.20; P=100; NOCPPY= 1; t=?

$A= P\left(1+\frac{I}{NOCPPY}\right)^{t\times NOCPPY}$

Try the options.

Option (a) – 6

$A= 100\left(1+\frac{0.20}{1}\right)^{6\times 1} = 298.5894$

Option (b) – 5

$A= 100\left(1+\frac{0.20}{1}\right)^{5\times 1} = 248.832$

Option (c) – 4

$A= 100\left(1+\frac{0.20}{1}\right)^{4\times 1} = 207.36$

Option (d) – 3

$A= 100\left(1+\frac{0.20}{1}\right)^{3\times 1} = 172.8$

Therefore, option (c) is the answer.

Question 7

The present value of an annuity of Rs. 25,000 to be received after 10 years at 6% per annum compounded annually is Rs _____.
($1.06^5 = 1.33823$)

(a) Rs. 15,960 (b)Rs. 13,960
(c) Rs. 11,960 (d) Rs. 17,960

Answer: b
Explanation:
The language of this question is wrong. The word "annuity" should not have been there. Also, the given information ($1.06^5 = 1.33823$) is of no use.

$$P = \frac{A}{\left(1+\frac{A}{NOCPPY}\right)^{t\times NOCPPY}}$$

$$P = \frac{25{,}000}{\left(1+\frac{0.06}{1}\right)^{10\times 1}}$$

= P = 13,959.87 = 13,960

JUNE 2022

Question 1

₹ 2500 is paid every year for 10 years to pay off a loan. What is the loan amount if interest rate be 14% per annum compounded annually?

(a) ₹ 15,841.90 (b) ₹ 13,040.27

(c) ₹ 14,674.21 (d) ₹ 14,010.90

Answer: Options (a)

Explanation:

Annuity (A) = 2,500

n = 10yrs.

R = 14%

$I = \frac{R}{100} = \frac{14}{100} = 0.14$

Present value

$v = \frac{A}{i}\left[\frac{(1+i)^n-1}{(1+0.14)^n}\right]$

$= \frac{2,500}{0.14}\left[\frac{(1+0.14)^{10}-1}{(1+0.14)^{10}}\right]$

$= \frac{2,500}{0.14}\left[\frac{(1.14)^{10}-1}{(1.14)^{10}}\right]$

$= \frac{2,500}{0.14}\left[\frac{3.707221-1}{3.707221}\right]$

$= \frac{2,500}{0.14} \times \frac{2.70721}{3.707221}$

= 13,040.27

Question 2

₹ 200 is invested at the end of each month in an account paying interest 6% per year compounded monthly. What is the future value of this annuity after 10th payment?

(a) ₹ 2,044 (b) ₹ 12,044

(c) ₹ 2,040 (d) ₹ 12,000

Answer: Options (a)

Explanation:

Given Annuity (A) = ₹ 200

n = 10, R = 6% p.a.

$i = \frac{6}{12}$ % per month

i = 0.005

Future value $A(n, i) = \frac{A}{i}[(1+i)^n] - 1$

$= \frac{200}{0.005}[(1+0.005)^{10}] - 1$

$= \frac{200}{0.005}[1.0511] - 1$
$= 200 \times 10.22$
$= ₹\ 2{,}044$

Question 3

In How much time a sum of amount doubles at simple interest at 12.5% rate?

(a) 7 year (b) 8 year
(c) 9 year (d) 10 year

Answer: Options (b)

Explanation:

Let Principal (P) = 100
(A) = 200
(R) = 12.5%
T =?
S.I = A – P
= 200 – 100
= 100
(Time) T = $\frac{S.I \times 100}{P \times R} = \frac{100 \times 1000}{100 \times 12.5} = 8\ years$

Question 4

Anshika took a loan of ₹ 1,00,000 @ 8% for 5 years. What amount will she pay if she wants to pay the whole amount in five equal instalments?

(a) ₹ 25,405.63 (b) ₹ 26,045.68
(c) ₹ 28,045.50 (d) None

Answer: Options (a)

Explanation:

V = 10000
R = 8%
i = $\frac{8}{100} = 0.08$
A = ?, n = 5
Present Value
V = $\frac{A}{i}\left[\frac{(1+i)^n - 1}{(1+i)^n}\right]$
$100000 = \frac{A}{0.08}\left[\frac{(1+0.08)^5 - 1}{(1+0.08)^5}\right]$
$100000 \times 0.08 = A\left[\frac{(1.08)^5 - 1}{(1.08)^5}\right]$
$8000 = \frac{A \times 0.469328}{1.469328}$
$8000 = A \times 0.319417$
$8000 = \frac{8000}{0.319417}$

= 25,045.63

Question 5

Ankit invests ₹ 3,000 at the end of each quarter receiving interest @7% per annum for 5 years. What amount will be receive at the end of the period?

(a) ₹ 71,200.20 (b) ₹ 71,104.83

(c) ₹ 7.,204.83 (d) None

Answer: Options (b)

Explanation:

Given Annuity (A) = 3000

$R = \frac{7}{4}\% = 1.75\%$

$I = \frac{R}{100} = \frac{1.75}{100} = 0.0175$

n = 5 years

= 5 × 4 Quarter

= 20 Quarter

Future Value $A_{(n, i)}$ $= \frac{A}{i}[(1+i)^n - 1]$

$= \frac{3000}{0.0175}[(1+0.0175)^{20} - 1]$

$= \frac{3000}{0.0175}[(1.0175)^{20} - 1]$

= 71,104.83

Question 6

The effective rate of interest corresponding a normal rate of 7% p.a. convertible quarterly.

(a) 7% (b) 7.5%

(c) 5% (d) 7.18%

Answer: Options (d)

Explanation:

In interest is paid Quarterly

$R = \frac{7}{4}\% = 1.75\%$

T = 1 years = 1 × 4 Quarterly

= 4 Quarterly

Effective Rate

$E = \left[\left(1+\frac{R}{100}\right)^T - 1\right] \times 100$

$= \left[\left(1+\frac{1.75}{100}\right)^4 - 1\right] \times 100$

$= [(1+0.0175)^4 - 1] \times 100$

$= [(1.0175)^4 - 1] \times 100$

$= [1.0781 - 1] \times 100$

$= 0.0781 \times 100$
$= 7.18\%$

Question 7

Assuming that the discount rate is 7% p.a. How much would pay to receive ₹ 200, rowing at 5% annually for ever?

(a) ₹ 2500 (b) ₹ 5000
(c) ₹ 7,500 (d) ₹ 10000

Answer: Options (d)

Explanation:

Discount rate (i) = 7% p.a = 0.07
growing rate (g) = 5% annually = 0.05
(R) = ₹ 200
Present value of growing perpetuity

$PVA = \frac{R}{i-g}$

$= \frac{200}{0.07-0.05}$

$= \frac{200}{002}$

$= 10000$

Question 8

A company establishes a sinking fund to provide for the payment ₹ 2,00,000 debt maturity in 20 years contribution to the fund are to be made at the end of every year. Find amount of each deposit of interest is 10% per annum?

(a) ₹ 3,592.11 (b) ₹ 3,492.11
(c) ₹ 3,392.11 (d) None

Answer: Options (b)

Explanation:

$A_{(n,i)} = 2,00,000$

$R = 10\%$, $i = \frac{10}{100} = 0.1$

$A_{(n,i)} = \frac{A}{i}[(1+i)^n - 1]$

$200000 = \frac{A}{0.1}[(1+0.1)^{20} - 1]$

$200000 \times 0.1 = A\,[(1.1)^{20} - 1]$

$20000 = A\,[6.7275 - 1]$

$20000 = A \times 5.7275$

$A = \frac{20000}{5.7275}$,

$A = 3492.11$

Question 9

The CAGR of initial value of a investment of ₹ 15,000 and final value of ₹ 25,000 in 3 years is:

(a) 19% (b) 18.56%

(c) 17.56% (d) 17%

Answer: Options (b)

Explanation:

Initial value (V_{t0}) = 15000

Final Value (V_{tn}) = 25000

$T_n - t_o = 3$

$$\text{CAGR } (0, 3) = \left[\left(\frac{V_{tn}}{V_{to}}\right)^{\frac{1}{tn-to}} - 1\right] \times 100$$

$$= \left[\left(\frac{25000}{15000}\right)^{\frac{1}{3}} - 1\right] \times 100$$

$$= \left[\left(\frac{5}{3}\right)^{\frac{1}{3}} - 1\right] \times 100$$

$$= \left[(1.66)^{1/3} - 1\right] \times 100$$

$$= [1.1856 - 1] \times 100$$

$$= 0.1856 \times 100 = 18.56$$

Question 10

ABC Ltd. wants to lease out na asset costing ₹ 3, 60,000 for a five year period. It has a fixed rental of ₹ 1, 05,000, per annum payable annually starting from the end of first year. Suppose rate of interest is 14% per annum compounded annually on which money can be invested by the company. Is this agreement favourable to the company?

(a) Yes (b) No

(c) It depends (d) None of the above

Answer: Options (a)

Explanation:

Given, A = 105000, n = 5, $= \frac{14}{100} = 0.14$

Present Value

V = A.P (n , i)

= 105000 × P(5,0.14)

= 105000 × 3.43308

= 360473.40

Which is greater than the initial cost of the asset (360000) and leasing is favourable and Preferable.