$m = 2, \quad t = 1 \text{ yr.}$

$n = mt = 2 \times 1 = 2$

$P = A(1+i)^{-n} = 78030\left(1+\dfrac{4}{200}\right)^{-2}$

$= 74999.999.... = ₹ 75000$

Calculator Trick

Type $4 \div 200 + 1$ then press $\div$ button then press $=$ button (power $= 2$) times then press $\times$ button then type A value $= 78030$ then press $=$ button we get the required result.

PAST EXAM QUESTIONS WITH SOLUTIONS (MEMORY BASED)

Q.1. The difference between the simple and compound interest on a certain sum for 3 year at 5% p.a. is ₹ 228.75. The compound interest on the sum for 2 years at 5% p.a. is :

(a) ₹ 3,175   (b) ₹ 3,075

(c) ₹ 3,275   (d) ₹ 2,975

[Nov. 2006]

Solution : Tricks

$P = \dfrac{Difference \times (100)^3}{r^2(300+r)}$

[For 3 years only]

$= \dfrac{228.75 \times (100)^3}{5 \times 5(300+5)} = ₹ 30,000$

$A = 30000 + 5\% + 5\%$ buttons $=$ ₹ 33075

$\therefore$ C.I $= A - P = ₹ 33075 - 30000$

$= ₹ 3,075$

$\therefore$ (b) is Correct

Q.2. In what time will ₹ 3,90,625 amount to ₹ 4,56,976 at 8% per annum, when the interest is compounded semi-annually ? [Given: $(1.04)^4 = 1.16986$]

(a) 2 years   (b) 4 years

(c) 5 years   (d) 7 years

[Feb. 2007]

Solution : (a).

$A = P\left(1 + \dfrac{r}{100m}\right)^{mt}$

$\dfrac{4,56,976}{3,90,625} = \left(1 + \dfrac{8}{200}\right)^{2t}$

or $1.16985856 = (1.04)^{2t}$

or $1.16966 = (1.04)^{2t}$

or $(1.04)^4 = (1.04)^{2t}$

$\therefore 2t = 4 \therefore t = 2$ years

$\therefore$ (a) is correct

Q.3. How long will ₹12,000 take to amount to ₹14,000 at 5% p.a. converted quarterly? [Given: $(1.0125)^{12.4} = 1.1666$]

(a) 3 years   (b) 3.1 years

(c) 13.5 years   (d) 12.4 years.

[May 2007]

Solution : (b) $\dfrac{A}{p} = \left(1 + \dfrac{5}{400}\right)^{4t}$

or $\dfrac{14000}{12000} = (1.0125)^{4t}$

or $1.16666......... = (1.0125)^{4t}$

or $(1.0125)^{12.4} = (1.0125)^{4t}$ [Note :- Always use values given in question]

or $4t = 12.4 \therefore t = 3.1 \text{yrs.}$

$\therefore$ (b) is correct

Q.4. If ₹ 1,000 be invested at interest rate of 5% and the interest be added to the principal every 10 years, then the number of years in which it will amount to ₹ 2,000 is :

(a) $16\dfrac{2}{3}$ years   (b) $\dfrac{1}{10}$ years

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

[Aug. 2007]

Solution : Given P $= ₹ 1000$; $m = \dfrac{1}{10}$;

$n = mt = \dfrac{1}{10} \times t = 0.1t$

$r = 5\%$ p.a.

$A = P\left(1 + \dfrac{5}{0.1 \times 100}\right)^{0.1t}$

$\dfrac{2000}{1000} = (1.50)^{0.1t}$

or $2 = (1.5)^{0.1t}$

or $0.1t = \dfrac{\log 2}{\log(1.5)}$

or $0.1t = 1.709$ or $t = \dfrac{1.709}{0.1}$

$= 17.09 = 16\dfrac{2}{3}$, (a) is correct

Q.5. The annual birth and death rates per 1000 are 39.4 and 19.4 respectively. The number of years in which the population will be doubled assuming there is no immigration or emigration is :

(a) 35 years   (b) 30 years

(c) 25 years   (d) None of these

[Aug. 2007]

Solution : (a) is correct

	Per 1000	Per 100
Birth rate	39.4	3.94
Death rate	19.4	1.94
Population increase 2.00%		
Population increase = 2.%		

$\dfrac{A}{P} = 2 = (1+0.02)^t$

Calculator Trick

Type 1.02 Then push $\times$ button then continue pressing $=$ button until to get 2. No. of pressings of $=$ button is 34 times. So, $t = 35$ years (approx.)

Q.6. The effective rate equivalent to nominal rate of 6% compounded monthly is:

(a) 6.05   (b) 6.16

(c) 6.26   (d) 6.07

[Aug. 2007]

Solution : (b)

$r_e = \left[\left(1 + \dfrac{r}{100m}\right)^m - 1\right] \times 100$

$= \left[\left(1 + \dfrac{6}{1200}\right)^{12} - 1\right] \times 100 = 6.16\%$

option (b) is correct.

Q.7. A person deposited ₹ 5,000 in a bank. The deposit was left to accumulate at 6% compounded quarterly for the first five years and at 8% compounded semiannually for the next eight years. The compound amount at the end of 13 years is :

(a) ₹ 12621.50   (b) ₹ 12613.10

(c) ₹ 13613.10   (d) None

[Nov. 2007]

Solution :

Calculator Tricks :-

$$A = 5000\left(1+\frac{6}{400}\right)^{5\times4}\left(1+\frac{8}{200}\right)^{8\times2}$$

₹12613.17 = ₹ 12610.00 (approx)

∴ (b) is correct.

Q.8. Anshul's father wishes to have ₹ 75,000 in a bank account when his first college expenses begin. How much amount his father should deposit now at 6.5% compounded annually if Anshul is to start college in 8 years hence from now?

(a) ₹ 45,320   (b) ₹ 46,360

(c) ₹ 55,360   (d) ₹ 48,360.

[Feb. 2008]

Solution : (a)

Calculator Tricks

$$P = A(1+i)^{-n}$$

$$= 75000\left(1+\frac{6}{100}\right)^{-8}$$

Calculator Tricks:

Type 6 ÷ 100 + 1 ÷ button then press = button 8 times

× 75000 = button

we get ₹ 45,317 ≅ 45320

(a) is correct.

Q.9. The difference between compound interest and simple interest on a certain sum for 2 years @ 10% p.a. is ₹ 10. Find the sum:

(a) ₹ 1,010   (b) ₹ 1,095

(c) ₹ 1,000   (d) ₹ 990

[June 2008]

Solution : (c) **Tricks**

$$P = \frac{\text{Actual (C.I - S.I.)}}{\text{(C.I - S.I.) at Re.1}}$$

$$P = \frac{10}{[(1.10)^2 - 1] - 0.2} = ₹1000$$

∴ (c) is correct

Calculator Tricks :- For 2 years. P = 10 ÷ 10% ÷ 10% button = ₹ 1000.

Q.10. 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 6 months

(b) 5 years 7 months

(c) 5 years 5 months

(d) None

[June 2008]

Solution : (a) is correct

Tricks :

$$t = \frac{\log (2,00,000 / 4,90,740)}{\log (1 - 15/100)}$$

= 5.5 years (approx.)

= 5 yrs. 6 months

Note:

Calculator Tricks : Type 0.85 √button 19 times −1 × 227695 = button then press M+ then type 200,000 ÷ 4,90,740 = button then √button 19 times −1 × 227695 = button then ÷ MRC button = button we get answer.

Q.11. If the difference between compound interest and simple interest is ₹ 11 at the rate of 10% for two years, then find the sum:

(a) ₹ 1,200   (b) ₹ 1,100

(c) ₹ 1,000   (d) None of these

[Dec. 2008]

Solution : (b) is correct

Tricks $P = \dfrac{Difference \times (100)^2}{(rate)^2}$

$$= \frac{11 \times (100)^2}{(10)^2} = ₹ 1100$$

Calculator Tricks :- P = 11 ÷ 10% ÷ 10% button = ₹ 1100

Q.12. In how many years, a sum will become double at 5% p.a. compound interest.

(a) 14.0 years   (b) 14.1 years

(c) 14.2 years   (d) 14.3 years

[June 2009]

Solution : (c) is correct

Tricks $t = \dfrac{Log(A/P)}{me \log(1 + r/100m)}$

$$= \frac{\log 2}{\log(1.05)} = 14.2 \, yrs. \,(approx)$$

Q.13. A sum amount to ₹ 1331 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

[June 2009; Dec. 2009]

Solution : (c) is correct

Tricks :- Go by choices

For (c) ; $A = 1000\left(1+\dfrac{10}{100}\right)^3 = ₹ 1331.$

So; t = 3 yrs.

Calculator Tricks :- GBC

(c) A = 1000 ÷ 10% + 10% + 10% button = ₹ 1,331

Q.14. The compound interest for a certain sum @ 5% p.a. for first years is ₹25. The S-I for the same money @ 5% p.a. for 2 years will be.

(a) ₹40   (b) ₹50

(c) ₹60   (d) ₹70

[Dec. 2009]

Solution : (b) is correct

Tricks :-

S.I For 1st yrs. = C . I for 1st yrs. = ₹25

S.I For 2 yrs. For same 'p' = 2 × 25 = ₹ 50

Q.15. At what % rate of compound interest corresponding (C.I) will a sum of money became 16 times in four years, if interest is being calculated compounding annually?

(a) r = 100%   (b) r = 10%

(c) r = 200%   (d) r = 20%

[June 2010]

Solution : (a) is correct

Tricks :- Go by choices

For (a) Let P = 1; A = 1 $\left(1+\dfrac{100}{100}\right)^4 =$

$(2)^4 = 16$

∴ (a) is correct

Q.16. If the simple interest on a sum of money at 12% p.a. for two years is ₹3,600. The compound interest on the same sum for two years at the same rate is:

(a) ₹3,816   (b) ₹3,806
(c) ₹3,861   (d) ₹3,860

[June 2010]

Solution : (a) is correct

$$P = \frac{3600 \times 100}{12 \times 2} = ₹15000$$

$$\therefore c.i = 15000\left(1 + \frac{12}{100}\right)^2 - 15000$$
$$= ₹3816.$$

Tricks:-

CI for 1st yr. = SI for 1st year = 3600 ÷ 2 = ₹1800

CI for 2nd year = 1800 + 1800 × 12% = ₹2016

∴ C.I for 2 years = 1800 + 2016 = ₹3816.

Q.17. The effective annual rate of interest corresponding to nominal rate 6% p.a. payable half yearly is

(a) 6.06%   (b) 6.07%
(c) 6.08%   (d) 6.09%

[Dec. 2010]

Solution : (d) is correct

$$r_e = \left[\left(1 + \frac{6}{200}\right)^2 - 1\right] \times 100 = 6.09\%$$

Q.18. The cost of Machinery, is ₹1,25,000/- If its useful life is estimated to be 20 years and the rate of depreciation of its cost is 10% p.a., then the scrap value of the Machinery is (given that $(0.9)^{20} = 0.1215$)

(a) 15,187   (b) 15,400
(c) 15,300   (d) 15,250

[Dec. 2010]

Solution : (a) is correct

$$S \text{ (Scrap Value)} = P\left(1 - \frac{d}{100}\right)^t$$

where P = Principal;
d = rate of depreciation

$$\therefore S = 1,25,000\left(1 - \frac{10}{100}\right)^{20}$$
$$= ₹15,187.50$$

Q.19. Mr. X invests 'P' amount at Simple Interest rate 10% and Mr. Y invests 'Q' amount at Compound Interest rate 5% compounded annually. At the end of two years both get the same amount of interest, then the relation between two amounts P and Q is given by:

(a) $p = \frac{41Q}{80}$ (b) $p = \frac{41Q}{40}$

(c) $p = \frac{41Q}{100}$ (d) $p = \frac{41Q}{200}$

[Dec. 2010]

Solution : (a) is correct

$$S.I = \frac{P.10 \times 2}{100} = \frac{P}{5}$$

$$C.I = Q\left[\left(1 + \frac{5}{100}\right)^2 - 1\right]$$
$$= 0.1025.Q$$

From Question
S.I = C.I

$$\frac{P}{5} = 0.1025Q$$

or P = 5 × 0.1025Q = 0.5125Q

$$\therefore P = \frac{5125}{10000}Q = \frac{205Q}{400} = \frac{41Q}{80}$$

$$\therefore P = \frac{41Q}{80}$$

Tricks :- GBC

Q.20. If the difference of S.I and C.I is ₹72 at 12% for 2 years. Calculate the amount.

(a) 8,000   (b) 6,000
(c) 5,000   (d) 7,750

[June 2011]

Solution : (c) is correct

Tricks : $P = \frac{(C.I - S.I) \times (100)^2}{r^2}$

$$= \frac{72 \times 100 \times 100}{12 \times 12} = ₹5000$$

Calculator Tricks :- P = 72 ÷ 12% ÷ 12% = 5000

Q.21. Nominal rate of interest is 9.9% p.a. If interest is Compounded monthly, What will be the effective rate of interest

(Given $\left(\frac{4033}{4000}\right)^{12} = 1.1036$ (approx))?

(a) 10.36%   (b) 9.36%
(c) 11.36%   (d) 9.9%

[Dec. 2011, June 2012]

Solution : (a) is correct.

Tricks:-

$$r_e = \left[\left(1 + \frac{9.9}{1200}\right)^{12} - 1\right] \times 100$$
$$= 10.36\%$$

Q.22. The difference between CI and SI on a certain sum of money for 2 years at 4% per annum is ₹1. The sum is

(a) 625   (b) 630
(c) 640   (d) 635

[June 2013]

Solution : (a) is correct

Tricks :- For 2 yrs

$$\text{Sum of Money} = \frac{Diff.(100)^2}{r^2}$$

$$= \frac{1 \times (100)^2}{4^2} = ₹625$$

Calculator Tricks:- P = 1 ÷ 4% ÷ 4% button = ₹625.

Q.23. If the sum of money when compounded annually become 1140 in 2 years and 1710 in 3 years at rate of interest

(a) 30%   (b) 40%
(c) 50%   (d) 60%

[June 2013]

Solution : (c) is correct.

Interest in 3rd yr. = ₹1710 − ₹1140 = ₹570

Tricks Note :- For 3rd yr ; it will be like S.I

$$r = \therefore \frac{1 \times 100}{Pt} = \frac{570 \times 100}{1140 \times 1} = 50\%$$

Tricks II Go by choices.

For (c) A = 1140 + 50% (Calculator)
= ₹1710

∴ (c) is correct

Q.24. The difference between and C.I & S.I at 7% p.a. for 2 years is ₹29.4 then principal is

(a) ₹5,000   (b) ₹5,5000

(c) ₹6,000   (d) ₹6,500

[Dec. 2013]

Solution : (c) is correct

Tricks $P = \dfrac{Difference \times (100)^2}{r^2}$

$= \dfrac{29.4 \times (100)^2}{(7)^2} = ₹\,6000.$

Calculator Tricks :- P = 29.4 ÷ 7% ÷ 7% button = ₹ 6000

Q.25. The Partners A & B together lent ₹3903 at 4% p.a. interest compounded annually. After a spam of 7 years, A gets the same amount as B gets after 9 years. The share of A in the sum of ₹3903 would have been

(a) ₹1875   (b) ₹2280

(c) ₹2028   (d) ₹2820

[June 2014]

Solution : (c) is correct

$A\left(1 + \dfrac{4}{100}\right)^7 = B\left(1 + \dfrac{4}{100}\right)^9$

or $\dfrac{A}{B} = \left(1 + \dfrac{4}{100}\right)^2 = \left(\dfrac{26}{25}\right)^2$

$= \dfrac{676}{625}$

A : B = 676 : 625

$A = \dfrac{676}{676 + 625} \times 3903 = ₹\,2028$

Tricks:- GBC

Q.26. A certain sum of money double itself in 4 years at C.I. In how many years it will become 32 times to itself

---

(a) 15 years   (b) 24 years

(c) 20 years   (d) None

[Dec. 2014]

Solution : (c) is correct

Tricks:- $2^{t_2} = 32^4$

$= 2^{t_2} = \left(2^5\right)^4 = 2^{20}$

$= t_2 = 20$ yrs.

Q.27. On a certain sum rate of interest @ 10% p.a., S.I = ₹ 90 Term = 2 years Find Compound interest for the same :

(a) ₹ 544.5   (b) ₹ 94.5

(c) ₹ 450   (d) ₹18

[Dec. 2015]

Solution : (b) is correct

S.I. p.a = $\dfrac{90}{2}$ = ₹45

Tricks: Compound interest

= 45 + (45 + 10%) = ₹ 94.5

Q.28. If an amount is kept at simple interest, it earns ₹ 600 in first 2 years but when kept at Compound interest it earns at interest of ₹ 660 for the same period; then the rate of interest and principle amount respectively are

(a) 20%; ₹1200   (b) 10%; ₹1200

(c) 20%; ₹1500   (d) 10%; ₹1500

[June 2016]

Solution : (c)

Tricks:- Go by choices

(c) S.I = $\dfrac{1500 \times 2 \times 20}{100}$ = ₹ 600 (True)

C.I = $1500\left[\left(1 + \dfrac{20}{100}\right)^2 - 1\right]$ = ₹ 660 (also True)

(c) is correct

Q.29. Mr. X bought an electronic item for ₹1000. What would be the future value of the same item after two years, if the value is compounded semi-annually at the rate of 22% per annum ?

(a) ₹1488.40   (b) ₹1518.07

(c) ₹2008.07   (d) ₹2200.00

[June 2016]

Solution : (b) is correct

$FV = P\,(1+i)^n$

$= 1000\left(1 + \dfrac{22}{200}\right)^{2 \times 2}$

= ₹ 1518.07 (approx.)

Q.30. The difference between the simple interest and compound interest on a certain sum of money invested for 2 years at 5% p.a. is ₹30. Then the sum =

(a) 10,000   (b) 12,000

(c) 13,000   (d) None

[Dec. 2016]

Solution : (b)

Calculator Tricks:

P = 30 ÷ 5% ÷ 5% button = ₹12,000

Q.31. A sum of money amounts to ₹7803 for one year at the rate of 4% compounded semi-annually then the sum invested is

---

(a) 7,000   (b) 7,500

(c) 7,750   (d) 8,000

[Dec. 2016]

Solution : (b)

$P = 7803\left[1 + \dfrac{4}{200}\right]^{-2}$

Calculator Tricks:

P = (4 ÷ 200 + 1) ÷ = button 2 times × 7803 = button

= ₹ 7500

Tricks : (b) (GBC) → A = 7500 + 2% + 2% button = 7803.

Q.32. The difference between simple and compound interest on a sum of ₹ 10000 for 4 years at the rate of interest 10% per annum is _____

(a) 650   (b) 640

(c) 641   (d) 600

[June 2017]

Solution : C.I − S.I

$= \left[10,000\left(1 + \dfrac{10}{100}\right)^4 - 10,000\right] - \left[\dfrac{10,000 \times 10 \times 4}{100}\right]$

= 4641 − 4000 = ₹ 641.

option (c) is correct. [Note :- Do by Calculator]

Q.33. If the compound interest on a sum for two year at the rate 5% p.a. is ₹512.50, then the principal is _____ :

(a) 4,000   (b) 3,000

(c) 5,000   (d) None of these

[Dec. 2017]

Solution : (c)

Tricks:- GBC

Amount = 5000 + 5% + 5% button

= 5512.50.

C.I = 5512.50 - 5000 = ₹ 512.50.

Q.34. Find effective rate of interest corresponding to the nominal rate of interest 7% compounded monthly is

_____ :

(a) 7.26 %   (b) 7.22 %

(c) 7.02 %   (d) 7.20 %

[Dec. 2017]

Solution : (b)

$$r_e = \left[\left(1+\frac{7}{1200}\right)^{12} - 1\right] \times 100\%$$

= 7. 229 % = 7.22 %

Q.35. In compound interest, if the amount is 9 times to its principle in two years then the rate of interest is ?

(a) 300%   (b) 200%

(c) 150%   (d) 100%

[June 2018]

Solution : (b) Given,

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

or ; $9P = P\left(1+\frac{r}{100}\right)^2$

or ; $9 = \left(1+\frac{r}{100}\right)^2$

or ; $3^2 = \left(1+\frac{r}{100}\right)^2 \Rightarrow 3 = 1+\frac{r}{100}$

$$\Rightarrow 2 = \frac{r}{100} \Rightarrow r = 200\%$$

Tricks : - 1 + 200 % + 200 % ≈ 9

So, (b) is correct.

Q.36. If difference between Compound Interest and Simple Interest for 3 years is ₹ 912 at the rate 4 % p.a., the principal is

(a) ₹1,87,500   (b) ₹1,87,000

(c) ₹1,87,550   (d) ₹1,85,700

[June 2018]

Solution : (a)

Tricks :-

P = 912 ÷ 4% ÷ 4% ÷ (300 + 4)%

= ₹ 1,87,500

Q.37. If Rs. 1,000 be invested at interest at interest rate of 5% and the interest be added to the principal every 10 years, than the number of years in which it will amount to Rs. 2,000 is :

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

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

[May 2018]

Solution : (a)

∵ Interest is added to the principal every 10 years. So, within 10 years ; simple interest will apply.

So, Amount after 10 yrs.

$$= 1000 + 1000 \times \frac{10 \times 5}{100}$$

= Rs. 1500.

Total amount = Rs. 2000

Extra Interest needed = 2000 - 1500

= Rs. 500.

$$\text{Time} = \frac{500 \times 100}{1500 \times 5} = \frac{20}{3}$$

$$= 6\frac{2}{3} \text{ yrs.}$$

So; Total time = $10 + 6\frac{2}{3}$

$$= 16\frac{2}{3} \text{ yrs.}$$

Q.38. 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 Rs. 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

[May 2018]

Solution : (b)

Tricks:- Go by choices (GBC)

(a) S.I $= \frac{1200 \times 2 \times 20}{100} = 480 \neq 600$

So; (a) is false.

(b) S.I $= \frac{1500 \times 2 \times 20}{100} = $ Rs. 600

C.I = $(-1500 + 20\% + 20\%)$ (button)

= 660.

So; (b) is True.

Q.39. If ₹10,000 is invested at 8% per year compound quarterly, then the value of the investment after 2 years is [Given $(1 + 0.2)^8 = 1.171659$]

(a) ₹ 10,716.59   (b) ₹ 11,716.59

(c) ₹ 117.1659   (d) None of these

[Nov. 2018]

Solution : (b)

$$FV = 100000\left(1 + \frac{8}{400}\right)^{2 \times 4}$$

= ₹ 11716.59

Q.40. A bank pays 10% rate of interest, interest being calculated half yearly. A sum of ₹ 400 is deposited in the bank. The amount at the end of 1 years will be

(a) ₹ 439   (b) ₹ 440

(c) ₹ 442   (d) ₹ 441

[Nov. 2018]

Solution : (d)

$$FV = 400\left(1 + \frac{10}{200}\right)^2 = 441$$

Calculator Tricks :-

FV = 400 + 5 % + 5 % = 441

Q.41. A men deposited ₹ 8,000 in a bank for 3 years at 5% per annum compound interest, after 3 years he will get

(a) ₹ 9,000   (b) ₹ 8,800

(c) ₹ 9,200   (d) ₹ 9,261

[Nov. 2018]

Solution : (d)

$$FV = 8000\left(1 + \frac{5}{100}\right)^3 = ₹ 9261.$$

Calculator Tricks :

FV = 8000 + 5% + 5% + 5% buttons = 9261

Q.42. If in two years time a principal of ₹ 100 amounts to ₹ 121 when the interest at the rate of r % is compounded annually, then the value of r will be

(a) 14   (b) 10.5

(c) 15   (d) 10

[Nov. 2018]

Solution : (d)

Details :-

$$121 = 100\left(1+\frac{r}{100}\right)^2 \Rightarrow \frac{121}{100} = \left(1+\frac{r}{100}\right)^2$$

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

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

$\therefore r = 10\%$

I Tricks :- GBC

for $FV = 100\left(1+\frac{10}{100}\right)^2 = 121$

(True)

II Calculator Tricks :-

FV = 100 + 10% + 10% buttons = 121

Q.43. 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) 7.4%

(c) 7.5%   (d) 7.18%

[Nov. 2018]

Solution : (d)

$$r_e = \left[\left(1+\frac{7}{400}\right)^4 - 1\right] \times 100 = 7.18\%$$

Q.44. How much will ₹ 25,000 amount to in 2 years at compound interest if the rates for the successive years are 4% and 5% per year

(a) ₹ 27,000   (b) ₹ 27,300

(c) ₹ 27,500   (d) ₹ 27,900

[Nov. 2018]

Solution : (b)

$$FV = 25000\left(1+\frac{4}{100}\right) \times \left(1+\frac{5}{100}\right)$$

= ₹ 27,300/-

Calculator Tricks:- 25000 + 4% + 5% buttons

= ₹27,300/-

Q.45. ₹ 8,000/- at 10% per annum interest compounded half yearly will become at the end of one year

(a) ₹ 8,800   (b) ₹ 8,900

(c) ₹ 8820   (d) ₹ 9,600

[Nov. 2018]

Solution : (c)

$$FV = 8000\left(1+\frac{10}{200}\right)^2 = ₹ 8,820$$

Calculator Tricks :-

FV = 8000 + 5% + 5% buttons = 8820

Q.46. The value of furniture depreciates by 10% a year, if the present value of the furniture in an office is ₹ 21870, calculate the value of furniture 3 years ago

(a) ₹ 30,000   (b) ₹ 40,000

(c) ₹ 35,000   (d) ₹ 50,000

[Nov. 2018]

Solution : (a)

Calculator Tricks :- GBC

(a) 30000 - 10% - 10% - 10% button = 21870.

Details Method

$$21870 = P\left(1+\frac{10}{100}\right)^3$$

$$\therefore P = \frac{21870}{(0.9)^3} = ₹ 30,000$$

Q.47. If compound interest on a sum for 2 years at 4% per annum is ₹ 102, then the simple interest on the same period at the same rate will be

(a) ₹ 90   (b) ₹ 100

(c) ₹ 101   (d) ₹ 93

[Nov. 2018]

Solution : (b)

Details :- $C.I = P\left(1+\frac{4}{100}\right)^2 - P = 102$

or $P\left[(1.04)^2 - 1\right] = 102$

or $P \times 0.0816 = 102$

or $P = \frac{102}{0.0816} = 1250$

$$\therefore S.I. = \frac{p.r.t}{100} = \frac{1250 \times 4 \times 2}{100} = ₹ 100$$

Tricks :- Go by choices

For option (b)

S.I. for 2 years = ₹ 100

$\therefore$ S.I. for 1 years = ₹ 50

S.I. of 1st yr. = C.I. of 1st yr. = ₹ 50

C.I. for 2nd yr. = 50 + 4% = ₹ 52

Total C.I. for 2 yrs = 50 + 52 = ₹ 102 (True)

$\therefore$ Option (b) is correct

Q.48. 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) ₹ 37,000

(b) ₹ 37,200

(c) ₹ 37,500

(d) None of the above

[Nov. 2018]

Solution : (b)

Tricks :-

P = 372 ÷ 10% ÷ 10% = ₹ 37,200

Q.49. What is the net present value of piece of property which would be valued at ₹ 2 lakh at the end of 2 years? (Annual rate of increase = 5%)

(a) ₹ 2.00 lakh

(b) ₹ 1.81 lakh

(c) 2.01 lakh

(d) None of the above

[Nov. 2018]

Solution : (b)

$$NPV = 2\left(1+\frac{5}{100}\right)^{-2} = 1.81 \text{ lakh}$$

(approx)

Q.50. 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) ₹ 250   (b) ₹ 300

(c) ₹ 462.16   (d) ₹ 350

[June 2019]

Solution :

Tricks :- GBC

(c) 462.16 on Calculator, do as Type 462.16 + 9% + 6% + 3% button we get 550. So (c) is correct.

Q.51. 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

[June 2019]

Solution : (a) is correct

Q.52. If $p.i^2 = 96$, and R = 8% compounded annually then P =

(a) ₹ 14,000   (b) ₹ 15,000

(c) ₹ 16,000   (d) ₹ 17,000

[June 2019]

Solution : (b)

Tricks :- Given, $p.i^2 = 96$

Means interest of two periods (yrs. here) is 96.

So; GBC (Calculator Tricks)

(a) $I = 14000 \times 8\% \times 8\%$

$= 89.6 \neq 96$

So; (a) is False.

(b) Type $15000 \times 8\% \times 8\%$ button

We get 96.

So, (b) is correct.

Tricks II

$P = 96 \div 8\% \div 8\%$ buttons.

$= ₹ 15,000.$

Q.53. The present value of a scooter is ₹ 7290. The rate of depreciation is 10%. What was its value 3 years ago?

(a) 10,000   (b) 10010

(c) 9990   (d) 12000

[Dec. 2019]

Solution : (a)

Calculator Tricks : GBC

after 3 years;

PV. = 7290.

For option (a), Type 10,000 - 10% button - 10% button -10% button ;

we get ₹ 7290.

∴ (a) is correct.

Q.54. The difference between compound interest, compounded semi annually and simple interest on ₹ 400 at 10% p.a. for one year.

(a) ₹ 1   (b) ₹ 28

(c) ₹ 35   (d) ₹ 40

[Dec. 2019]

Solution : (a)

In C.I. 10% p.a compounded semi-annually $\Rightarrow (10/2) = 5\%$ interest in 6 months. There are 2 periods in 1 yr.

∴ FV = 400 + 5% + 5% button = 441

∴ C.I = 441 - 400 = 41.

S.I = 400 × 10% = 40 for 1 yr.

∴ C.I - S.I = 41 - 40

= ₹ 1.

[Another Trick: Difference = 400 × 5% × 5% = ₹ 1]

Q.55. In how much time the S.I. on a certain sum becomes 0.125 times to its principle at 10% p.a is

(a) 1.00 yrs   (b) 1.25 yrs

(c) 1.50 yrs   (d) 2.00 yrs

[Dec. 2019]

Solution : (b)

Let principal = ₹ 1

∴ S.I = 0.125

∴ $t = \frac{I \times 100}{p.r} = \frac{0.125 \times 100}{1 \times 10}$

= 1.25 yrs

Q.56. In what time will a sum ₹ 800 amounts to ₹ 882 at 5% p.a. compounded annually

(a) 1 yrs   (b) 2 yrs

(c) 3 yrs   (d) 4 yrs

[Dec. 2019]

Solution : (b)

Tricks : GBC

for (b) FV = Amounts = 800 + 5% + 5% button = ₹ 882

∴ (b) is correct.

Q.57. Find the effective rate of interest if an amount of ₹ 30,000 deposited in a bank. For 1 year at the rate of 10% p.a. compounded semi annually.

(a) 10.05%   (b) 10.10%

(c) 10.20%   (d) 10.25%

[Dec. 2019]

Solution : (d)

Here, No need of Principals value.

Formula

∴ Effective rate of interest

$$= \left[(1+1)^m - 1\right] \times 100$$

$$r_e = \left[\left(1+\frac{10}{200}\right)^2 - 1\right] \times 100$$

Calculator Tricks

Type $10 \div 200 + 1 \times$ button = button 1 time -1×100 = button

We get 10.25%

∴ $r_e = 10.25\%$

Q.58. The present population of a town is 25,000. If it grows at the rate of 4%, 5%, 8% during 1st year, 2nd year, 3rd year respectively. Then find the population after 3 years.

(a) 29,484   (b) 29,844

(c) 29,448   (d) 28,944

[Dec. 2019]

Solution : (a)

Tricks : Population after 3 yrs

= 25000 + 4% + 5% + 8% buttons

= 29484.

Q.59. An amount ₹ 35000 with the rate of interest is 7% per annum, it is compounded on a monthly basis, then tell the effective rate of interest.

(a) 7.22%   (b) 7.64%

(c) 7.0%   (d) 7.5%

[Dec. 2019]

Solution : (a)

$$r_e = \left[\left(1+\frac{7}{1200}\right)^{12} - 1\right] \times 100$$

Calculator Tricks

Type $7 \div 1200 + 1 \times$ button = button 11 times -1×100 = button

We get 7.229% = 7.22% (approx.)

Q.60. On what sum will the compound interest at 5% p.a for 2 years compounded annually be ₹ 3,280

(a) ₹ 16,000   (b) ₹ 32,000

(c) ₹ 48,000   (d) ₹ 64,000

[Dec. 2020]

Solution : (b)? Formula

C.I. $= P[(1 + i)^n - 1]$

$$3280 = P\left[\left(1+\frac{5}{100}\right)^2 - 1\right]$$

$= P[1.1025 - 1]$

$3280 = P(0.1025)$

$\therefore P = \dfrac{3280}{0.1085} = 32000$

Calculator Tricks :- GBC

(a) CI = 16000 + 5% + 5% − 16000

$= ₹ 1640$

$\neq 3280$

$\therefore$ (a) is incorrect.

(b) C.I. = 32000 + 5% + 5% button − 32000

$= ₹ 3280$ (Correct)

$\therefore$ (b) is correct.

Note : No Need to write anything else Only on Calculator in seconds.

Q.61. An amount P becomes ₹ 5,100.5 and ₹ 5,203 after second and fourth years respectively, at r% of interest per annum compounded annually. Thus, values of P and r are

(a) ₹ 5,000 and 1   (b) ₹ 4,000 and 1.5

(c) ₹ 6,000 and 2   (d) ₹ 5,500 and 3

[Dec. 2020]

Solution : Tricks GBC (Calculator Tricks)

(a) FV after 2 yrs = 5000 + 1% + 1% button (Press) = ₹ 5100.5 (True)

FV after 4 yrs = 5000 + 1% + 1% + 1% + 1% button = ₹ 5203 (True)

$\therefore$ (a) is correct.

Q.62. The useful life of a machine whose cost is ₹ 10,000 is 10 years. If it depreciates at 10% p.a. then the scrap value of the machine is.

(a) 3486.70   (b) 3158.30

(c) 3500   (d) 7033

[Dec. 2019]

Solution : (a)

Scrap Value

$$= 10,000\left(1-\frac{10}{100}\right)^{10} = 10,000(0.9)^{10}$$

Calculator Tricks:

Type 0.9× = button 9 times × button 10,000 = button, we get ₹ 3486.78

Q.63. A certain sum invested at 4% per annum compounded semi-annually amounts to ₹ 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

[Dec. 2020]

Solution : Tricks GBC

Calculator Tricks Interest for 1st 6 months = 2%.

(a) FV = 1,10,120 + 2% + 2%

$\neq 1,20,000$

(a) is incorrect.

(b) FV = ₹ 1,15,340 + 2% + 2% button

$= ₹ 1,19,999.736 = ₹ 120,000$

(b) is correct.

II. Calculator Tricks

$P = A(1 + i)^{-n}$

$$= 1,20,000\left(1+\frac{4}{200}\right)^{-2}$$

on Calculator → Type $4 \div 200 + 1 \div$ button

then Press = button 2 times

then press "×" button then type 1,20,000 = button = ₹ 1,15,340

Q.64. 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) 0.1666   (d) 0.1588

[Dec. 2020]

Solution : Tricks GBC

Use calculator [No need to write anything else]

(a) Let r = 0.1567 = 15.67%

$$C.I = 216\left(1+\frac{15.67}{100}\right)^3 - 216 \neq 127$$

(b) $C.I = 216\left(1+\dfrac{17.77}{100}\right)^3 - 216$

$\neq 127$

(c) $r = 0.1666 = 16.66\%$

$\therefore C.I = 216\left(1+\dfrac{16.66}{100}\right)^3 - 216.$

Cal. $16.66 \div 100 + 1 \times = 2$ times $- 216$

$= 126.9412 \cong ₹ 127.$

$\therefore$ (c) is correct.

Detail

$$\frac{P}{P\left[\left(1+\dfrac{r}{100}\right)^3 - 1\right]} = \frac{216}{127}$$

or $\left[\left(1+\dfrac{r}{100}\right)^3 - 1\right] = \dfrac{127}{216}$

or $\left[\left(1+\dfrac{r}{100}\right)^3\right] = \dfrac{127}{216} + 1$

$$= \frac{343}{216} = \left(\frac{7}{6}\right)^3$$

$$\therefore 1 + \frac{r}{100} = \frac{7}{6}$$

$$\therefore \frac{r}{100} = \frac{7}{6} - 1 = \frac{1}{6}$$

$$\therefore r = \frac{100}{6} = 16.66\%$$

$$r = 0.1666$$

(c) is correct.

Q.65. Find the present value of ₹ 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

[Dec. 2020]

Solution : Calculator Tricks

$$PV = A(1+i)^{-n}$$

$$= 100,000 \left(1 + \frac{9}{100}\right)^{-5}$$

On Calculator Type $9 \div 100 + 1 \div = 5$ times × 100000

= buttons = ₹ 64,994.20

$$\text{OR } PV = \frac{A}{(1+1)^n}$$

$$= \frac{1,00,000}{\left(1+\frac{9}{100}\right)^5} = \frac{1,00,000}{(1.09)^5}$$

$$= \frac{1,00,000}{1.5386} = 64,994.15 \, [\text{Given}(1.09)^5$$

$$= 1.5386]$$

$$\therefore \text{(b) is correct.}$$

Q.66. 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) 0.076 (d) 0.85

[Dec. 2020]

Solution : Let P = ₹ 1

Effective rate

$$= \left[1\left(1+\frac{4.5}{400}\right)^4 - 1\right] \times 100$$

= 4.576 % (approx) yearly.

If 4.5% compounded yearly

Then Gain % = 4.576 − 4.5% = 0.076%

(c) is correct.

Q.67. Find the amount of compound interest, if an amount of ₹ 50,000 is deposited in a bank for one year at the rate of 8% per annum compounded semiannually

(a) 3080 (b) 4080

(c) 5456 (d) 7856

[Jan. 2021]

Solution : Tricks (b) is correct.

Principal = ₹ 50,000

Semi annually rate of interest

$$r = \frac{8}{2} = 4\%$$

Amount = 50,000 + 4% + 4% (button)

(By using calculator)

= ₹ 54,080

C.I. = A − P = 54080 − 50000

= ₹ 4080

(b) is correct

Q.68. The population of a town increase by 2% of the population at the

beginning of the year. The number of year by which the total increases in population would be 40% is :

(a) 7 years

(b) 10 years

(c) 17 years

(d) 19 years (approx)

[Jan. 2021]

Solution : (c) is correct

% Increase in population = r = 2%

Let after t years population = 1 + 40% = 1.40

In population increase case, always use compound Interest. Formula.

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

$$\text{or } 1.40 = 1\left(1 + \frac{2}{100}\right)^{t \times 1}$$

$$= 1.40 = (1.02)^t$$

Calculator

Type 1.02 × = button (Press)

until to get 1.40

After pressing = button 16 times, we get 1.40 approx,

$$\therefore t = 16 + 1 = 17 \text{ years}$$

Q.69. The simple on sum at 4% p.a. for 2 years is ₹ 80. Find the CI on the same sum for the same period.

(a) ₹ 81.6 (b) ₹ 80.3

(c) ₹ 83.2 (d) ₹ 82.3

[Jan. 2021]

Solution : Tricks (a) is correct

S.I. for 2 year = ₹ 80

$$\therefore \text{S.I. for each year} = \frac{80}{2} = ₹ 40$$

S.I. of 1st year = C.I. of 1st year = ₹ 40

C.I. for 2nd years = Interest on Principal + Interest on interest earned in 1st year.

= S.I. + Interest on S.I.

= 40 + 40 × 4% = ₹ 41.6

[Calculator 40 + 4% = 41.6]

∴ Total Compound Interest = 40 + 41.6

= ₹ 81.6

i.e. C.I. = 40 + 4% + 40 = ₹ 81.6

Q.70. 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

[Jan. 2021]

Solution : (a) is correct

$$r_e = [(1+i)^m - 1] \times 100\%$$

$$= \left[\left(1 + \frac{9}{400}\right)^4 - 1\right] \times 100$$

Where m = No. of conversion periods in 1 year = 4

Calculator

$[9 \div 400 + 1 \times = \text{button 3 times} - 1]$

× 100 (button) = 9.308%

= 9.31% p.a.

Clearly 9.31% is more than 9.1%

9% compounded quarterly is better.

Q.71. The effective rate of interest corresponding to a nominal rate of 7% p.a. compounded quarterly is

(a) 7.5% (b) 7.6%

8.26

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

[July 2021]

Solution : (d) is correct

$$\text{S.L.} = \frac{Prt}{100} = \frac{800\cancel{0} \times 1\cancel{0} \times \frac{12}{5}}{1\cancel{00}}$$

$$= ₹ 1920$$

For compound interest

Rate of interest for $\frac{2}{5}$ years

$$= \frac{2}{5} \times 10 = 4\%$$

Tricks

Hence

C.I. $= 8000 + 10\% + 10\% + 4\%$

button $- 8000$ (Type)

$= 2067.20$

So, Difference between C.I. & S.I.

$= 2067.20 - 1920 = ₹ 147.20$

Q.80. S deposits an amount in bank which gives 10% compound interest, compounded annually for 5 years. What is effective rate of simple interest?

(a) 12.21   (b) 11.11

(c) 13.21   (d) 12.81

[Dec. 2021]

Solution : (a)

Given

r = 10% Compounded yearly

---

t = Time = 5 years

Let P = ₹ 100

∴ Compound Interest

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

$$= 100\left[\left(1+\frac{10}{100}\right)^5 - 1\right] = ₹ 61.051$$

Let R be @ single rate of interest which gives ₹ 61.051 in 5 years

∴ S.I = C.I.

$$\therefore \frac{P.R.T}{100} = 61.051$$

$$\text{or } \frac{100 \times R \times 5}{100} = 61.051.$$

$$\text{or } R = \frac{61.051}{5} = 12.2102\%$$

$$= 12.21\%$$

Q.81. Cost of a laptop is ₹ 1,10,000 and its value depreciate 12% annually its life is 6 years its scrap value........times its cost

(a) 0.44   (b) 0.42

(c) 0.45   (d) 0.48

[Dec. 2021]

Solution : (c)

Scrap Value

$$S = P\left(1-\frac{d}{100}\right)^t$$

$$\text{or } \frac{S}{P} = \left(1-\frac{12}{100}\right)^6$$

$$= (0.88)^6 = 0.4644$$

$$S = 0.46$$

$$P \Rightarrow S = 0.46P$$

Calculator

Type 0.88 × = 5 times

Q.82. If the compound interest earned at $i\%$ p.a. in n years is to be earned at $s\%$ simple interest rate for n years, the s =

(a) i   (b) $i\frac{1}{n}$

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

[Dec. 2021]

Solution : (c)

Compound Interest = Simple Interest

$$\therefore \cancel{p}\,[(1+i)^n - 1] = \cancel{p}\,.n.s$$

[Where S in decimal form]

$$\text{or } S = \frac{(1+i)^n - 1}{n}$$

Q.83. A company needs ₹ 10,000 in five years to replace as equipment. How much (in ₹) must be invested now at the interest rate of 8% p.a. is order to provide for the equipment ?

(a) ₹ 6,606   (b) ₹ 6,806

(c) ₹ 10,500   (d) ₹ 11,500

[Dec. 2021]

Solution : (b)

$$PV = A(1+i)^{-n}$$

$$= 10000\left(1+\frac{8}{100}\right)^{-5}$$

$$= 1000(1.08)^{-5} = ₹ 6806$$

Calculator Tricks → Type 8 ÷ 100 + 1 ÷ = button

5 times × 10000 = button = ₹ 6805.8 = ₹ 6806

Q.84. It needs to pay ₹ 5,00,000 after 10 years. He invested a sum in a scheme at 9% rate of interest compounded half-yearly. How much amount (in ₹) he invested? $(1.045^{19} = 2.41171)$

(a) 3.97.321   (b) 2.70.321

(c) 2.97.321   (d) 3.40.321

[Dec. 2021]

Solution : (c)

Given

FV = A = ₹ 5,00,000

t = 10 years

r = 9% compounded half yearly m = 2;

n = mt = 2×10 = 20

$$PV = A\left(1+\frac{r}{100\,m}\right)^{-n}$$

$$= 5,00,000\left(1+\frac{9}{200}\right)^{-20}$$

$$= \frac{500,000}{(1.045)^{20}} = \frac{5,00,000}{2.41171}$$

$$= ₹ 2,07,321$$

Q.85. 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) 5   (b) 6

(c) 4   (d) 3

[Dec. 2021]

Solution : (c)

I. Calculator Tricks

$\overline{1}$ + 20% + 20% + 20% + 20% button

= 2.0736 > 2

∴ t = 4 yrs.

2nd
Method

$$\frac{A}{P} = \left(1 + \frac{20}{100}\right)^t$$

$$= (1.20)^t$$

On Calculator
Press 1.20 × = button 3 times
It becomes greater than 2.
So t = 3+1 = 4 years.

Q.86. 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.

(a) 364.80   (b) 564.80
(c) 464.80   (d) 664.80

[June 2022]

Solution : 1st Condition P = ₹ 100; A = ₹ 105; n = 2; r = ?

Now $\frac{A}{P} = (1 + i)^n$

or $\frac{105}{100} = (1 + i)^2$

$\Rightarrow (1 + i)^2 = 1.05$ ....(1)

Secondly ∴ P = ₹ 500/-; A = ?

t = 5 yrs; n = 5.

∴ $A = P(1 + i)^n$

$= 500 (1 + i)^5$

$= 500 (1 + i)^4 (1 + i)$

$= 500 \{(1 + i)^2\}^2 \cdot \sqrt{(1 + i)^2}$

$= 500 (1.05)^2 \cdot \sqrt{1.05}$

$= ₹ 564.86$

∴ (a) is correct

Q.87. 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?

(a) ₹ 3,972   (b) ₹ 2,160
(c) ₹ 3,120   (d) ₹ 3,742

[June 2022]

Solution :
Let P = ₹ 100
A = ₹ 160
S.I = A − P = 160 − 100 = ₹ 60
$r = \frac{I \times 100}{P.t} = \frac{60 \times 100}{100 \times 6} = 10\%$

Now
As CI A = 12,000 + 10% + 10% + 10% button.
= ₹ 15,972
C.I = A−P = ₹ 15,972−12,000
= ₹ 3,972
∴ (a) is correct

Q.88. The present value of ₹ 2,000, after 8 years at the rate of 6% per annum, is _____. (1.06⁸ = 1.59385)

(a) ₹ 1,054   (b) ₹ 1,254
(c) ₹ 3,054   (d) ₹ 2,054

[June 2022]

Solution : PV = A (1+i)⁻ⁿ

$= 2000 \left(1 + \frac{6}{100}\right)^{-8}$

Calculator Tricks
Type 6 ÷ 100 + 1 ÷ = button 8 times × 2000 = button

∴ PV = ₹ 1254 (Approx)
(b) is correct.

Q.89. A machine worth ₹ 4,90,740 is depreciated at 15% on its opening value each year. When its value would reduce to ₹ 2,00,750.

(a) 5 years 5 months
(b) 5 years 6 months
(c) 5 years 7 months
(d) 5 years 8 months

[Dec. 2022]

Solution:
Tricks :

$$t = \frac{\log\left(\frac{S}{P}\right)}{\log\left(1 - \frac{d}{100}\right)}$$

$$= \left[\frac{\log\left(\frac{2,00,750}{4,90,740}\right)}{\log\left(1 - \frac{15}{100}\right)}\right]$$

$$= \frac{\log(0.409076)}{\log(0.85)} = 5.4998 = 5.5 \text{ yrs}$$

= 5 yrs 6 months

Calculator Tricks

I. Type 0.85 press √ button 19 times −1 × 2,27,695 = button then press M+ button.

II. Type 2,00,750 ÷ 4,90,740 = button
Then press √ button 19 times

−1 × 2,27,695 = button

III. Then press ÷ button then press MRC = button
[It is time value in decimal form]

IV. We get 5.4998 yrs
= 5.5 yrs
Means 5 years and 6 months

(b) is correct.

Q.90. 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?

(a) ₹ 127.60   (b) ₹ 147.60
(c) ₹ 145.34   (d) ₹ 117.60

[Dec. 2022]

Solution : ₹ 64 Amounts to ₹ 83.20 in 2 yrs.

It means ₹ 64 becomes 83.20 ÷ 64
= 1.3 times in 2 years.

Hence, ₹ 86 will become 86 × 1.3 (times) in 2 yrs.

and ₹ 86 × 1.3 will become (86 × 1.3) × 1.3 (times)

= ₹ 145.34 in next 2 yrs.

So ₹ 86 will become ₹ 145.34 in 4 years.

(c) is correct

Q.91. The effective annual rate of interest corresponding to a normal rate of 6% per annum payable half yearly is :

(a) 6.06%   (b) 6.07%
(c) 6.08%   (d) 6.09%

[Dec. 2022]

Solution: $r_c = \left[(1+i)^m - 1\right] \times 100\%$

$$= \left[\left(1 + \frac{6}{200}\right)^2 - 1\right] \times 100\% = 6.09\%$$

[Note : Calculator :– Type 6 ÷ 200 + 1 × = button 1 time −1 × 100 = button]

(We get result)

∴ (d) is correct.

Q.92. 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?
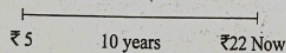
(a) 15.97%   (b) 16.77%

(c) 18.64%   (d) 14.79%

[Dec. 2022]

Solution: ∵ EPS growing annually

So compound interest applies

Let C.I $pa = r$

₹ 5   10 years   ₹22 Now

Go by choices

(a) $r = 15.97\%$ (let)

$$\therefore Fv = 5\left(1 + \frac{15.97}{100}\right)^{10}$$

= 22.00019 ......

= 22 (True)

[Note : Calculator:-

Type 15.97 ÷ 100 + 1 × = button 9 times × 5 = button.

We get 22]
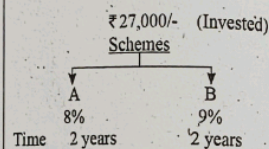
∴ (a) is correct.

Q.93. 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'?

(a) ₹ 12,000   (b) ₹ 12,500

(c) ₹ 13,000   (d) ₹ 13,500

[Dec. 2022]

Solution:

₹27,000/- (Invested)
Schemes

A   B
8%   9%
Time   2 years   2 years

Go by choices

(a) Let $P_1 = 12000$ $P_2 = 27,000 - 12,000$

$= ₹ 15,000$

Calculator : CI   = 12,000 + 8%
+ 8% − 12,000
= M + button

Then   15,000 + 9% + 9% − 15,000
= M + button

Then press MRC button

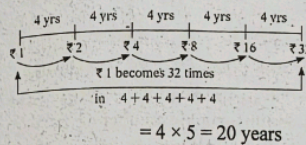We get ₹ 4818.30 (True)

∴ (a) is correct

Q.94. 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.

(a) 12 years   (b) 16 years

(c) 20 years   (d) 24 years

[Dec. 2022]

Solution: Tricks :

4 yrs   4 yrs   4 yrs   4 yrs   4 yrs
₹1   ₹2   ₹4   ₹8   ₹16   ₹32
₹ 1 becomes 32 times
in   4 + 4 + 4 + 4 + 4

$= 4 \times 5 = 20$ years

∴ (c) is correct

Q.95. 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?

(a) 9%   (b) 8%

(c) 11%   (d) 10%

[Dec. 2022]

Solution: Given,

P = ₹ 15000

$r = 9; t = 2$ yrs

C.I − S.I = ₹ 96

Tricks

P = D ÷ $r\%$ ÷ $r\%$ button

GBC (a) 96 ÷ 9% ÷ 9% button

≠ 15000 (False)

So (a) is wrong.
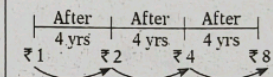
(b) For 8%

P = 96 ÷ 8% ÷ 8% button (Press)

= ₹ 15000 (True)

∴ (b) is correct

Q.96. A sum of money doubles itself in 4 years at certain compound interest rate. In how many years this sum will become 8 times at the same compound interest rate?

(a) 12 years   (b) 14 years

(c) 16 years   (d) 18 years

[Dec. 2022]

Solution : Tricks

After   After   After
4 yrs   4 yrs   4 yrs
₹1   ₹2   ₹4   ₹8

∴ ₹ 1 becomes ₹ 8 in 4 + 4 + 4 = 12 yrs.

(a) is correct

Q.97. 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 %

[June 2023]

Solution : Here r = 10% Quarterly ∴ m = 4

$$r_e = \left[(1+i)^m - 1\right] \times 100\%$$

$$= \left[\left(1 + \frac{10}{400}\right)^4 - 1\right] \times 100\% = 10.38\%$$

Calculator

10 ÷ 400 + 1 × = button 3 times

−1 × 100% (button)

= 10.38%

(d) is correct.

Q.98. The difference between compound interest and simple interest on a certain sum of money invested for 3 years at 6% per annum is ₹ 110.16. The principle is:

(a) ₹ 3,000   (b) ₹ 3,700
(c) ₹ 12,000   (d) ₹ 10,000

[June 2023]

Solution : Calculator Tricks

$P = D \div r\% \div r\% \div (300 + r)\%$

$= 110.16 \div 6\% \div 6\% \div (300 + 6)\%$ button. (Press)

$= 10,000/-$

(d) is correct.

Q.99. A machine depreciates at 10% of its value at the beginning of a year. The cost and scrap value realized at the time of sale being ₹ 23.240 and ₹ 9,000 respectively. Approximately, for how many years the machine is put to use?

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

[June 2023]

Solution :

$\therefore S = P\left(1 - \dfrac{d}{100}\right)^t$

Where P = Present Value = Cost

S = Scrap Value

d = Rate of depreciation

t = Time

$9000 = 23240\left(1 - \dfrac{10}{100}\right)^t$

or $(0.9)^t = \dfrac{9000}{23240}$

or $(0.9)^t = 0.387...$

By Calculator

Press 0.9 x = button 8 times

So t = 8 + 1 = 9 years.

$\therefore$ (c) is correct.

Q.100. 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 $1.02^8 = 1.17166$)

(a) 15   (b) 17
(c) 19   (d) 20

[June 2023]

Solution : Let Present population P = 100

Let after "t" yrs; population

$A = 100 + 40 = 140$

$\therefore \dfrac{A}{O} = \left(1 - \dfrac{r}{100}\right)^t$

$\dfrac{140}{100} = 1.40 = \left(1 + \dfrac{2}{100}\right)^t$

or $1.40 = (1.02)^t$

Calculator Tricks

Press 1.02 x = button 16 times

We get 1.4000 Approx.

$\therefore$ t = 16 + 1 = 17 yrs.

Q.101. The Compound interest on ₹ 15,625 for 9 months at 16% per annum compounded quarterly is:

(a) ₹ 1,851   (b) ₹ 1,941
(c) ₹ 1,951   (d) ₹ 1,961

[June 2023]

Solution :

$P = ₹\ 15,625$

$t = 9\ \text{months} = \dfrac{9}{12}\ \text{year}$

$n = mt = 4 \times \dfrac{9}{12} = 3$

$r = 1.6\%\ \dfrac{1}{4}\ \text{yearly}$

$\therefore C.I. = P[(1 + i)^n - 1]$

$= 15,625\left[\left(1 + \dfrac{16}{400}\right)^3 - 1\right]$

Calculator Tricks

Press $16 \div 400 + 1$ x = button

2 times − 1 x 15625 = button; we get ₹ 1951

$\therefore$ (c) is correct.