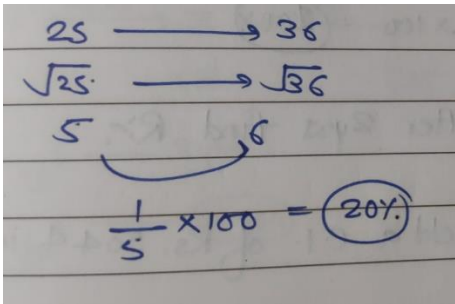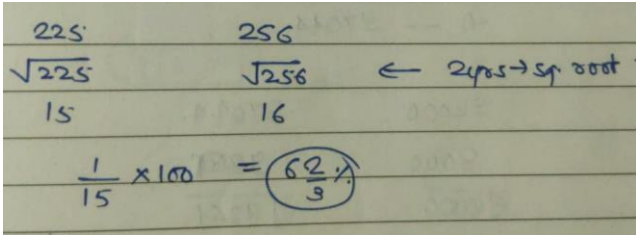|	
Compound Interest	
Q.No	Answer
Type I – Basic Ques. On Yearly calculation	
1	**Answer: Option 'A'** Given principal = 8000. No. of years = 2 Rate of interest = 5. Amount = P x $(1+r/100)^n$, we get Amount = 8000 x $(1+5/100)^2$. Ans : 8820
2	**Answer: Option 'B'** Given principal = 6250 No. of years = 2 Rate of interest = 8 Amount = P x $(1+r/100)^n$, We get Amount = 6250 x $(1+8/100)^2$ = 7290 C.I = Amount - Principal = 7290 - 6250 = 1040
3	Answer: Option 'A' Let the Principal be, P = Rs. 100 Given, S.I = 60% of 100 = Rs. 60, n = 6 years Then, Rate of Interest, r = (S.I × 100)/ (p × n) => r = (60 × 100) / (100 × 6) => r = 10 % p.a Now, P = Rs. 12,000, n = 3 years, r = 10% p.a C.I = P {[1 + (r/100)]n - 1} = 12,000 × {[1 + (10/100)]3-1} = 12,000 × [(11/10)3-1] = 12,000 × [(1331/1000) - 1] = 12,000 × (331/1000) = 12 × 331 = 3972 Thus, Compound Interest = Rs. 3972
4	Answer: Option 'A' Given principal = 12500 No. of years = 3 Rate of interest = 10 Amount = P x $(1+r/100)^n$, We get Amount = 12500 x $(1+10/100)^3$ = 16637.5 C.I = Amount - Principal = 16637.5 - 12500 = 4137.5
5	Answer: Option 'D' Let Principal = P, Rate = R% per annum, Time = n years When interest is compounded annually, total amount can be calculated by using the formula Compound Amount = P $(1 + R / 100)^n$ Given that, P = Rs.8000, R = 20% per annum Compound Amount = Rs. 13824 We have to find the time period during which the amount will be Rs.13824 => Rs.13824 = 8000 x $(1 + 20/100)^n$ => (13824 /8000) = $(120 / 100)^n$ => $(24 / 20)^3$ = $(12 / 10)^n$ => $(12 /10)^3$ = $(12 /10)^n$ Therefore, n = 3. Hence the required time period is 3 years.
6	Answer: Option 'B' Rs.104/-
7	Answer: Option 'B' Rs.10123.20

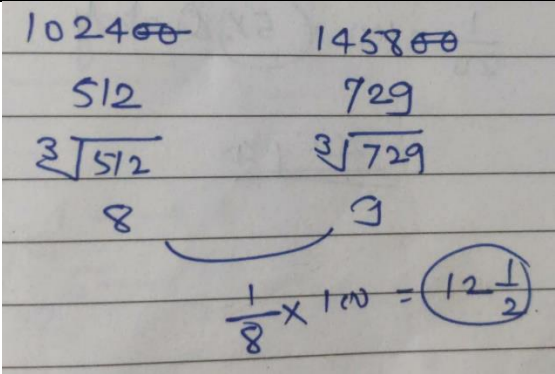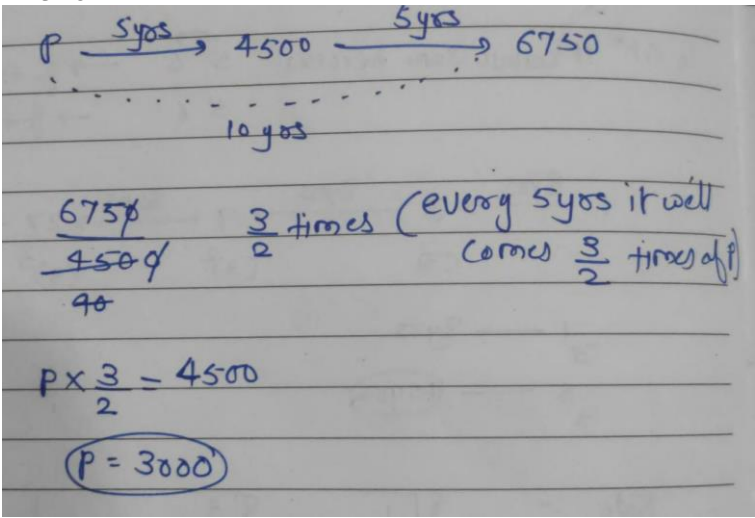|	
8	Answer: Option 'A' Rs.1898/-
9	Answer: Option 'B' Principal = Rs. 7700/- time = 2 years rate = 15 ¼% Amount = P(1+R/100)n = 7700 × (1 + 61/(4 × 100)2) = 7700 × [(1 + 61/400)2] = 7700 × [(461/400)2)] = 7700 × 461/400 × 461/400 = 7700 × 1.1525 × 1.1525 = 7700 × 1.32825625 = 10227.573125 C.I = 10227.573125 - 7700 = 2527.57/-
10	Answer: B) 3109 Explanation: Time = 2 years 4 months = 2(4/12) years = 2(1/3) years. Amount = Rs'. [8000 X (1+(15/100))^2 X (1+((1/3)*15)/100)] =Rs. [8000 * (23/20) * (23/20) * (21/20)] = Rs. 11109. . :. C.I. = Rs. (11109 - 8000) = Rs. 3109.
11	Answer: Option 'A' Rs.1898/-
12	Option B Solution: 1st year = 20% =1/5————-5 ————-6 2nd year = 16 (2/3)= 1/6——-6————7 3rd year = 14 (2/7) =1/7 ——-7————8 ————————————-= 210————336 on simplifying = 5:8 r=(8-5)/5*100=60% 160%=32000 100%=20000
13	Option B Solution:
14	Correct Option: C Interest earned by the man on 2nd year $= 4500 \times [\{1 + (\frac{30}{100})\}^2 - 1] - (\frac{4500 \times 30 \times 1}{100})$ $= 4500 \times (\frac{69}{100}) - 1350 = 3105 - 1350 = $ Rs. 1755 Interest earned by the man on 3rd year

	$= 4500 \times [\{1 + (\frac{30}{100})\}^3 - 1] - 4500 \times [\{1 + (\frac{30}{100})\}^2 - 1]$

$= 4500 \times (\frac{1197}{1000}) - 4500 \times \frac{69}{100} = 5386.5 - 3105 = Rs.2281.5$

Therefore, required difference = 2281.5 – 1755 = Rs. 526.5

Hence, option C is correct. |

<table>
<tr><td colspan="2" align="center">Type II - Half yearly / Quarterly</td></tr>
<tr><td>1</td><td>Option B
Solution:
In half yearly=> Time-double; Rate= half
Rate=5% ; Time=4 years; Sum = Rs 20,000
1 years————2 years————3 years————-4 years
1000————————1000————————1000————————-1000
————————————50————————50————————50
————————————————————————50————————50
————————————————————————2.5————————-50
————————————————————————————————————2.5
————————————————————————————————————2.5
————————————————————————————————————2.5
——-0.125
Total = Rs 4000 +300 + 10+0.125= Rs 4310.125</td></tr>
<tr><td>2</td><td>Answer: D) 824.32

Explanation:
Principal = Rs. 10000; Rate = 2% per half-year; Time = 2 years = 4 half-years.
Amount == Rs. 10824.32.

$Rs. \left[10000 * \left(1 + \frac{2}{100}\right)^4\right] = Rs. \left[10000 * \frac{51}{50} * \frac{51}{50} * \frac{51}{50} * \frac{51}{50}\right]$

⚠ Over Quota   C.I. = Rs. (10824.32 - 10000) = Rs. 824.32.</td></tr>
<tr><td>3</td><td>Answer: B) 20000

Explanation:
Let sum=Rs.x

C.I. when compounded half yearly = $\left[x\left(1 + \frac{10}{100}\right)^4 - x\right] = \frac{4641}{10000}$

C.I. when compounded annually = $\left[x\left(\frac{20}{100}\right)^2 - x\right] = \frac{11}{25}$

$\frac{4641}{10000}x - \frac{11}{25}x = 482$

=> x=20000</td></tr>
</table>

4	**Answer:** B) Rs.8000 **Explanation:** Compound Interest on P at 10% for 2 years when interest is compounded half-yearly $$= P\left(1 + \frac{R}{2}/100\right)^{2T} - P = P\left(1 + \frac{1}{20}\right)^4 - P = P\left(\frac{21}{20}\right)^4 - P$$ Simple Interest on P at 10% for 2 years $= \frac{PRT}{100} = \frac{P \times 10 \times 2}{100} = \frac{P}{5}$ Given that difference between compound interest and simple interest = 124.05 $$P * \left(\frac{21}{20}\right)^4 - P - \frac{P}{5} = 124.05$$ $$=> P\left[\left(\frac{21}{20}\right)^4 - 1 - \frac{1}{5}\right] = 124.05$$ P=8000
5	D – 6.09
6	Answer: B) 2522 Explanation: Principal = Rs. 16000; Time = 9 months =3 quarters; Rate = 20% per annum = 5% per quarter. Amount = Rs. [16000 x (1+(5/100))3] = Rs. 18522 CI. = Rs. (18522 - 16000) = Rs. 2522
7	Correct Option: (b) **Hint:** Amount $= P\left[1 + \dfrac{(R/4)}{100}\right]^{4n}$ - - - - - - - - [Interest compounded quarterly] We are given: Principal = Rs. 5000, Time = 9 months = 3 quarters, Rate = 6 % per annum Substituting the given values, we get Amount $= P\left[1 + \dfrac{(6/4)}{100}\right]^{3}$ Amount=Rs.5228.39 Therefore, Compound interest = 5228.39 – 5000 = Rs. 228.39
8	Correct Option: C P = 10000, T = 6 months, R = 20/4 = 5% (rate of interest apply quarterly) By the net% effect we would calculate the effective compound rate of interest for 6 months = 10.25% (Refer to sub-details) CI = 10.25% of 10000 CI $= \dfrac{10.25 \times 10000}{100} = 1025.$ _____ Sub-details: Calculation of effective compound rate of interest for 2 quarters (6 months) will be as follows. Here, x = 5 and y = 5% Net% effect = x + y = _xy

	100 $= 5 + 5 + \dfrac{5 \times 5}{100} = 10 + 0.25 = 10.25\%$
9	Correct Option: D Principal = Rs. 500; Amount = Rs. 583.20; Time = 2 years. Let the rate be R% per annum. then, $[1000(1 + \dfrac{R}{100})^2] = 1166.40.$ Or $(1 + \dfrac{R}{100})^2 = (\dfrac{108}{100})^2$ $\Rightarrow 1 + \dfrac{R}{100} = \dfrac{108}{100}$ or $R = 8.$ So, Rate = 8% p.a Hence, option D is corret.
10	
	Type III – Difference
1	**Option D** **Solution:** For 2 years SI = 5* 2= 10 % of the sum CI = 5 + 5+ (5*5)/100 = 10.25% of the sum required diff. = 10.25 – 10 = 0.25% of the sum Therefore , the required diff. = (160/10) * 0.25 = Rs.4
2	**Answer:** B) Rs.3 **Explanation:** S.I = Rs.(1200x10x1/100) = Rs.120. C.I = Rs[(1200x1+5/100)² -1200] = Rs.123. **Difference** = Rs.[123-120] = Rs. 3.
3	**Answer:** D) 8780.80 **Explanation:** when interest is reckoned using compound interest, interest being compounded annually. The difference in the simple interest and compound interest for two years is on account of the interest paid on the first year's interest Hence 12% of simple interest = 90 => simple interest =90/0.12 =750. As the simple interest for a year = 750 @ 12% p.a., the principal =750/0.12 = Rs.6250. If the principal is 6250, then the amount outstanding at the end of 3 years = 6250 + 3(simple interest on 6250) + 3 (interest on simple interest) + 1 (interest on interest on interest) = 6250 +3(750) + 3(90) + 1(10.80) = 8780.80.
4	**Option C** **Solution:** Difference = [sum * r^2 (300 + r)]/(100)^3 = [10000 * 3 * 3 (300+3)]/(100)^3 = 27.27
5	**Option B** **Solution:** diff between CI and SI =P * r²/100³ * (300+r)

	$620 = p*100/100^3 * 310$ $P = Rs\ 20,000$
6	**Option D** **Solution:** SI-CI for 3 yrs $= Pr^2/100^3*(300+r)$ $640 = P*20^2/100^3*320$ $640 = (P*20*20/100*100*100)*320$ $P = Rs\ 5000$
7	**Answer:** B) Rs.8000 **Explanation:** Compound Interest on P at 10% for 2 years when interest is compounded half-yearly $= P\left(1 + \frac{R}{2}/100\right)^{2T} - P = P\left(1 + \frac{1}{20}\right)^4 - P = P\left(\frac{21}{20}\right)^4 - P$ Simple Interest on P at 10% for 2 years $= \frac{PRT}{100} = \frac{P \times 10 \times 2}{100} = \frac{P}{5}$ Given that difference between compound interest and simple interest = 124.05 $P*\left(\frac{21}{20}\right)^4 - P - \frac{P}{5} = 124.05$ $=> P\left[\left(\frac{21}{20}\right)^4 - 1 - \frac{1}{5}\right] = 124.05$ $P = 8000$
8	**Answer:** A) 2.04 **Explanation:** C.I. when interest compounded yearly $= rs.[5000*(1+4/100)(1+1/2*4/100)]$ $= Rs.\ 5304.$ C.I. when interest is compounded half-yearly $= rs.5000(1+2/100)^3$ $= Rs.\ 5306.04$ Difference $= Rs.\ (5306.04 - 5304) = Rs.\ 2.04$
	Type IV - P becomes n times of itself
1	**Answer:** B) 5years **Explanation:** Rs.100 invested in compound interest becomes Rs.200 in 5 years. The amount will double again in another 5 years. i.e., the amount will become Rs.400 in another 5 years. So, to earn another Rs.200 interest, it will take another 5 years.
2	**Answer:** C) 5:6 **Explanation:** $\dfrac{P\left(1+\frac{r}{100}\right)^4}{P\left(1+\frac{r}{100}\right)^5} = \dfrac{1}{\left(1+\frac{r}{100}\right)} = \dfrac{100}{100+r} = \dfrac{100}{120} = \dfrac{5}{6}$
3	**Option B** **Solution:** in C.I principal increase like 1….3….9…..27

	...3.....3....3 = 9years
4	Correct Option: D $P(1 + \frac{R}{100})^5 = 2P \Rightarrow (1 + \frac{R}{100})^5 = \frac{2P}{P} = 2$ ...(i) Let $P(1 + \frac{R}{100})^n = 8P$ $\Rightarrow (1 + \frac{R}{100})^n = 8 = 2^3 = \{(1 + \frac{R}{100})^5\}^3$ [using (i)] $\Rightarrow (1 + \frac{R}{100})^n = (1 + \frac{R}{100})^{15} \Rightarrow n = 15.$ Thus, the required time = 15 years. Hence, option D is correct
5	**Answer:** B) 4 **Explanation:** $P(1 + \frac{20}{100})^n > 2P \Leftrightarrow (\frac{6}{5})^n > 2$ $(\frac{6}{5} \times \frac{6}{5} \times \frac{6}{5} \times \frac{6}{5}) > 2$ so, answer is 4 years
6	
	Type V - P becomes A in given period
1	**B – 20%**
2	**C – 6.66%**
3	**A – 12.5 %**

4	. **Option C** **Solution:** $A=P(1+r/100)^n$ $25920=15000(1+r/100)^3$ $25920/15000 = (1+r/100)^3$ $648/375 = (100+r)^3/100^3$ Put r value from options R=20%.
5	**Answer:** C) 5% **Explanation:** **S.I. on Rs.800 for 1 year** =Rs[840 - 800] = Rs.40 **Rate** =(100x40/800x1)% = 5%
6	**Option A** **Solution:** x : y = y : z x : 8000 = 8000 : 10000 x = 6400
7	**Option A** **Solution:** $P(1+r/100)^t = A$ $390625(1+4/100)^t = 456976$ $(1+1/25)^t = 456956 / 390625$ $(26/25)^t = (26/25)^4$ T = 4
8	**Answer – A**
9	**Answer – B**

	$$P \xrightarrow{\ 2yrs\ } 650 \xrightarrow{\ 2yrs\ } 676$$ $$\frac{676}{650} = \frac{26}{25} \text{ times}$$ $$P \times \frac{\cancel{26}\ ^{\text{to }25}}{25} = \cancel{650}$$ $$\boxed{P = 625}$$
10	**Answer – C** $$P \xrightarrow{\ 2yrs\ } 8000 \xrightarrow{\ 3yrs\ } 27000$$ 8000 27000 8 27 $\sqrt[3]{8}$ $\sqrt[3]{27}$ 2 : 3 $$R = \frac{1}{2} \times 100 = 50\% \qquad \Big| \quad \frac{3}{2} \text{ times every year}$$ $$P \times \frac{3}{2} \times \frac{3}{2} = 8000$$ $$\boxed{P = \frac{32000}{9}}$$
	Type VI – Miscellaneous Examples
1	**Answer:** A) Rs.625 **Explanation:** Let the two parts be Rs. x and Rs. (1301 - x). $x\left(1 + \frac{4}{100}\right)^7 = (1301 - x)\left(1 + \frac{4}{100}\right)^9$ $\frac{x}{(1301 - x)} = \left(1 + \frac{4}{100}\right)^2 = \left(\frac{26}{25} * \frac{25}{26}\right)$ => 625x=676(1301-x) 1301x=676 x 1301x=676. So,the parts are rs.676 and rs.(1301-676)i.e rs.676 and rs.625
2	**Answer:** C) 3087 **Explanation:** Shyam's share * (1+0.05)9 = Ram's share * (1 + 0.05)11

	Shyam's share / Ram's share = (1 + 0.05)11 / (1+ 0.05)9 = (1+ 0.05)2 = 441/400 Therefore Shyam's share = (441/841) * 5887 = 3087
3	**Answer:** A) 5% **Explanation:** Given compound interest for 3 years = Rs. 1513.2 and simple interest for 5 years = Rs. 2400 Now, we know that C.I = $\left[P\left(1 + \frac{R}{100}\right)^n - 1 \right]$ => 1513.2 = $\left[P\left(1 + \frac{R}{100}\right)^3 - 1 \right]$ ....(A) And S.I = PTR/100 => 2400 = P5R/100 ....(B) By solving (A) & (B), we get
4	Correct Option: C Let the amount invested in Scheme A is ₹ x. Then, the amount invested in Scheme B be ₹ (6100 – x) Now, according to the question, $x(1 + \frac{10}{100})^2 - x = \frac{(6100 - x) \times 10 \times 4}{100}$ $\Rightarrow x(\frac{121}{100} - 1) = \frac{(6100 - x) \times 40}{100}$ $\Rightarrow \frac{21x}{100} = \frac{(6100 - x) \times 40}{100}$ $\Rightarrow 21x = 6100 \times 40 - 40x$ $\Rightarrow 61x = 6100 \times 40$ $\Rightarrow x = \frac{6100 \times 40}{61} = ₹ 4000$ ∴ The amount invested in Scheme A is ₹ 4000. Hence, option C is correct.
5	**Answer:** C) Either I or II alone sufficient to answer **Explanation:** I. Amount = $Rs. \left[200 * \left(1 + \frac{6}{100}\right)^{16} \right]$ II. Amount = $Rs \left[200 * \left(1 + \frac{6}{100}\right)^{16} \right]$ Thus, I as well as II gives the answer.