

# 6. HIRE-PURCHASE SYSTEM

## Problems on Interest Calculation

### Problem 1.

**(A) When rate of interest and total cash price are given.**

On April, 1, 1988 Shyamlal purchased a plant on hire-purchase system. According to the terms of the agreement ₹ 80,000, was to be paid on the signing of the contract. The balance was to be paid in four annual installments of ₹ 50,000 each plus interest. The cash price of the plant was ₹ 2,80,000. Interest chargeable on outstanding balance was 20% per annum. You are required to calculate interest.

### Solution

No. of Instal	Balance of Payment	Interest = $P \times R \times T$	Total hire Purchase Price
Cash Price	2,80,000	Nil	80,000
DP	80,000		
I	2,00,000 50,000	$2,00,000 \times 20\% \times 1 =$ 40,000	90,000
II	1,50,000 50,000	$1,50,000 \times 20\% \times 1 =$ 30,000	80,000
III	1,00,000 50,000	$1,00,000 \times 20\% \times 1 = 20,000$	70,000
IV	50,000	$50,000 \times 20\% \times 1 = 10,000$	60,000
	50,000	Total = 1,00,000	3,80,000 HPP

#### **HPP**

Cash Price	2,80,000
+ Interest Total	<u>1,00,000</u>
	<u>3,80,000</u>

**(B) When rate of interest, total cash price and installments are given.**

Maheer purchases a car on hire-purchase system on April 1, 1989, the total cash price of the car is ₹ 3,30,000 payable ₹ 1,00,000 on signing of the agreement and three equal annual installments of ₹ 1,00,000 payable on 31<sup>st</sup> March for 3 years. Interest is charged at 15% per annum. You are required to calculate interest paid by the buyer to seller each year.

**Solution**

No. of Inst.	Bal <sup>n</sup> of Payment	Interest	Amount of Inst.
	3,30,000	Nil	
DP	1,00,000		1,00,000
1.	2,30,000	$2,30,000 \times 15\% \times 1 = 34,500$	1,00,000
	65,500		
2.	1,64,500	$1,64,500 \times 15\% \times 1 = 24,675$	1,00,000
	75,325		
3.	89,175	$1,00,000 - 89,175 = 10,825$	1,00,000
		Total = 70,000	4,00,000

**Note:** Interest of last installment is taken as b/f.

**Note:- When Down payment & All Inst. Total**

- (i) Equal to cash price  
- It means Interest has to be added to install.
- (ii) Exceeds such price  
- It means interest is already  
Added in the Installment

***(C) When rate of interest and installments are given but total cash price is not given.***

Mr. Nair purchased a VCR on hire-purchase system on April 1, 1989. As per terms, he is required to pay ₹ 8,000 down, i.e., on April 1, 1989; ₹ 7,000 on March 31 1990, ₹ 7,000 on March 31, 1991 and ₹ 6,000 on March 31 1992. Interest is charged at 20% p.a. You are req. to calculate total cash price of the VCR and interest paid with each installment.

**Solution**

**Analysis Table**

No. of Installment	Cash Price	Interest	Installment with Interest.
DP	8,000	Nil	8,000
I	4,167	$(7,000 + 5,000 + 5,000) \times 20/120 = 2,833$	7,000
II	5,000	$(7,000 + 5,000) \times 20/120 = 2,000$	7,000
III	5,000	$6,000 \times 20/120 = 1,000$	6,000
<b>Total</b>	<b>22,167</b>	<b>5,833</b>	<b>28,000</b>

**Calculate interest from last**

(i)  $I = P \times T \times R$

$$I = 6,000 \times \frac{20}{100} = 1,000$$

Now cash Price = Installment Amount - Interest  
= 6,000 - 1,000 = 5,000

(ii) **Interest =  $P \times T \times R$**

$$= (7,000 + 5,000) \times \frac{20}{100} = 2,000.$$

Now Cash Price = Installment Amount - Interest  
= 7,000 - 2,000 = 5,000

(iii) **Interest = Principal  $\times$  Time  $\times$  Rate of Interest**

$$I = (7,000 + 5,000 + 5,000) \times \frac{20}{120} = 2,833$$

Now cash Price = 7,000 - 2,833 = 4,167

**(D) When total cash price and installments are given but rate of interest is not given.**

A motor cycle, cash price of which is ₹ 32,000 is sold on hire-purchase system for ₹ 40,000 payable in four equal quarterly installments of ₹ 10,000 each. The first payment is made at the end of first quarter. Show how interest is calculated.

**(E) When only installments are given.**

X purchased a scooter on hire-purchase system and agrees to pay three yearly instalments ₹ 10,400, 9,600 and ₹ 8,800. Calculate interest and cash price.

**Solution**

No. of installment	Cash Price	Interest	Installment with interest
1	x	Interest of 3x	x + Int. of 3x
2	x	Interest of 2x	x + Int. of 2x
3	x	Interest of x	x + Int. of 1x

**Note:-**

(i) Since time gap between every two installment is equal.

Let us suppose, Cash price of each installment = x

(ii) 1<sup>st</sup> installment will interest = x + interest of 3x.....(i)

(iii) 2<sup>nd</sup> installment will interest = x + interest of 2x.....(ii)

Now, Subtract equation (ii) From equation (i)

Then,  $x + \text{Interest of } 3x = 1^{\text{st}} \text{ installment with Interest}$   
 $x + \text{Interest of } 2x = 2^{\text{nd}} \text{ installment with Interest}$   
 Interest of  $x = 10,400 - 6,600$   
 $\therefore \text{Interest of } x = 800$

Now,

Putting the value of  $x$  in equation - (i)

$$x + 3 \times 800 = 10,400$$

$$\therefore x = 10,400 - 800 \times 3 = 8,000$$

$$\therefore \text{Total cash price} = x + x + x = 9,000 \times 3 = 24,000$$

(iv) Interest =  $10,400 - 8,000 = 2,400$

Interest =  $9,600 - 8,000 = 1,600$

Interest =  $8,800 - 8,000 = 800$

### Problem 2.

On 1<sup>st</sup> January 1990, a manufacturing company buys on Hire-Purchase system a machinery for ₹ 60,000 payable by three equal annual installments combining principal and interest, the rate of interest was 5% per annum.

Calculation the amount of cash selling price and interest. The present values of an annuity of one rupee of three year at 5% is ₹ 2.72325.

### Solution

### *Analysis Table*

No. of Installment	Cash price	Interest	Installment
DP	Nil	-	Nil
1	17,277	20,000	20,000
2	18,141	19,048	20,000
3	19,048	19,048	20,000
	<b>54,466</b>	<b>5,534</b>	<b>60,000</b>

### Problem 3.

A acquired 1<sup>st</sup> January, 2003 a machine under a Hire-Purchase agreement which provides for 5 half-yearly installments of ₹ 6,000 each, the first installment being due on 1<sup>st</sup> July,2003. Assuming that the applicable rate of interest is 10% per annum, calculate the cash value of the machine. All working should form part of the answer.

[May-2003]

**Solution**

**Analysis Table**

No. of Installment	Cash price	Interest	Installment
1	4,701	1,299	6,000
2	4,936	$6,000+5,442 \times$ $5,183+5,714$	6,000
3	5,183	$6,000+5,442 \times 5/105=817$ $+5,714$	6,000
4	5,442	$6,000+5,714 \times 5/105=558$	6,000
5	5,714	$6,000 \times 5/105=286$	6,000
	<b>25,976</b>	<b>4,024</b>	<b>30,000</b>

**Hire-Assets A/c**

Date	Particulars	₹	Date	Particulars	₹
1.1.03	To hire-vendor	25,976	31.12.13	By dep. A/c	2,598
				By c/d	23,378
		25,976			25,976
1.1.04	To balance b/d	23,378	31.12.04	By Dep.	2,338
				By c/d	21,040
		23,378			23,378
1.1.04	To balance b/d	21,040	31.12.05	By Dep.	2,104
				By c/d	18,936
		21,040			21,040

**Hire-Vendor A/c**

Date	Particulars	₹	Date	Particulars	₹
1.1.03	To Bank(D.P.)	xx	1.1.03	By Hire Assets A/c	25,976
30.6.03	To Bank	6,000	30.6.03	By Interest	1,299
31.12.03	To Bank	6,000	31.12.03	By Interest	1,064
31.12.03	To c/d	16,339			
		<b>28,339</b>			<b>28,339</b>
30.6.04	To Bank	6,000	30.6.04	By balance b/d	16,339
31.12.04	To Bank	6,000	31.12.04	By Interest	817
31.12.04	To c/d	5,714		By Interest	558
		<b>17,714</b>			<b>17,714</b>
30.6.05	To Bank	6,000	01.01.05	By balance b/d	5,714
			30.6.05	By Interest	286
		6,000			6,000

**Problem 4.**

Ram & Co. acquired a motor lorry on hire-purchase basis. It has to make cash down payment of ₹ 1,00,000 at the beginning. The payments to be made subsequently are ₹ 2,63,000, ₹1,85,000 and ₹ 1,14,000 at the end of first year, second year and third year respectively. Interest charged is @ 14% per annum. Calculate the price of motor lorry and interest paid in each installment.

[May-2008, 8 Marks]

**Solution**

**Statement Showing cost price & Total interest**

Particulars	Installment (₹)	Interest on cumulative (₹)	Principal (₹)
3 <sup>rd</sup> installment	1,14,000	$1,14,000 \times 14/114 = 14,000$	(1,14,000 - 14,000) = 1,00,000
Less:- Interest	(14,000)		
	1,00,000		
Add:- 2 <sup>nd</sup> Installment	1,85,000		
Less:- Interest	(35,000)	$2,85,000 \times 14/114 = 35,000$	(2,50,000 - 1,00,000) = 1,50,000
Add:- 1 <sup>st</sup> Installment	2,63,000		
Less:- Interest	(63,000)	$5,13,000 \times 14/114 = 63,000$	(4,50,000 - 2,50,000) = 2,00,000
	4,50,000		1,00,000
<b>Down payment</b>		<b>1,12,000</b>	<b>5,50,000</b>

**Note:-** Interest rate of 14% is given in question.

**Result:-** Hence, the cost price of motor Lorry purchase on hire purchase basis is of 5,50,000.

**Problem 5.**

<b>From the following, calculate the cash price of the asset:</b>	<b>(₹)</b>
Hire purchase price of the asset	50,000
Down payment	10,000
Four annual installments at the end of each year	10,000
Rate of Interest	5% p.a.

[May - 2010, 2 Marks]

**Solution**

**Statement Showing cost price of Asset**

Particulars	Installment	Interest on cumulative	Principal (₹)
4 <sup>th</sup> installment	10,000	$10,000 \times 5/105 = 476$	$(10,000 - 476) = 9,524$
Less:- Interest	(476)		
	9,524		
Add:- 3 <sup>rd</sup> Installment	10,000		
	19,524		
Less:- Interest	(930)	$19,524 \times 5/105 = 930$	$(18,594 - 9,524) = 9,070$
	18,594		
Add:- 2 <sup>nd</sup> Installment	10,000		
	28,594		
Less:- Interest	(1,362)	$28,594 \times 5/105 = 1,362$	$(27,232 - 18,594) = 8,638$
	27,232		
Add: 1 <sup>st</sup> Installment	10,000		
	37,232		
Less: Interest	(1,773)	$37,232 \times 5/105 = 1,773$	$(35,459 - 27,232) = 8,227$
	35,459		10,000
<b>Down payment</b>		<b>4,541</b>	<b>45,459</b>

**Working Note:-** Interest rate of 5% is given in question.

**Result:-** - Hence, the cash price of good is found to be ₹ 45, 459 & total interest is ₹ 4,541.

**Problem 6.**

On 1<sup>st</sup> April, 2009 a car company sold to Arya Bros., a motor car on hire purchase basis. The total hire-purchase price was ₹ 4,60,000 with down payment of ₹ 1,60,000. Balance amount was to be paid in three annual instalments of ₹ 1,00,000 each. The first instalment payable on 31<sup>st</sup> March, 2010. The cash price of the car was ₹ 4,00,000.

How will Arya Bros. account for interest over three accounting years assuming books of accounts are closed on 31<sup>st</sup> March every year.

[May- 2010]

**Problem 7.**

Bhushan purchased an asset on hire-purchase system. He paid ₹ 1,000 down and ₹1,200 each at the end of 2<sup>nd</sup>, 4<sup>th</sup> and 6<sup>th</sup> year. Interest is charged @ 10% p.a. on two yearly rests. Calculate amount of interest and cash price included in each installment.

**Solution**

**Analysis Table**

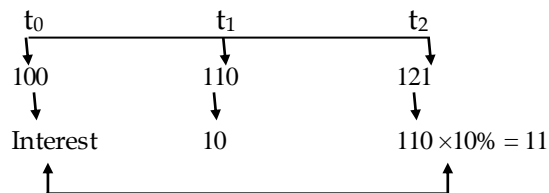
No. of Installment	Cash price	Interest	Installment
DP	1,000	Nil	1,000
1	695	$1,200 + 833 \left. \vphantom{1,200 + 833} \right\} \times 20/120 = 505$ + 1,000	1,200
2	833	$[1,200 + 1,000] \times 20/120 = 367$	1,200
3	1,000	$1,200 \times 20/120 = 200$	1,200
	<b>3,528</b>	<b>1,072</b>	<b>4,600</b>

**Problem 8.**

G.D. Milling Industries Auraiya purchased an assets on hire - purchase system. They pay ₹ 1524 down and ₹ 5,400 in 3 installments of ₹ 1,800 each at the interval of two years. Hire-vendor charge interest at 10 percent per annum on yearly rests.

**Solution**

Interest nest : yearly, P.A.



**Analysis Table**

No. of Installment	Cash price	Interest	Installment
DP	1,524	Nil	1,524
1	1,016	$1,800 + 1,229 \left. \vphantom{1,800 + 1,229} \right\} \times 21/121 = 784$ + 1,488	1,800
2	1,229	$[1,800 + 1,488] \times 21/121 = 571$	1,800
3	1,488	$1,800 \times 21/121 = 312$	1,800
	<b>5,257</b>	<b>1,667</b>	<b>6,924</b>



**Problem 9.**

On 1<sup>st</sup> April, 2012, Fastrack Motors Co. sells a truck on hire purchase basis to Teja Transport Co. for a total hire purchase price of ₹ 9,00,000 payment as to ₹ 2,40,000 as down payment and the balance in three equal annual installments of ₹ 2,20,000 each payable on 31<sup>st</sup> March 2013, 2014 and 2015.

The hire vendor charges interest @ 10% per annum.

You are required to ascertain the cash price of the truck for Teja Transport Co. Calculations may be made to the nearest rupee.

**Solution**

$$\text{Ratio of interest and amount due} = \frac{\text{Rate of interest}}{100 + \text{Rate of interest}} = \frac{10}{110} = \frac{1}{11}$$

There is no interest element in the down payment as it is paid on the date of the transaction. Installments paid after certain period includes interest portion also. Therefore, to ascertain cash price, interest will be calculated from last installment to first installment as follows:

***Calculation of interest and Cash Price***

<b>No. of Installments (1)</b>	<b>Amount due at the time of installment (2)</b>	<b>Interest (3)</b>	<b>Cumulative Cash price (2-3) = (4)</b>
3 <sup>rd</sup>	2,20,000	1/11 of ₹ 2,20,000 = ₹ 20,000	2,20,000
2 <sup>nd</sup>	4,20,000 (W.N.1)	1/11 of ₹ 4,20,000 = ₹ 38,182	3,81,818
1 <sup>st</sup>	6,01,818 (W.N.2)	1/11 of ₹ 6,01,818 = ₹ 54,711	5,47,107

Total cash price = ₹ 5,47,107 + 2,40,000 (down payment) = ₹ 7,87,107

***Working Notes:***

1. ₹ 2,00,000 + 2<sup>nd</sup> instalment of ₹ 2,20,000 = ₹ 4,20,000
2. ₹ 3,81,818 + 1<sup>st</sup> Installment of ₹ 2,20,000 = ₹ 6,01,818