

## COMMERCIAL ARITHMETIC II MARKING SCHEME

### (a) HIRE PURCHASE

1	Cost price $100 \times 3240 = \text{sh } 27,00$ 120 Deposit = $\frac{10}{100}$ of 2700 = 270 $= 3240 - 270$ $= \text{Sh.}2970$		<b>1989Q23</b>
2.	Interest $= (13800 - 2280) \times \frac{20}{100} \times 2$ $= 11520 \times 0.2 \times 2$ $= 4608$  Monthly instalments $= \frac{11520 + 4608}{24}$ $= \text{Kshs. } 672$	M1  M1 A1 3 M	<b>2007Q6</b>
3.	(a) (i) the cost $= \text{ksh } (7,500 + 11 \times 6,000)$ $= \text{ksh } 73,500$  (ii) the amount % increase $= \frac{73,500 - 60,000}{60000}$ $= 22.5\%$  (b) the amount paid $= 60,000 \times 25 \times 0.95$ $= \text{ksh } 1,425,000$  (c) institution x ksh 73,500 x 25 $= \text{Ksh } 1,837,500$	M1 M1 A1 M1  A1  M1 A1 M1  M1 A1 10	

	Institution Y; ksh $60,000 \times 25 \times 1 + \left(\frac{22}{100}\right)^2$ Difference $= \text{ksh } (1,881,600 - 1,837,500)$ $= \text{ksh } 44,100$		<b>2011Q17</b>
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	$26400+10000=36400$ $36400 \times 1.2=43680$ $=\text{Sh.}43,680$  $(b) A = P \left(1 + \frac{r}{100}\right)^n$ $= 43680 \left(1 + \frac{20}{100}\right)^8$ $= 43680 (1.12)^8$ $= 187816.00$  Deposit = $3 \times 10000 = 30000$ $187816 - 30000$ $= \text{Sh}157,816$  <p style="text-align: right;"><b>1995Q17</b></p>	
9.	$(a) 21000 \times 48 - 560000$ $10080000 - 560000$ $= \text{Sh.}448,000$  $(b) 448000 - \frac{560000 \times R \times 4}{100}$ $r = \frac{44800 \times 100}{560000 \times 4}$ $= 20\%$  <p style="text-align: right;"><b>1996Q7</b></p>	M1 A1 M1 A1 4M
10.	$1600 \frac{(1+r)^2}{100} = 25000$ $\frac{(1+r)^2}{100} = \frac{25000}{16000}$ $1 + \frac{r}{100} = \sqrt{1.5625}$ $\frac{r}{100} = 0.25$ $r = 25\%$  <p style="text-align: right;"><b>1998Q13</b></p>	M1 M1 M1 M1 4M
11.	a). by 30 <sup>th</sup> june, 1996 $A = 12000 \times 1.09$ $= \text{shs } 13080$  b). By 30 <sup>th</sup> June 1997 $A = 12000 \times 1.09 + 12000 \times 1.092$ $= 13080 + 14257.20$ $= \text{shs } 27337.20$  <p style="text-align: right;"><b>1999Q10</b></p>	B1 M1 M1
12.	12% used -n = 4 A - 4800 (1.12) substituting	

	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th>No</th> <th>Log</th> </tr> <tr> <td>48000</td> <td>4.6812</td> </tr> <tr> <td>(1.12)<sup>4</sup></td> <td>0.1968</td> </tr> <tr> <td><u>7.55 x 10<sup>4</sup></u></td> <td><u>4.8780</u></td> </tr> </table> Amount payable = shs.75510 <p style="text-align: right;"><b>2000Q12</b></p>	No	Log	48000	4.6812	(1.12) <sup>4</sup>	0.1968	<u>7.55 x 10<sup>4</sup></u>	<u>4.8780</u>	
No	Log									
48000	4.6812									
(1.12) <sup>4</sup>	0.1968									
<u>7.55 x 10<sup>4</sup></u>	<u>4.8780</u>									
13.	a). i). $750,000 \times \frac{90}{100}$ $= 675,000$ ii). $675,000(1.1)^3 = 898.425$ $898,425 + 75,000 = 973\ 425$  b). $675,000 (1-1)^n = 816\ 750$ $(1.1)^n = 1.21$  $n = \frac{0.828}{0.0414}$ $n = 2 \text{ years}$  <p style="text-align: right;"><b>2002Q17</b></p>	M1 A1 M1 A1  M1 A1 8m								
14.	i). $I = \frac{PRT}{100}$ $= \frac{5}{100} \times 2 \times p$ $= 0.1p$  ii). $A = P(1+0.05)^2$ $= 1.1025p$ Interest = 0.1025p  Different in interest $= 0.1025p - 0.1p$ $210 = 0.0025$ Therefore $P = \frac{210}{0.0025}$ $= 82,000/=$  <p style="text-align: right;"><b>2005Q15</b></p>	M1  M1  M1 A1								

15.	<p>a). i). principal  <math>= 358400 - (12800 \times 3)</math>  <math>= 320000</math></p> <p>(ii) <math>r = \frac{12800}{320000} \times 100\%</math>  <math>= 4\%</math></p> <p>b). i). Deposit <math>= \frac{25}{100} \times 56000</math>  <math>= 14000</math></p> <p>Instalments <math>= \frac{56000 - 14000}{2625}</math>  <math>= 16</math></p> <p>ii). Cash price =  <math>\frac{100 - 12.5}{100} \times 4000 = 35000</math></p> <p>%Difference =  <math>\frac{56000 - 35000}{35000} \times 100\%</math>  <math>= 60\%</math></p> <p style="text-align: right;"><b>2006 Q17 P2</b></p>	M1 A1 M1 M1 A1 M1 M1 M1 10 M
16.	<p>Amount for Kago  <math>= 30000 + \frac{12}{100} \times 30000 \times 5</math>  <math>= 48,000</math></p> <p>Compound interest rate for Nekesa  <math>=</math>  <math>30000 \left(1 + \frac{r}{100}\right)^5 = 48\,000</math></p> <p><math>\left(1 + \frac{r}{100}\right)^5 = \frac{48\,000}{30000} = 1.6</math></p> <p><math>1 + \frac{r}{100} = \sqrt[5]{1.6}</math>  <math>r = 100 (1.098560543 - 1)</math>  <math>= 9.9\%</math></p> <p style="text-align: right;"><b>2012 Q7 P2</b></p>	M1  M1  A1  4

17	<p>(a) (i) <math>180\,000 + (11 - 1) \times</math>  <math>= 288\,000</math>  <math>10x = 108\,000</math>  <math>x = 10\,800</math></p> <p>(ii) <math>S_n = \frac{11}{2} (180\,000 + 288\,000)</math>  <math>= 2574000</math></p> <p>(a) <math>\frac{150\,000 \times 1.1^{10}}{12}</math>  <math>= 32\,422</math> or <math>32425</math> (use of tables)</p> <p>(b) (i) <math>\frac{[150,000 \times (1.1 - 1)]}{(1.1 - 1)}</math>  <math>= 2779675</math></p> <p>(ii) <math>\frac{2779675 - 2574000}{11 \times 12}</math>  <math>= 1558</math></p> <p style="text-align: right;"><b>2012 Q17 P2</b></p>	M1 A1  M1 A1  M1 A1  M1 A1  M1 A1  10
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## APPRECIATION AND DEPRECIATION

1.	<p>(a) <math>A = P\left(1 - \frac{r}{100}\right)^n</math>  <math>= 110000\left(1 - \frac{5}{100}\right)^3</math>  <math>= 110000 \times 0.85^3</math>  <math>= \text{sh } 67553.75</math></p> <p>(b) <math>A = P\left(1 - \frac{r}{100}\right)^n</math>  <math>55000 = 110000\left(1 - \frac{15}{100}\right)^n</math>  <math>55000 = 110000(0.85)^n</math>  <math>\frac{55000}{110000} = 0.85^n</math>  <math>0.5 = 0.85^n</math></p> <p><math>\text{Log } 0.5 = n \text{log } 0.85</math>  <math>n = \frac{\text{log } 0.5}{\text{Log } 0.85}</math>  <math>n = 4.265 \text{yrs}</math></p> <p style="text-align: right;"><b>1989Q21</b></p>		<p style="text-align: center;"><math>= \text{Shs } 526535</math></p> <p><math>\left(1 - \frac{r}{100}\right)^2 = \frac{658000}{950000} = 0.6926</math></p> <p><math>1 - \frac{r}{100} = \sqrt[60]{0.6926}</math></p> <p><math>1 - r/100 = 1 - \sqrt[60]{0.6926}</math>  <math>r/100 = 1 - \sqrt[60]{0.6926}</math>  <math>= 1 - 0.6926</math>  <math>= 0.0062</math>  <math>r = 0.62\%</math></p> <p style="text-align: right;"><b>1999Q17</b></p>	M1 A1  M1 M1 A1 8 m								
2.	<p><math>A = P\left(1 - \frac{r}{100}\right)^n</math>  <math>= 24000\left(1 - \frac{5}{100}\right)^3</math>  <math>= 24000 (0.95)^3</math>  <math>= \text{sh } 20,577</math></p> <p style="text-align: right;"><b>1990Q9</b></p>		<p><math>P(1 - 0.09)^3 = 150700</math>  <math>P = \frac{150700}{(0.91)^3} = 199,981</math></p> <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="border-right: 1px solid black; padding: 2px;">No.</th> <th style="padding: 2px;">Log</th> </tr> </thead> <tbody> <tr> <td style="border-right: 1px solid black; padding: 2px;">150 700</td> <td style="padding: 2px;">5.1781</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">0.913</td> <td style="padding: 2px;"><u>1.8770</u></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;"><math>2.0 \times 10^5</math></td> <td style="padding: 2px;">5.3011</td> </tr> </tbody> </table> <p style="text-align: right;"><b>2002Q9</b></p>	No.	Log	150 700	5.1781	0.913	<u>1.8770</u>	$2.0 \times 10^5$	5.3011	M1  M1 M1 A1 4m
No.	Log											
150 700	5.1781											
0.913	<u>1.8770</u>											
$2.0 \times 10^5$	5.3011											
3.	<p><math>A = P\left(1 - \frac{r}{100}\right)^n</math>  <math>= 40000\left(1 - \frac{10}{100}\right)^4</math>  <math>= 40000 (0.95)^4</math>  <math>= \text{Sh.}26244</math></p> <p style="text-align: right;"><b>1991Q9</b></p>		<p>7. Value at end of 2nd year  <math>\left\{ \frac{21600 \times 75}{100} \times \frac{80}{100} \right\}</math>          Value at end of 4th year</p> <p><math>21600 \times \frac{75}{100} \times \frac{80}{100} \times \left(\frac{85}{100}\right)^2</math>  <math>= 9369.60</math></p> <p style="text-align: right;"><b>2003Q4</b></p>	M1  M1 A1 3M								
4.	<p>1995 value = <math>50,000 \times 1 \times 1.2</math>  <math>= 60,000</math>          1997 value = <math>60,000 \times (1.1)^3</math>  <math>= 79860</math></p> <p style="text-align: right;"><b>1998Q5</b></p>	A1 B1 M1 3m	<p>8. (a) Interest periods  <math>\frac{3}{2} \times 4 = 6</math>  <math>450\,000(1 + \frac{6}{100})^6</math>  <math>450\,000 \times 1.06^6</math>  <math>\text{Shs } 638\,550</math></p> <p>(b) <math>500 \times 280 \times 3</math>  <math>\text{Shs} = 1,260,000</math></p> <p>c). value  <math>9000(1 - \frac{16}{100})^3</math>  <math>450\,000(0.84)^3</math>  <math>450\,000(0.5927)</math>  <math>\text{Shs} = 266,715</math></p>	M1 A1  M1 A1 M1 M1								
5.	<p>a). <math>950000\left(1 - \frac{5}{100}\right)^2</math></p> <p><math>92000\left(1 - \frac{5}{100}\right)^2\left(1 - \frac{15}{100}\right)^3</math></p>	M1  M1 A1										

	<p>Total profit =  (1,260,000+266715)  - 638 300  =Shs 888 415</p> <p style="text-align: right;"><b>2003Q23</b></p>	<p>A1 8 M</p>
9.	$480\,000 \times \frac{100}{96} = 500\,000$ $800\,000 \left(1 - \frac{r}{100}\right) = 500\,000$ $\left(1 - \frac{r}{100}\right)^5 = \frac{5}{8} = 0.625$ $1 - \frac{r}{100} = \frac{5}{8} = \sqrt[5]{0.625}$ $= 9.103 \times 10^{-1}$ $= \frac{r}{100} = 1 - 0.9103$ $r = 8.97\%$ <p style="text-align: right;"><b>2004Q10</b></p>	
10.	<p>a). Interest =  <math>109375 \times \frac{8}{100} \times 2</math>  = 17500  Amount = 109375+17500  = shs. 126875</p> <p>b). i). 1st year value  = <math>\frac{96}{100} \times 126875</math>  = shs 121 800</p>	<p>M1 M1 A1 M1  A1 B1 M1</p>

	<p>ii). 4th year value  = 121800 (1+ <math>\frac{6}{100}</math>)<sup>9</sup>  = 205779</p> <p>c). % Gain =  <math>\frac{205779 - 126875}{126875} \times 100</math>  = 62.19%</p> <p style="text-align: right;"><b>2008Q23</b></p>	<p>A1 M1  A1 10 M</p>
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## INCOME TAX

1.	$2300 \times 2 = 4600$ $2300 \times 3 = 6900$ $(5520 - 4600) \times 5 = 4600$  Tax payable $= 4600 + 6900 + 4600 = 16,100$ Basic salary $= 5520 \times 20 = 110,400$ $(16100 + 120 + 100 - 220)$ $= 16100$ $110 - 16100$ $= \text{sh}94300$ <u>94300</u> $12 = \text{sh}7858.33$  Sh.7858.30(to the nearest 10cents) <b>1992Q17</b>	
2.	$7500 + 2500 = 10,000$ Basic salary = $10000 \times 12$ $= 120,000$ <u>39600</u> $\times 2 = 3960$ $20$ <u>39600</u> $\times 3 = 5940$ $20$ <u>39600</u> $\times 5 = 9900$ $20$ <u>1200</u> $\times 7 = 420$ $20$ $3960 + 5940 + 9900 + 420$ $= 20,220$  <u>20220</u> $= 1685$ $12$ $1685 - 200 = 1485$ Income tax per month $= \text{sh} 1485$  <b>1993Q1</b>	
3.	(a) $13120 + 3000 = 16420$ sh per month $\frac{16420}{20} = \text{£}821$  (iii) $325 \times 2 = 650$ $325 \times 3 = 975$ $171 \times 4 = 684$ 2309 before relief (i) $2309 - 455 = 1854$	

	(c) other deductions $100 + 280 + 2624 + 3004$  <b>1996Q18</b>	
4.	(a) taxable pay $\frac{20,000}{20} \times \frac{115}{100} \times \frac{700}{20}$ $1000 \times \frac{115}{100} - 35$ $1150 - 35 = \text{£}1115$  Taxable income $342 \times 2 + 342 \times 3 + 89 \times 5$ $684 + 1026 + 1368 + 445 - 600$ $3523 - 600 = \text{sh. } 2923$  Net tax = $35.23 - 600$ Sh. 2923 (£146.15) <b>1998Q18</b>	M1 M1  M1 M1 M1 A1  B1 8M
5.	a) total earnings <u>40480</u> = £ 2024 $20$ $435 \times 2 = 870$ $435 \times 3 = 1305$ $435 \times 4 = 1740$ $435 \times 5 = 2175$ $284 \times 6 = \underline{1704}$ 7794  Net tax shs.7794 - shs 800 $= \text{shs } 6994$ New earnings.  $15 \times 2024 = 3036$ £ 3036 - £ 2024 = 1012 Excess tax = $1012 \times 6$ Shs.6072  %age excess = $\frac{6072}{7794} \times 100\%$ $= 77.91\%$ <b>2001Q17</b>	M1  M1 M1  A1  B1   M1  M1  A1   8 M
6.	a). <u>16510</u> $\times 12$ $20 = 9906$ b). taxation ; $4512 \times 2 = 9024$	M1 A1

	$4512 \times 3 = 13536$ $(9906 - 9024) = 882 \times 4$ $= 3528$ $\frac{9024 + 13536 + 3528}{12}$ $= 26088 \div 12 = 2174$ <p>c). Tax due: <math>2174 - 960 = 1214</math></p> <p style="text-align: right;"><b>2002Q18</b></p>	M1 M1 M1 A1 M1 M1 A1  8 M
7.	<p>a). Total monthly income shs (20600+1200+2880+340) = shs 35820</p> <p>b). 1st 9680: <math>\frac{10}{100} \times 9680 = 968</math></p> <p>2nd 9120 ; <math>\frac{15}{100} \times 9120 = 1824</math></p> <p>3rd 9120 ; <math>\frac{20}{100} \times 9120 = 1824</math></p> <p>4th 7900 <math>\frac{25}{100} \times 7900 = 1975</math></p> <p>Total tax - Less relief = <math>6135 - 1056</math></p> <p>Monthly tax paid = shs. 5079</p> <p style="text-align: right;"><b>2004Q17</b></p>	M1  A1 M1 M1 M1 M1 M1 A1 8 M
8.	<p>Tax on 1<sup>st</sup> 9680 <math>\frac{10}{100} \times 9680 = 968</math></p> <p>Monthly income (shs) <math>\frac{(1916 - 968) 100 + 9680}{15}</math></p> <p>= <math>6320 + 9680 = 16000</math></p> <p style="text-align: right;"><b>2006Q8</b></p>	M1  M1  A1 3m
9.	<p>a). i). principal = <math>358400 - (12800 \times 3) = 320000</math></p> <p>(ii) <math>r = \frac{128000}{32000} \times 100\% = 4\%</math></p> <p>b). i). Deposit = <math>\frac{25}{100} \times 56000 = 14000</math></p> <p>Instalments = <math>\frac{56000 - 14000}{2625} = 16</math></p> <p>ii). Cash price =</p>	M1 A1 M1 M1  A1 M1 M1 M1 10 M

	$100 - 12.5 \times 4000 = 35000$ $100$ <p>Difference = <math>\frac{56000 - 35000}{35000} \times 100\% = 60\%</math></p> <p style="text-align: right;"><b>2006Q17</b></p>	
10	<p>a). Tax on 1st Kshs 9680 = <math>9680 \times \frac{10}{100} = 968</math></p> <p>Tax on next (18800-9680) = <math>9120 \times \frac{15}{100} = 1368</math></p> <p>Tax on next (24,200-18800) = <math>5400 \times \frac{20}{100} = 1080</math></p> <p>Total tax = Kshs. <math>9968 + 1368 + 1080 = 2000</math></p> <p>b). Tax paid = <math>3416 - (1056 + 2400 \times \frac{5}{100}) = 2000</math></p> <p>c). Increase in tax paid = <math>2000 \times \frac{36.3}{100} = 726</math></p> <p>Increase = <math>\frac{3630}{2400} \times 100 = 15\%</math></p> <p style="text-align: right;"><b>2009Q21</b></p>	M1  M1 M1 A1  M1 A1 M1  M1 A1 10 M
11.	<p>(a) (i) July salary = <math>17000 \times 1.02 = 17340</math></p> <p>(ii) Total taxable income = <math>17340 + 6000 + 2500 + 1800 = 27640</math></p> <p>(a) Gross tax</p> <p><math>9680 \times \frac{10}{100} = 968</math></p> <p><math>9120 \times \frac{15}{100} = 1368</math></p> <p><math>8840 \times \frac{20}{100} = 1768</math></p> <p>Gross tax = <math>968 + 1368 + 1768 = 4104</math></p> <p>Net tax = <math>4104 - 1056 = 3048</math></p> <p style="text-align: right;"><b>2012 Q20 P2</b></p>	M1  M1 M1 A1  M1 A1 M1  M1 A1 10

