Exam

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) At the end of a 5-year period, the difference between the future value of $200 invested at 8% p.a. simple interest and $200 invested at 8% p.a. compounded annually interest will be _____. 1) _____
A) $13.87 B) $22.10 C) $56.05 D) $213.87

Answer: C
Explanation: A)
B)
C)
D)

2) What is the future value of $20 invested for 80 years at an annually compounded interest rate of 7% p.a.? 2) _____
A) $11,200.00 B) $448.68 C) $4,495.66 D) $4,484.68

Answer: D
Explanation: A)
B)
C)
D)

3) What does the equation, $(1 + r/m)^m - 1$, calculate? 3) _____
A) Compound interest rate over *t* periods where r is the effective simple interest rate
B) Compound interest rate over *t* periods where r is the number of compounding periods
C) The number of compounding periods over *t* years where *r* is the effective simple interest rate
D) Effective simple interest rate over *t* periods where r is the compound interest rate

Answer: D
Explanation: A)
B)
C)
D)

4) What is the future value of a $1,000 invested for 20 years at an interest rate of 10% p.a. compounded quarterly? 4) _____
A) $7209.57 B) $3000.00 C) $6727.50 D) $4709.21

Answer: A
Explanation: A)
B)
C)
D)

5) What is the present value of an annuity consisting of 5 annual payments of $200 with an interest rate of 8% p.a. compounded annually and the first payment made immediately? 5) _____
A) $862.43 B) $643.77 C) $889.68 D) $798.54

Answer: A
Explanation: A)
B)
C)
D)

6) What is the future value of $3,400 invested for 7 years at a simple interest rate of 7.5% p.a.? 6) _____

A) $21,250.00 B) $3,173.33 C) $5,185.00 D) $5,950.00

Answer: C

Explanation: A)
B)
C)
D)

7) What is X in the formula $X = PV(1 + r)$? 7) _____

A) The present value of a single cash flow in one period's time
B) The future value of a single cash flow in one period's time
C) The future value of an annuity of PV cash flows
D) The present value of an annuity of PV cash flows

Answer: B

Explanation: A)
B)
C)
D)

8) Which of the following will yield the highest future value at the end of 5 years? 8) _____

A) $1,200 invested at 11.5% p.a. compounded quarterly
B) $1,250 invested at 9.95% p.a. compounded daily
C) $1,300 invested at 10.25% p.a. compounded monthly
D) $1,400 invested at 12% p.a. simple interest

Answer: D

Explanation: A)
B)
C)
D)

9) What is the present value of an annuity due consisting of 5 annual payments of $1,000 with an interest rate of 8% p.a., with the first payment occurring in 5 years' time? 9) _____

A) $4,283.23 B) 5,392.13 C) $2,935.30 D) $5,312.13

Answer: C

Explanation: A)
B)
C)
D)

10) Asset A provides a cash flow of $100 in six years' time. Asset B provides a cash flow of $100 in four years' time. Which asset would a rational investor rather own? 10) _____

A) Asset A B) Asset B
C) Either asset A *or* asset B D) Can't tell from the information provided

Answer: B

Explanation: A)
B)
C)
D)

11) What is the present value of $1,800 to be received in 1 year when the discount rate is 9.5% p.a.? 11) _____

A) $1,643.84 B) $1,501.22 C) $1,487.60 D) $1,636.36

Answer: A

Explanation: A)
B)
C)
D)

12) What is the present value of the following set of cash flows when the discount rate is 12% p.a. compounded monthly? 12) _____

Year 1	$150
Year 2	$300
Year 3	$500
Year 4	$950

A) $1,308.10 B) $1,348.59 C) $1,398.45 D) $1,332.72

Answer: A

Explanation: A)
B)
C)
D)

13) What is the future value of $2,500 invested for 3 years at an interest rate of 11% p.a. compounded semi-annually? 13) _____

A) $5,611 B) $4,429 C) $4,676 D) $3,447

Answer: D

Explanation: A)
B)
C)
D)

14) The future value in 10 years of $1,000 invested at a 10% p.a. compounded annually interest rate will be _____ the future value in 10 years of $1,000 invested at a 10% p.a. simple interest rate. 14) _____

A) Less than
B) Less than or equal to
C) Greater than
D) Equal to
E) Greater than or equal to

Answer: C

Explanation: A)
B)
C)
D)
E)

15) What simple interest rate per year will give same future value at the end of 3 years as 10% p.a. compounded semi-annually? 15) _____

A) 10.00% B) 11.33% C) 10.25% D) 12.50%

Answer: B

Explanation: A)
B)
C)
D)

16) What is the present value of a perpetuity consisting of payments of $500 with an interest rate of 10% p.a.? 16) _____

A) $5,000.00 B) $4,000.00 C) $3,000.00 D) $2,000.00

Answer: A

Explanation: A)
B)
C)
D)

17) Which of these answers best describes an ordinary annuity? 17) _____

A) A series of equally sized regularly occurring cash flows extending *n* periods into the future, with the cash flows occurring at the end of each period
B) A series of equally sized regularly occurring cash flows extending *n* periods into the future, with the cash flows occurring at the start of each period
C) A series of equally sized regularly occurring cash flows extending indefinitely into the future, with the cash flows occurring at the start of each period
D) A series of equally sized regularly occurring cash flows extending indefinitely into the future, with the cash flows occurring at the end of each period

Answer: A

Explanation: A)
B)
C)
D)

18) What is the future value of $500 invested for 4 years at a simple interest rate of 5% p.a.? 18) _____

A) $525 B) $575 C) $550 D) $600

Answer: D

Explanation: A)
B)
C)
D)

19) Which of the following statements is true? 19) _____

A) Simple interest pays interest only on principle whereas compound interest also pays interest on interest.
B) Simple interest relates to future value whereas compound interest relates to present value.
C) Simple interest applies when an investor receives payment while compound interest applies when an investor makes payments.
D) Simple interest annualises rates while compound interest allows interest to be stated in any time period.
E) Simple interest relates to present value whereas compound interest relates to future value.

Answer: A
Explanation: A)
B)
C)
D)
E)

20) What is the value of a share which is expected to pay a dividend of $0.11 every six months forever, on the basis that you intend to hold the shares forever, and the Australian ten-year bond rate today is 7.29%? 20) _____

A) $2.20 B) $3.08 C) $0.60 D) $1.51

Answer: B
Explanation: A)
B)
C)
D)

21) What is the present value of an ordinary annuity consisting of 5 annual payments of $1,000 with an interest rate of 8% p.a., with the first payment occurring in 5 years' time? 21) _____

A) $4,918.64 B) $4,992.71 C) $2,717.37 D) $3,696.95

Answer: C
Explanation: A)
B)
C)
D)

22) What is the future value of $800 invested for 10 years at a simple interest rate of 2% p.a.? 22) _____

A) $816 B) $1,134 C) $1,040 D) $960

Answer: D
Explanation: A)
B)
C)
D)

23) Over a one-year period, the difference between the future value of $500 invested at 15% p.a. simple interest and $500 invested at 15% p.a. annually compounded interest will be _____. 23) _____

A) $150.00 B) $1.50 C) $15.00 D) Nothing

Answer: D
Explanation: A)
B)
C)
D)

24) The future value of an ordinary annuity consisting of 10 annual payments is $1593.74. The interest rate is 10% p.a. compounded annually; therefore the amount of each payment must be how much? 24) _____

A) $120.00 B) $90.00 C) $110.00 D) $100.00

Answer: D

Explanation: A)
B)
C)
D)

25) What is the future value of $4,000 invested for 8 years at an annually compounded interest rate of 9.25% p.a.? 25) _____

A) $8,250.66 B) $4,074.00 C) $1,840.06 D) $8,117.67

Answer: D

Explanation: A)
B)
C)
D)

26) Mr Riches has inherited a commercial building that is expected to yield the following cash flows for the next 5 years: 26) _____

Year 1	$1,250,000
Year 2	$1,300,000
Year 3	$2,450,000
Year 4	$3,560,000
Year 5	$5,820,000

However, Mr Riches would rather receive the same cash flow each year and he approached CDM Bank Ltd to sell the building in return for a fixed cash flow each year for 5 years. CDM Bank Ltd has agreed to this arrangement. If CDM Bank Ltd is using an interest rate of 10% p.a. compounded monthly to value the building how much would they be willing to pay Mr Riches each year?

A) $2,663,498.55 B) $2,687,456.15 C) $2,648,984.45 D) $2,653,899.02

Answer: D

Explanation: A)
B)
C)
D)

27) Which of these responses would describe an asset's future value? 27) _____

A) The accumulated value
B) The value at some point in the future of a present amount invested at some interest rate
C) The current value of one or more future cash payments, discounted at some interest rate
D) None of the above

Answer: B

Explanation: A)
B)
C)
D)

28) What is the future value of an ordinary annuity consisting of 10 annual payments of $100 with an interest rate of 10% p.a. compounded weekly? 28) _____

A) $1,593.70 B) $1,632.97 C) $1,457.90 D) $1,873.23

Answer: B

Explanation: A)
B)
C)
D)

29) What is the future value of $100 invested for 10 years at an interest rate of 2% p.a. compounded annually? 29) _____

A) $123.77 B) $120.00 C) $122.11 D) $121.90

Answer: D

Explanation: A)
B)
C)
D)

30) What is the future value of $100 continuously compounded at a rate of 8% p.a. for 9 months? 30) _____

A) $106.18 B) $108.32 C) $110.56 D) $102.56

Answer: A

Explanation: A)
B)
C)
D)

31) What is the future value of $1,000 continuously compounded at a rate of 10% p.a. for 5 years? 31) _____

A) $1,610.51 B) $1,648.72 C) $1,498.43 D) $1,500.00

Answer: B

Explanation: A)
B)
C)
D)

32) Which of the following statements is most true? 32) _____

A) There is a relationship between the future value of investment and the effect of compounding frequency. At low interest rates, increases in compounding frequency will decrease the future value.

B) There is a relationship between the future value of investment and the effect of compounding frequency. At high interest rates, increases in compounding frequency will decrease the future value.

C) Regardless of the value of the interest rate, increasing the compounding frequency will decrease the future value.

D) Regardless of the value of the interest rate, increasing the compounding frequency will increase the future value.

Answer: D

Explanation: A)
B)
C)
D)

33) What is the future value of $200 invested for 10 years at an annually compounded interest rate of 2% p.a.? 33) _____

A) $438.00 B) $243.80 C) $254.60 D) $242.00

Answer: B

Explanation: A)
B)
C)
D)

34) What is the present value of an ordinary annuity consisting of 15 annual payments of $50 with an interest rate of 3.5% p.a. compounded quarterly? 34) _____

A) $575.87 B) $3,486.36 C) $1,159.29 D) $2,326.24

Answer: D

Explanation: A)
B)
C)
D)

35) What is the present value of $800 to be received in 5 years' time when the discount rate is 9% p.a. compounded quarterly? 35) _____

A) $519.95 B) $512.65 C) $509.75 D) $515.69

Answer: B

Explanation: A)
B)
C)
D)

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

36) Why is it not possible to determine the future value of a perpetual stream of cash flows? 36) _____

Answer: By definition a perpetual stream of cash flows continues indefinitely and hence has no future value. We can however determine the value of the perpetuity at any point in the future since its future value will simply be the present value of the remaining cash flows beyond that point.

Explanation:

37) XHZ Fashion Stores Ltd is considering expanding its retailing operations into China. The company has the option to purchase a retail outlet in Nanjing or Xi'An. The forecast cash flows from each retail outlet are given below (that the year 7 cash flow is forecast to extend indefinitely into the future). All values are given in A$. 37) _____

Nanjing Outlet

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7 and beyond
$540,000	$670,000	$750,000	$780,000	$820,000	$950,000	$1,100,000

Xi'An Outlet

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7 and beyond
$320,000	$450,000	$680,000	$745,000	$795,000	$1,150,000	$1,250,000

The company has determined the appropriate discount rate for the Nanjing outlet is 6.95% p.a. compounded monthly whilst the discount rate for the Xi'An outlet is 6.90% p.a.

compounded daily.

Using this information answer the following questions:
a) What is the effective annual compound discount rate of both the Nanjing and Xi'An outlets?
b) What is the maximum amount that XHZ Ltd should pay for each of the retail outlets?
c) What constant cash flow each year would give the same price for each of the retail outlets as was calculated in part b)? Which outlet generates the highest equivalent annual cash flow?
d) Which store should XHZ Ltd purchase if the price of the Nanjing outlet was $13,500,000 and the price of the Xi'An outlet was $14,800,000?

Answer: a) Using the effective interest rate equation we get the following discount rates for the two outlets:

Nanjing outlet = $[1 + (0.0695/12)]^{12} - 1 = 7.18\%$ p.a.

Xi'An outlet = $[1 + (0.0690/365)]^{365} - 1 = 7.14\%$ p.a.

b) The maximum amount that XHZ Ltd would be willing to pay is the present value of the cash flows of the two outlets. This is found by discounting the cash flows by the effective rate determined in part a) of the question. The first step is to find the present value of the perpetuity beginning in year 7 and then discount this value and the years 1 through 6 cash flows as single future values.

Nanjing Outlet:

$PV_6 = 1,100,000/0.0718 = \$15,320,334.26$

$PV_0 = 540,000/(1.0718) + 670,000/(1.0718)^2 + 750,000/(1.0718)^3 + 780,000/(1.0718)^4 + 820,000/(1.0718)^5 + 950,000/(1.0718)^6 + 15,320,334.26/(1.0718)^6$

$= \$13,599,858.88$

So the maximum purchase price of the Nanjing outlet would be $13,599,858.88

Xi'An Outlet:

$PV_6 = 1,250,000/0.0714 = \$17,507,002.80$

$PV_0 = 320,000/(1.0714) + 450,000/(1.0714)^2 + 680,000/(1.0714)^3 + 745,000/(1.0714)^4 + 795,000/(1.0714)^5 + 1,150,000/(1.0714)^6 + 17,507,002.80/(1.0714)^6$

$= \$14,706,924.86$

So the maximum purchase price of the Xi'An outlet would be $14,706,924.86

c) The constant cash flow each year would give the same price for each of the retail outlets as was calculated in part b) is a perpetuity calculation.

Nanjing Outlet:

$\$13,599,858.88 = A/0.0718$

$A = \$976,469.87$

Xi'An Outlet:

$\$14,706,924.86 = A/0.0714$

$A = \$1,050,074.44$

Thus the Xi'An store generates the highest equivalent annual cash flow.

d) Given those purchase prices the 'wealth' created by each outlet would be:

Nanjing Outlet:

$\$13,599,858.88 - \$13,500,000 = \$599,858.88$

Xi'An Outlet:

Answer: $14,706,924.86 - $14,800,000 = -$93,075.14

So XHZ Ltd should purchase the Nanjing store as it is the only one which will increase the firm's wealth.

Explanation:

38) You have just won first division in the State lottery, and have a choice between three alternatives as to how your prize is to be received. You can get $100,000 now, or $10,000 per year in perpetuity, or $50,000 now and $150,000 at the end of 10 years. If the appropriate discount rate is 12% per annum, which option should you choose? 38) _____

Answer: Calculate the present value of each option, and choose the one with the highest present value. Option 1 has a present value of $100,000 (given); option 2 has a present value of $10,000/0.12 = $83,333; option three has a present value of $50,000 + $150,000[(1-(1 + 0.12)$^{-10}$]/0.12 = $98,300. Therefore the highest present value, and thus the best option to choose, is option 1: take the $100,000 today.

Explanation:

39) You are considering the purchase of new car using a financing arrangement. Under the deal you must make a $10,000 deposit immediately and then monthly payments of $800 for a period of 48 months. The monthly payments are made at the end of each month. The interest rate is 12% p.a. compounded monthly. What is the effective cost of the car? 39) _____

Answer: You must make an initial payment of $10,000 plus a series of annuity payments of $800 per month for 48 months. The present value of the annuity is:
The monthly interest rate will be 12/12 or 1%
$800 [1 - (1 + 0.01)$^{-48}$]/0.01 = $30,379.17
Therefore the effective cost of the car will be $30,379.17 + $10,000 = $40,379.17

Explanation:

40) An investor has the possibility to deposit $500 in one of two potential bank accounts. Account A offers an interest rate of 5% p.a. compounded semi-annually whilst Account B offers an interest rate of 4.9% p.a. compounded quarterly. Which will yield the highest future value? 40) _____

Answer: Determine the effective simple interest equivalent of each accounts interest rate and compare them. Account A is giving the depositor an effective simple interest rate of 5.06% [EAR = (1 + 0.05/2)^{2} -1] whilst Account B is offering the depositor an effective interest rate of 4.99% [EAR = (1 + 0.049/4)^{4} - 1]. Hence Account A will yield the highest future value for the depositor.

Explanation:

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

41) The present value of an annuity due is always less than the present value of an otherwise identical ordinary annuity. 41) _____

Answer: True ● False

Explanation:

42) The effective rate of interest decreases as the compounding frequency increases. 42) _____

Answer: True ● False

Explanation:

43) An annuity due has cash flows that occur at the end of each period. 43) _____

Answer: True False
Explanation:

44) A deferred annuity is an annuity due that starts at a date more than one period into the future. 44) _____

Answer: True False
Explanation:

45) The future value compounding formula is $FV = PV(1 + r)^n$. 45) _____

Answer: True False
Explanation:

46) Holding all other factors constant, increasing the frequency of the compounding period will increase the future value of an initial investment. 46) _____

Answer: True False
Explanation:

47) A perpetuity is an annuity that lasts forever. 47) _____

Answer: True False
Explanation:

48) Interest earned on long-term bonds is an example of an annuity. 48) _____

Answer: True False
Explanation:

49) A bank that offers depositors a 10% p.a. rate compounded semi-annually is using continuous compounding to calculate depositors' interest payments. 49) _____

Answer: True False
Explanation:

50) An ordinary annuity has unequal cash flows. 50) _____

Answer: True False
Explanation:

51) The effective simple interest rate will always be higher than the compound interest rate if the compounding interval is greater than one. 51) _____

Answer: True False
Explanation:

52) The cash flows of an ordinary annuity occur at the end of each period. 52) _____

Answer: True False
Explanation:

53) The amount of interest earned each year does not change when interest is compounded. 53) _____

Answer: True False
Explanation:

54) A constant dividend paying share is an example of an ordinary annuity. 54) _____

Answer: True False
Explanation:

55) The future value of a future cash flow will always be lower than the present value if the interest rate used is anything other than zero. 55) _____

Answer: True False
Explanation:

1) C
2) D
3) D
4) A
5) A
6) C
7) B
8) D
9) C
10) B
11) A
12) A
13) D
14) C
15) B
16) A
17) A
18) D
19) A
20) B
21) C
22) D
23) D
24) D
25) D
26) D
27) B
28) B
29) D
30) A
31) B
32) D
33) B
34) D
35) B
36) By definition a perpetual stream of cash flows continues indefinitely and hence has no future value. We can however determine the value of the perpetuity at any point in the future since its future value will simply be the present value of the remaining cash flows beyond that point.
37) a) Using the effective interest rate equation we get the following discount rates for the two outlets:
Nanjing outlet = $[1 + (0.0695/12)]^{12} - 1 = 7.18\%$ p.a.
Xi'An outlet = $[1 + (0.0690/365)]^{365} - 1 = 7.14\%$ p.a.

b) The maximum amount that XHZ Ltd would be willing to pay is the present value of the cash flows of the two outlets. This is found by discounting the cash flows by the effective rate determined in part a) of the question. The first step is to find the present value of the perpetuity beginning in year 7 and then discount this value and the years 1 through 6 cash flows as single future values.
Nanjing Outlet:
$PV_6 = 1{,}100{,}000/0.0718 = \$15{,}320{,}334.26$
$PV_0 = 540{,}000/(1.0718) + 670{,}000/(1.0718)^2 + 750{,}000/(1.0718)^3 + 780{,}000/(1.0718)^4 + 820{,}000/(1.0718)^5 +$

950,000/$(1.0718)^6$ + 15,320,334.26/$(1.0718)^6$
= $13,599,858.88
So the maximum purchase price of the Nanjing outlet would be $13,599,858.88

Xi'An Outlet:
PV_6 = 1,250,000/0.0714 = $17,507,002.80
PV_0 = 320,000/(1.0714) + 450,000/$(1.0714)^2$ + 680,000/$(1.0714)^3$ + 745,000/$(1.0714)^4$ + 795,000/$(1.0714)^5$ + 1,150,000/$(1.0714)^6$ + 17,507,002.80/$(1.0714)^6$
= $14,706,924.86
So the maximum purchase price of the Xi'An outlet would be $14,706,924.86

c) The constant cash flow each year would give the same price for each of the retail outlets as was calculated in part b) is a perpetuity calculation.
Nanjing Outlet:
$13,599,858.88 = A/0.0718
A = $976,469.87

Xi'An Outlet:
$14,706,924.86 = A/0.0714
A = $1,050,074.44

Thus the Xi'An store generates the highest equivalent annual cash flow.

d) Given those purchase prices the 'wealth' created by each outlet would be:
Nanjing Outlet:
$13,599,858.88 - $13,500,000 = $599,858.88

Xi'An Outlet:
$14,706,924.86 - $14,800,000 = -$93,075.14

So XHZ Ltd should purchase the Nanjing store as it is the only one which will increase the firm's wealth.

38) Calculate the present value of each option, and choose the one with the highest present value. Option 1 has a present value of $100,000 (given); option 2 has a present value of $10,000/0.12 = $83,333; option three has a present value of $50,000 + $150,000[(1-(1 + 0.12)$^{-10}$]/0.12 = $98,300. Therefore the highest present value, and thus the best option to choose, is option 1: take the $100,000 today.

39) You must make an initial payment of $10,000 plus a series of annuity payments of $800 per month for 48 months. The present value of the annuity is:
The monthly interest rate will be 12/12 or 1%
$800 [1 - (1 + 0.01)$^{-48}$]/0.01 = $30,379.17
Therefore the effective cost of the car will be $30,379.17 + $10,000 = $40,379.17

40) Determine the effective simple interest equivalent of each accounts interest rate and compare them. Account A is giving the depositor an effective simple interest rate of 5.06% [EAR = (1 + 0.05/2)^2 -1] whilst Account B is offering the depositor an effective interest rate of 4.99% [EAR = (1 + 0.049/4)^4 - 1]. Hence Account A will yield the highest future value for the depositor.

41) FALSE

42) FALSE

43) FALSE

44) FALSE

45) TRUE
46) TRUE
47) TRUE
48) TRUE
49) FALSE
50) FALSE
51) TRUE
52) TRUE
53) FALSE
54) FALSE
55) FALSE