QUESTION 3: SECTION A (14 marks; 16 minutes)
(a) Determine NPV

PROJECT X

Alternative 1

Year	Cash flow in Rand	Discount factor @ 10%	Present value in rand (rounded to nearest R1)
0	(1000 000)	1,000	(1000 000) ^
1	325 000	0,909	295 425 ^
2	450 000	0,826	371 700 ^
3	500 000	0,751	375 500 ^
		NPV	**42 625 ^**

Alternative 2

Steps when using financial calculator (HP10BII):
I/YR = 10
CFj = (1000 000) year 0
CFj = 325 000 year 1
CFj = 450 000 year 2
CFj = 500 000 year 3
Shift NPV = **43 013** ✔ ✔ ½
***Difference due to rounding of the discount factors as used in alternative 1.**

PROJECT Z

Alternative 1

Year	Cash flow in Rand	Discount factor @ 10%	Present value in rand (rounded to nearest R1)
0	(1 300 000)	1,000	(1 300 000) ^
1	410 000	0,909	372 690 ^
2	545 000	0,826	450 170 ^
3	700 000	0,751	525 700 ^
		NPV	**48 560 ^**

(Highest)

Alternative 2

Steps when using financial calculator (HP10BII):
I/YR = 10
CFj = (1300 000) year 0
CFj = 410 000 year 1
CFj = 545 000 year 2
CFj = 700 000 year 3
Shift NPV = **49 061** ✔ ✔ ½
***Difference due to rounding of the discount factors as used in alternative 1.**

Note to markers:
Students can use one of two alternative methods when calculating the NPV for each project. Note that for alternative 1, tables for discounting factors were not provided and therefore students would have had to calculate the factor by using the formula (also not provided).The correct factor for discounting should be used in the calculation in order to score marks. A mark for adding the NPV's in order to get the total NPV will be awarded irrespective of the factor used.
For alternative 2, students needed to write down the steps used on the calculator in order to obtain marks if the total answer for NPV is incorrect. Half marks are awarded for the 10% and for correct cash flows and the total NPV.

Maximum marks available (5)

(b) Combination of projects

NPVI (or PI) of **Project X** = (R1 000 000 + R42 625)/R1 000 000 = **1,04263** ✔ **(Highest)**

NPVI (or PI) of **Project Z** = (R1 300 000 + R48 560)/R1 300 000 = 1,03735 ✔

Projects X and Z have **contradicting measurements**. ✔ Based on NPV alone, Project Z should be selected as it has the highest NPV. However, the amounts to be invested in each project differ and we therefore need to calculate NPVI as well. Based on NPVI, Project X should be selected as it has the highest NPVI.

Since these two projects are **divisible** ✔ (can be expanded, contracted or combined until a total investment of R1 800 000 is reached), we need to compare combinations of the projects and compare each combination's NPV.

The following combinations are considered:

1. 1,8 of Project X = 1,8 x NPV 42 625 = **R76 725 (highest)** ✔
2. 1,3846 of Project Z = 1,3846 x 48 560 = R67 236
   Combination of both projects:
3. 1 of Project X and 8/13 of Project Z = NPV of (1 x 42 625) + (8/13 x 48 560) = R72 508
4. 1 of Project Z and ½ of Project X = NPV of (1 x 48 560) + (½ x 42 625) = R69 873

Conclusion

The management of Dressed for Success Ltd should invest the R 1 800 000 in 1,8 of Project X ✔ , as this will achieve the highest NPV.

Note to markers:
There are two issues in this part of the question – the one is the fact that the capital amounts to be invested in each of these projects differ and the other is that projects are divisible (can be expanded, contracted or combined.) Therefore, students needed to calculate the ***NPVI*** *for each project as well and not merely compare NPV. Furthermore, various combinations needed to be investigated in deciding which project(s) to invest in due to the fact that projects are* ***divisible****. Students needed to indicate that they know how and why to make this distinction when considering which project to invest in. Students needed to come up with a conclusion that makes sense according to their calculations.*

Marks available (6)
Maximum available (5)

(c) Environmental and/or quantitative factors

- Consider the impact of carbon emissions for each project.
- Water and air pollution.
- Are the projects "green" projects.
- Will the projects lead to a sustainable future?
- Availability of adequate funding.
- Rehabilitation costs after the project is completed.
- Appropriate WACC used for calculating NPV and NPVI.
- Inflation and the effect it has on the project'
- The costs of hiring the additional labour for Project Z since it will be more labour intensive than Project X.
- Training of staff due to the fact that Project X will require better qualified staff than Project Z and the costs involved for the training.

Note to markers:

Students cannot only state "environmental impact" or "environmental rating" and score a mark, they need to be specific.

No marks for qualitative factors.

Any valid factor will score one mark, maximum is three marks. Students also need to discuss the impact of these factors on their conclusion for another mark.

Available marks (4)

Maximum marks available (3)
[14]

QUESTION 3: SECTION B (6 marks; 7 minutes)

(a) **Mutually exclusive projects:** Only one of several alternatives may be chosen at a time i.e. Project X or Project Z. Therefore, if two projects are mutually exclusive, the acceptance of one will automatically mean the rejection of the other i.e. no combinations ✔.
Independent projects: Acceptance or rejection of one project has **no bearing or influence** on the acceptance or rejection of any other project ✔. The company can invest in Project X and/or Project Z provided there are available funds to cover the full cost of the project.

Note to markers:
This is a theory question and should be marked strict according to the definition in the textbook/study guide. (2)

(b) For projects which are **indivisible and mutually exclusive**, the project with the highest **NPV** should be invested in even if the projects have different investment amounts ✔. However, only one project can be invested in since they are mutually exclusive and no combinations may be made as they are also indivisible.

Conclusion

Project Z with an NPV of R48 560 should be invested in ✔.

Note to markers:
Students need to provide reasons as to why they would invest in Project Z. This answer can only be right or wrong as it is theory based. Award the mark for the project that they calculated with the highest NPV. (2)

(c) For **independent projects,** we rank the projects according to NPVI from highest to lowest and accept projects until capital is depleted ✔.
NPVI (or PI) of **Project X** = (R1 000 000 + R42 625)/R1 000 000 = **1,04263 (Highest)**
NPVI (or PI) of **Project Z** = (R1 300 000 + R48 560)/R1 300 000 = 1,03735

Conclusion

The company should invest in Project X as it yields the highest NPVI ✔. The investment amount for Project X is R1000 000 and the company will only have capital of R800 000 available after the investment is made. However, since these projects are indivisible and the capital amount to invest in Project Z is R1 300 000, the company can only invest in Project X.

Note to markers:
Students need to provide reasons as to why they would invest in Project X. This answer can only be right or wrong as it is theory based. (2)

Maximum marks available (6)

One mark can be awarded for overall presentation/communication if the student's layout was neat and tidy and had good strong arguments throughout the answer. Indicate the park with a "P".