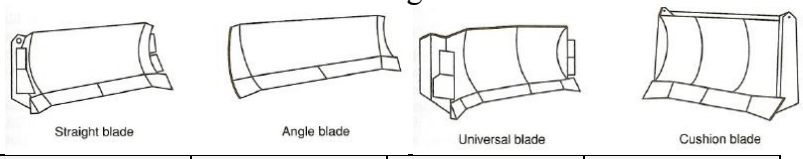
Question 1 (26%)

1) Indicate which one of the Dozer's types is better to work under these conditions:

Condition	Crawler dozers	Wheel dozers
operate in rough terrain or areas of low trafficability		
operate on steeper side slopes and climb great grades		
operate at high speed		
operate on paved roads without damaging the surface		
use in soil compaction effectively		

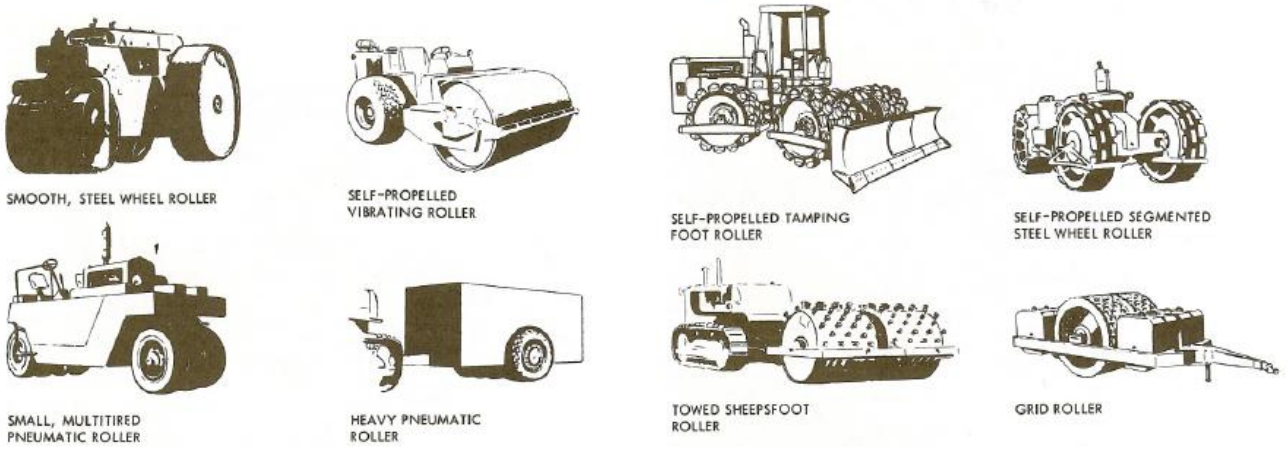
2) Indicate which one of the Dozer's Blades suitable for the following conditions:



Condition	Straight blade	Angle blades	Universal blade	Cushion blade
Having a smaller size that gives good penetrating and load pushing ability.				
Used for rough grading and for moving material laterally.				
Push a large volume of material over long distances.				
Reinforced and equipped with shock absorbers to push-load scrapers.				

3) For the following construction compaction equipments, check for all usages of basic compaction forces:

types of compaction equipment	static weight	manipulation (or kneading)	impact	vibration
Tamping foot rollers				
Grid or mesh rollers				
Smooth steel drum rollers				
Sheepsfoot rollers				



Question 2 (34%)

A four-wheel drive tractor produces a maximum rimpull of 18,160 kg at sea level. The tractor is being operated at an altitude of 3,050 m. The tractor has options to work under two circumstances specified in below table.

a) Can the tractor perform under each of three circumstances? (Fill the table)

Circumstance Number	Tractor's weight on the drivers	Coefficient of traction	Required pull	Maximum available power	Maximum usable pull	Can the tractor perform under this circumstance
1	20,000 kg	0.6	9,000 kg			
2	35,000 kg	0.45	15,000 kg			

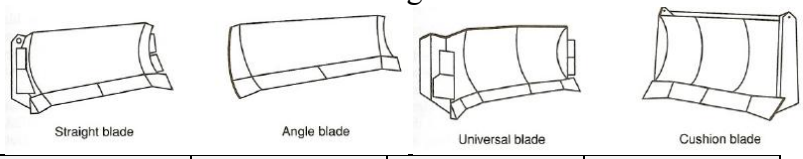
b) For the tractor to operate, it would be necessary to impact (reduce/increase) three factors, specify these three factors with their impact?

Question 1 (26%)

1) Indicate which one of the Dozer's types is better to work under these conditions:

Condition	Crawler dozers	Wheel dozers
operate in rough terrain or areas of low trafficability	*X*	
operate on steeper side slopes and climb great grades	*X*	
operate at high speed		*X*
operate on paved roads without damaging the surface		*X*
use in soil compaction effectively		*X*

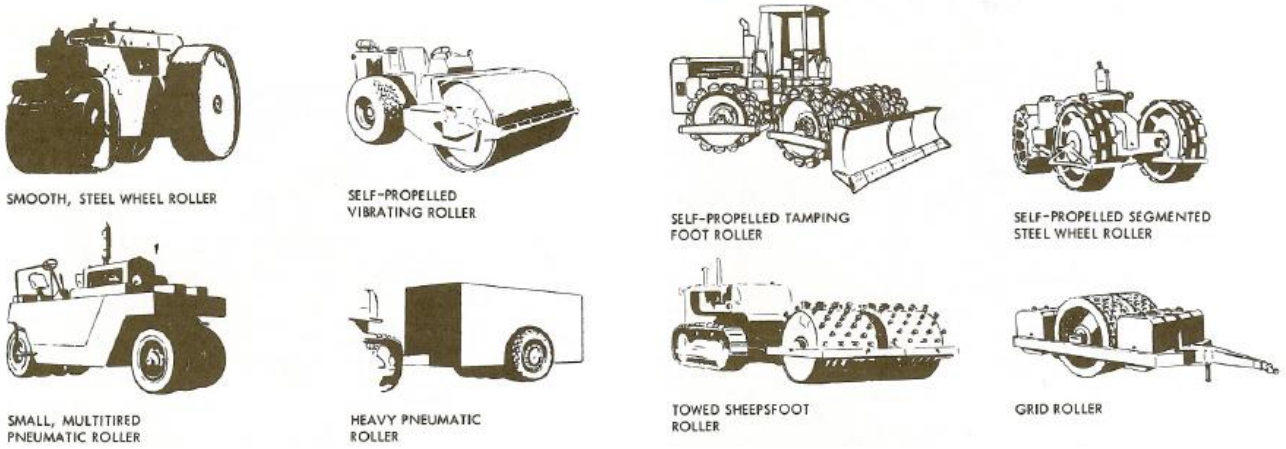
2) Indicate which one of the Dozer's Blades suitable for the following conditions:



Condition	Straight blade	Angle blades	Universal blade	Cushion blade
Having a smaller size that gives good penetrating and load pushing ability.	*X*			
Used for rough grading and for moving material laterally.		*X*		
Push a large volume of material over long distances.			*X*	
Reinforced and equipped with shock absorbers to push-load scrapers.				*X*

3) For the following construction compaction equipments, check for all usages of basic compaction forces:

types of compaction equipment	static weight	manipulation (or kneading)	impact	vibration
Tamping foot rollers	*X*	*X*		
Grid or mesh rollers	*X*	*X*	*X*	
Smooth steel drum rollers	*X*			
Sheepsfoot rollers	*X*	*X*		



Question 2 (35%)

A four-wheel drive tractor produces a maximum rimpull of 18,160 kg at sea level. The tractor is being operated at an altitude of 3,050 m. The tractor has options to work under two circumstances specified in below table.

a) Can the tractor perform under each of three circumstances? (Fill the table)

Circumstance Number	Tractor's weight on the drivers	Coefficient of traction	Required pull	Maximum available power	Maximum usable pull	Can the tractor perform under this circumstance
1	20,000 kg	0.6	9,000 kg	*14,346 kg*	*12,000 kg*	*YES*
2	35,000 kg	0.45	15,000 kg	*14,346 kg*	*15,650 kg*	*NO*

Derating factor = (3,050 – 915)/102 = 21% *(4-8B)*
Percent rated power available =100 – 21 = 79%
Maximum available power = 18,160 × 0.79 = 14,346 kg

Circumstance 1

Required pull (Total resistance) = 9,000 kg
Coefficient of traction = 0.6
Maximum usable pull = 0.6 × 20000 = 12,000 kg
< Maximum available power → Maximum usable pull govern
Maximum usable pull > required pull → ok

Circumstance 2
Required pull (Total resistance) = 15,000 kg
Coefficient of traction = 0.45
Maximum usable pull = 0.45 × 35,000 = 15,650 kg
> Maximum available power → Maximum available power govern
Maximum available power < required pull → Not ok

b) For the tractor to operate, it would be necessary to impact (reduce/increase) three factors, specify these three factors with their impact?

The three impacted factors are:
- *reduce the required pull (total resistance),*
- *increase the coefficient of traction, or*
- *increase the tractor's weight on the drivers.*