

# PRINCIPAL EXAMINER'S REPORT



BOTSWANA  
EXAMINATIONS  
COUNCIL

## JCE AGRICULTURE 2023

## COMPONENT 2

### GENERAL COMMENTS

The report covers on how candidates responded to items on the paper. Generally, candidates' responses were by far weaker than those of the previous year. Centers are encouraged to use this report as a reference point for identifying areas of improvement.

Generally, candidates' responses were weaker than those of the previous candidature in all Questions of different levels. Candidates failed to access marks from some of the items which needed application as well as knowledge and understanding. Items on management practices were poorly answered, especially on section B which is on Goat and Sheep Production. Candidates also failed to present the budget as expected (section C).

### Comments on Individual Questions

#### Question 1

- (a) Candidates were expected to name two career opportunities that can be pursued by a graduate from Botswana University of Agriculture and Natural Resources. This question was fairly answered. Some candidates wrote farmers though they are not trained at the above institution. Some of the responses were agriculture teacher, veterinary assistant, agricultural demonstrator, agricultural engineer.
- (b) Candidates were expected to name the branch of agriculture illustrated by the stimulus material. They managed to identify the branch of agriculture as animal husbandry.
- (c) Candidates were expected to explain how the grazing animals can negatively affect the environment. The question was well structured but fairly answered. They mostly stated effect without the cause. The expected responses were **Overgrazing**; eat all the grass leaving the soil bare/ eat all the grass resulting in soil erosion **trample over the grass**; leaving the soil uncovered resulting in soil erosion; hooves carry soil from one place to another resulting in soil erosion.

#### Question 2

- (a) Candidates were expected to identify the levels of production represented by equipment L and M. The question was well answered as they identified subsistence and commercial level.



- (b) Candidates were expected to describe any level of production depicted by the stimulus materials in 2a. The question was fairly answered since candidates were defining the levels instead of describing them. Subsistence – Production of food for family consumption, farmers produce on small scale, less money is needed/ they use few inputs, rely on family labor, use of simple tools or animal drawn implements, method of farming used is simple, do not use complicated machinery, less skill for management practices, use traditional method of production. COMMERCIAL – Production on large scale, produce more for sale in order to make profit/ production in large quantity for sale, more capital is needed/ more money needed for buying machinery, farming methods used is complicated, skilled labor needed for more production.

### Question 3

- (a) i. Candidates were expected to choose two fertilizers from the list and use them to complete the table presented. The question was fairly answered. Most of the candidates were not specific in answering when to apply the fertilizer to the crops. Some students stated methods of planting and applying fertilizers. The response was supposed to be as follows:

Name of the fertilizer	Type of fertilizer	When to apply to crops	Method of application
Urea	Inorganic	Top dressing	Banding/side dressing, ring, fertigation, foliar/spray, dalloping
Limestone ammonium nitrate	Inorganic	Top dressing	Banding/side dressing, ring, fertigation, foliar/spray, dalloping
Chicken manure	Organic	Basal	Broadcasting



- (b) Candidates were expected to calculate the number of hectares that would be covered by 350kg of kraal manure at the rate of 20kg/hectare. The question was fairly answered since some candidates did not show the units and working, the expected response was:

20kg : 1 ha  
350kg: x ha

$\frac{350\text{kg}1\text{ha}}{20\text{kg}}$   
 $X = 17.5 \text{ Ha}$

### Question 4

- (a) Candidates were expected to state two reasons for ploughing the soil before planting. The question was fairly answered. Some candidates defined ploughing rather than stating the reasons for ploughing before planting, and responses were as follows: For easy drainage of water, aeration, to bury crop residues, to expose eggs of pests to harsh conditions, improve root penetration, to incorporate fertilizer in the soil and to bury the weeds.
- (b) Candidates were expected to explain two factors considered when spacing crops. The question was poorly answered. Candidates stated the factors instead of explaining them. Other students did not give reasons. Possible answers : Purpose for which the crop is grown for, fodder crops need to be closely spaced because they are required in large quantities, Type of root system, lateral roots need more space to avoid coiling of the roots, Canopy of the crop, crops with large canopies need larger spacing to avoid shading one another, Soil fertility, more space is needed for less nutritious soil to avoid competition for nutrient, Machinery used, machinery will require more spacing to operate properly, Moisture Content of the soil, crops are largely spaced in a less moisture soil to avoid competition for water'
- (c) Candidates were expected to give advice on how to improve the emergence of maize seeds. The question was poorly answered. Candidates failed to advice what was to be done. They generally stated the methods of treating seeds rather than being specific to the scenario of maize seed and expected responses were to check expiry date for the seeds. Check if seeds are viable, consider the planting depth, soak seeds in water, check if the soil is heavy, soil fumigation.

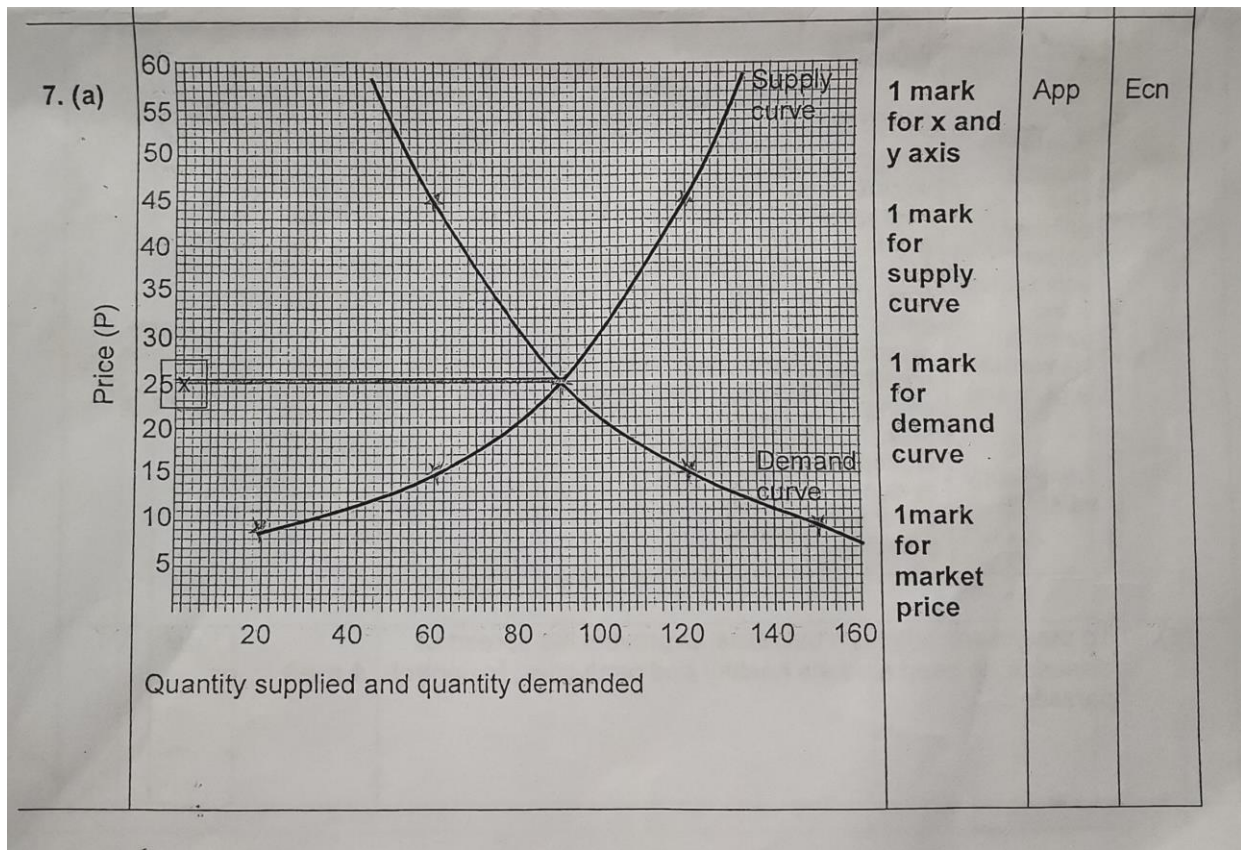


## Question 5

- (a) Candidates were expected to state correctional measures for Aphosphorosis. The item was fairly answered. Candidates gave general examples of supplements e.g. mineral licks. Some gave bone meal as part of the answers which is wrong, and the responses were to:  
Apply phosphate fertilizers to the range, provide cow with feeds containing phosphorus
- (b) Candidates were expected to explain roughages and concentrates. The question was well answered. Candidates were able to give the characteristics of the two types of feeds.  
Roughages: feeds of plant origin, which contains a high proportion of crude fibre, less digestible nutrients, low in carbohydrates and proteins  
  
Concentrates: feeds with high proportion of digestible nutrients, protein and carbohydrates, low in fibre, they are made from grains and animal products.

## Question 6

- (a) Candidates were expected to name the propagation method shown by the stimulus material. It was well answered as grafting/ Cleft grafting.
- (b) Candidates were expected to describe the propagation method shown by the stimulus material. The question was poorly answered. Candidates failed to logically present the steps as per the procedure. Possible responses Are: Identify an orange and lemon plant to be used as rootstock and scion, cut the scion using a knife, make a slant cut on the scion at the bottom, make a slant cut at the top of a root stock, Place the slanting cut of the scion on the slanting cut of the root stock, Tie where the root stock and scion join with a grafting tape.
- 7 (a) Candidates were expected to use the information and their knowledge to draw a well labelled demand and supply curve. It was poorly answered. Candidates were not able to calibrate the axis hence not plotting the two curves well.



(b) Candidates were expected to label the Market price on the graph using the letter X. It was poorly answered. Candidates labelled the equilibrium point as the Market price.

## SECTION B

### Goat/Sheep Production

8/9 (a) Candidates were expected to name any breed of goats / sheep. It was well answered. Most candidates managed to name breeds of goats/ sheep.

(b) Candidates were expected to state two characteristics of the breed named in 8 (a). The question was fairly answered. Candidates classified the breed instead of giving their characteristics.



Tswana	Boer	Kalahari Red	Toggernburg	Saanen
Different colours or colour combinations, medium size body, can withstand harsh weather conditions, have horns and short hair on their bodies	Reddish-brown head and white body, Hair on the body is short, grows fast, Produce high quality meat, High fertility rate, good mothering ability, High resistant to diseases,	Red in colour, Produce high quality lean meat, Well adapted to poor harsh arid hot semi desert conditions	Colours vary from dark brown to dark chocolate, white stripes down the face, White marking around the edges of the ears, large udder.	White or cream coloured with a light-coloured skin, short hair, Straight face and Erect ears, large udder
AngloNubian	British Alpine	Angora		
Has different colour combinations and patterns, Medium to large size, long floppy ears.	Has shiny black body, has white creamy markings on the face, around the eyes and under the tail.	Colour varies from white, black, cream, brown, Red and Black, long silky hair, long curled horns.		

- (c) Candidates were expected to state a reason for carrying out the management practice shown by the stimulus material. The question was well answered. To protect animals from diseases, to prevent the spread of diseases, to keep animals healthy and productive, to control parasites.
- (d) Candidates were expected to describe how the management practice shown by the stimulus material is carried out. The question was poorly answered. Candidates did not know how to carry out the management practice.

Fill the syringe with the drug/medicine/vaccine, Hold the head firmly, pull up a fold of skin under the neck, insert the needle under the fold of the skin, Push the plunger to release the vaccine, Pull the syringe with the needle out of the fold skin/ massage the animal.





## SECTION C- RABBIT PRODUCTION

- 10 (a)** Candidates were expected to list two materials that can be used to construct a rabbit cage. The question was fairly answered. Some candidates stated materials used for bedding. Wood, board, nails wire, steel bar, corrugated iron sheets, hinge.
- (b)** Candidates were expected to prepare a budget to present to CEDA to request for financial assistance. It was poorly answered. Candidates presented a profit and loss account instead of a budget.

### ESTIMATED START UP COSTS OF BUSINESS WILL BE AS FOLLOWS:

Estimated/Expected Costs/Expenditure		Estimated/Expected Returns/Income	
Items AMOUNT(P)		ITEMS (P)	AMOUNT
Houses for rabbits	700	50 Rabbits sold at P30	1500
Equipment	200	10 bags of manure at P20	200
Rabbit feed	150		
Medicines /Drugs	100		
Total Expenses	1150	TOTAL INCOME	1700

Estimated Profit/loss

Income – Expenses = 1750 – 1150 = P550.

- b) Candidates were expected to state two effects of external parasites on rabbits. The question was well answered. Suck blood causing anemia, bite the rabbit's causing discomfort/pain/irritation, transmit diseases, poor production, loss of weight, poor growth, loss of body fur, cause wounds, loss appetite, cause itching

11- PIG PRODUCTION- No candidate attempted this question.

### 12- FISH PRODUCTION

- (a) Candidates were expected to list any materials that can be used to construct a fishpond. The question was well answered. Bricks, sand, gravel, cement polyester plastic, clay soil, brick force, wire mesh valves, pipes.
- b) Candidates were expected to prepare a budget to present to CEDA to request for financial assistance. It was poorly answered. Candidates presented a profit and loss account instead of a budget.





## ESTIMATED START UP COSTS OF BUSINESS WILL BE AS FOLLOWS:

Estimated/Expected Costs/Expenditure	Estimated/Expected Returns/Income
Items AMOUNT(P)	ITEMS AMOUNT (P)
Houses for rabbits 700	50 fish sold at P30 1500
Equipment 200	
Rabbit feed 150	
Medicines /Drugs 100	
Total Expenses 1150	TOTAL INCOME 1500

Estimated Profit/loss

Income – Expenses = 1500 – 1150 = P350.

- c) Candidates were expected to state two effects of external parasites on rabbits. The question was well answered. Causes irritation, wounds, sucks out blood/fluids causing anemia, poor growth, poor production.

### 12- BEE KEEPING

- a) Candidates were expected to state two factors to consider when choosing a site for bee keeping. The question was well answered. Availability of food/Vegetation/ forage, Availability of shade, Availability of water, A site not too near to people/ residence/ industrial area, away from noisy area. Availability of windbreaks.
- b) Candidates were expected to prepare a budget to present to CEDA to request for financial assistance. It was poorly answered. Candidates presented a profit and loss account instead of a budget.



**ESTIMATED START UP COSTS OF BUSINESS WILL BE AS FOLLOWS:**

Estimated/Expected Costs/Expenditure		Estimated/Expected Returns/Income	
Items AMOUNT(P)		ITEMS (P)	AMOUNT
Beehive	700	50 honeycombs sold at P30	1500
Equipment	200		
Sugar	150		
Medicines /Drugs	100		
Total Expenses	1150	TOTAL INCOME	1500

Estimated Profit/loss

Income – Expenses = 1750 – 1500 = P350.

c) Candidates were expected to state two effects of external parasites on bees. The question was well answered.

Causing bees to panic and leave/ absconds, kill larva, remove larva from comb cells, suck honey, eat brood, eat comb, produce smell which makes bees drowsy, Contaminate honey.

## SECTION C

### PIG/RABBIT KEEPING/ FISH/BEE KEEPING

#### Question 9

- (a) Candidates were expected to name any two members of a bee colony. The question was well answered. Below were the expected responses.

Worker; Queen; Drone.

- (b) Candidates were expected to name any tools used to catch bees. The question was well answered, and the expected tools are as follows:

Match box; Smoker; Catch box; Bee brush /quill/feather.

- (c) Candidates were expected to explain three precautions that should be taken when catching bees. The question was fairly answered. Most candidates stated the precautions without explaining e.g. wear protective clothing without giving a reason instead of saying Wear protective clothing to avoid being stung.

- ✓ Avoid wearing perfume to avoid being stung.
- ✓ Avoid making noise to avoid scaring bees.
- ✓ Smoke the bees to make them calm.
- ✓ Catch bees late in the afternoon when they are calm.
- ✓ Avoid catching bees on windy days and rainy days when they are restless.
- ✓ Do not wave arms in panic or run away to avoid the attack.
- ✓ Avoid crushing bees to avoid alarming others.
- ✓ Always have a partner to assist.

#### Question 10

- a) Candidates were expected to name two products of fish. The question was fairly answered. Most of the candidates managed to state one product and the expected responses are:

Meat; Oil.

- b) Candidates were expected to name any tools used to catch fish. The question was well answered. Most of the candidates named the tools correctly and the expected responses are Fish line; Net; Hook; Fishing baskets; Spear /wounding gear; cork;

- c) Candidates were expected to explain the steps that should be taken when processing fish for canning. The question was poorly answered. The candidate failed to present the steps logically and explain them, Below are the expected steps:

- ✓ Internal organs of fish are removed to prevent rotting.
- ✓ Fish is cleaned to remove dirt for hygiene.
- ✓ Head fins and scales are removed to expose tender meat.
- ✓ Fish is cooked in big pots to kill harmful bacteria.
- ✓ Ingredients such as salt, vinegar and tomato juice are added to add flavour.
- ✓ Fish is put into cans and then sealed to avoid spoilage.

### PIG PRODUCTION

None of the students attempted section C question 11.

### RABBIT PRODUCTION

#### Question 12

- (a) Candidates were expected to name any two internal parasites of rabbits. The question was well answered, and the expected responses are as indicated below: Tapeworm; roundworm; hair worm; liver fluke; coccidian; pinworm; wireworm.
- (b) Candidates were expected to name any two diseases of rabbits. The question was well answered, and the expected responses were:
- Coccidiosis; rabbit/syphilis/vent; mastitis; weepy eyes/sore eyes/conjunctivitis; enteritis/bloat; ear canker; sore hooks.
- (c) Candidates were expected to explain three preparations that should be carried out before the arrival of young rabbits it was fairly answered. Most of the candidates stated the preparations without giving reasons for carrying them out and the responses are:
- ✓ Cleaning and disinfecting the house and equipment to kill pathogens.
  - ✓ Buying feeds to feed young rabbits.
  - ✓ Buying drugs to control parasites and diseases.
  - ✓ Construct a waterproof hutch with a dark corner for retreatment; Install feeders and drinkers filled with water and feeds to make them readily available.
  - ✓ Placing of litter/ bedding to absorb dropping provision of warmth.



## COMPONENT 4

The 2022 cohort was able to name vegetable crops that they studied but failed to classify them. They were not able to analyse given information to make conclusions. They failed to describe processes for carrying out management practices.

### Question 1

- (a) The expectation was for candidates to prepare a complete card of record on vegetable production using given information in order of occurrence (logical presentation), appropriate dates, tools and reasons as indicated below.

Date	Activity	Reason	Tool
March 1 <sup>st</sup>	Basal dressing	To increase nutrients	Hands
March 15 <sup>th</sup>		For correct spacing	Tape measure/rule r
	Planting seeds	To produce crops	Hands
	Covering with soil	For the growth/developm ent of a seed	Hands
	Mulching	To conserve moisture/induce seed germination	Grass  s/other material s for mulchin g Waterin g can
March 22 <sup>nd</sup>	Mulch removal	Allow sunlight	Hands
April 15 <sup>th</sup>	Pruning	For air circulation	Hands
	Cultivation	For aeration	Hand fork
May 4 <sup>th</sup>	Top dressing	Add nutrients to the soil	Hands



## \*Correct Entry

Most candidates entered all activities as required by the question and stated the correct tools for the activity given. However, some candidates left blank spaces where there was no specific tool to use instead of indicating that they used hands.

## Logical Presentation

Most candidates failed to differentiate between pre-planting, planting and post-planting activities and the reasons for the activities carried out. This was noted when candidates could not differentiate reasons for cultivation before and after planting, seeds and seedlings, basal dressing and top dressing, mulching and removal of mulch. Instead of giving reasons for activities, some candidates defined the activities e.g., pruning, thinning and top dressing.

### \* Timely recording

Most of the candidates did not state the correct dates using the stimulus (March to May) instead they stated activities that are outside the stimulus. Others congested all activities within a space of one month and could not state the correct interval between activities carried out such as planting and removal of mulch, seedling emergence and pruning.

### \* Neatness

This component was well done since most candidates made minimal cancellation. Generally, most candidates were not able to prepare a complete card of record. Schools are advised to emphasize the preparation of practical cards under vegetable production.

- (a) I The expectation was for candidates to name a pest affecting a vegetable studied such as spinach-cutworm, cabbage-aphids, and tomatoes-red spider mites. Most candidates were able to name a pest and a vegetable crop affected. However, some candidates named field crops instead of vegetable crops. The question was fairly answered. Schools are advised to make emphasis on the difference between examples of field crops and vegetable crops.
- ii The expectation was for candidates to describe the method used to control the pest named in **b (i)** without using chemicals such as; the use of crop rotation to break the life cycle of pests, soil cultivation to expose pests to be burned by the sun, early planting for crops to mature before the onset of pests, use of marigold for pest repulsion, use of scarecrows to scare away birds, pruning of affected leaves to prevent the spread of pests. Most candidates were able to name the method used to control pests but were not able to describe how the method controls the named pest. The question was not well answered. Schools are advised to make emphasis on description of methods used to control pests.

## Question 2

- (b) The expectation was for candidates to name the tool used for transplanting a seedling. The appropriate tool used for transplanting is a hand trowel/trowel. Most candidates were able to name the correct tool for transplanting. However, some candidates named a hand fork as a tool used for transplanting. The question was well answered.
- (c) The expectation was for candidates to outline steps taken when transplanting seedlings. The steps involve: watering seedlings a day before transplanting, making planting holes, removing a seedling with soil around the roots using a trowel, taking the seedling to a planting hole, covering the seedling with soil and firming soil to remove air pockets. Most candidates were not able to follow the correct steps when transplanting a seedling. There were cases where candidates mentioned seeds instead of seedlings. The question was not well answered. Schools are advised to emphasize on correct procedure when transplanting seedlings.
- (d) The expectation was for candidates to describe how compact soil would be improved for vegetable production. The steps taken involve breaking a hard layer/turning the soil upside down using a digging fork/ripper, breaking large lumps using a digging fork/harrow and addition of organic manure to improve soil structure. Most candidates were not able to describe how a compact soil could be improved instead stated the activities of improving compact soil without description. The question was not well answered. Schools are advised to make emphasis on both primary and secondary tillage operations.

## Question 3

- (a) The expectation was for candidates to make a diagram of a sunken bed and describe how a sunken bed is prepared. Preparation of a sunken bed involves; digging the soil using a digging fork/pickaxe, taking out topsoil to the sides using a spade, taking out subsoil to make the ridges, taking back topsoil and leveling the soil using a rake. The question was not well answered as candidates were not able to make a proper diagram of a sunken bed and describe how it is prepared. Schools are advised to impart skills on making diagrams of vegetable beds and steps taken when preparing vegetable beds.
- (b) i. The expectation was for candidates to suggest two management practices carried out in a plot in village x which received low rainfall. The management practices are watering, shading, soil cultivation, mulching and the addition of organic manure. Most candidates stated post-planting activities which did not address the question from the stimulus. The question was not well answered.





ii. The expectation was for candidates to outline steps carried out in one of the management practices suggested in **c (i)** above. One of the responses expected is watering and the steps taken are fit a rose into a watering can; fill the water into the watering can and spread water evenly into the plot. The question was not well answered as candidates were not able to outline steps for suggested management practices instead, they defined the management practice given. Schools are advised to make emphasis on procedures to carry out management practices in vegetable production.

### Question 4

- (a) The expectation was for candidates to list two crops that should follow each other in a crop rotation from a given list of vegetables (peas, carrots, broccoli, spinach, tomatoes, beetroots). The crops which should not follow each other are carrots and beetroots. The candidates were not able to select the two crops using the principles of crop rotation. The question was not well answered. The advice to schools is to make emphasis on the understanding of the principles of crop rotation.
- (b) The expectation was for candidates to choose **one** vegetable crop from the list of vegetable crops given and show how the crop is directly planted into the already prepared soil. The steps involve; marking and measuring planting stations at the correct spacing, making planting holes/furrows, placing seeds into holes/furrows, covering holes with soil, mulching and watering. Most candidates were able to complete the process of planting a seed. However, some candidates described the process of planting a seedling instead of a seed. The question was fairly answered.

### Question 5

The expectation was for candidates to arrange information given into financial and production records as indicated below.

Production record	Financial records
-Harvested 20 boxes of tomatoes	-Bought 10 packets of seed for P30 each -Paid 2 casual labourers p100 in total - Paid P25 for the water bill -Paid labour for preparing plots

- ✓ Most candidates were able to itemize the information given into production and financial records. However, some candidates included the items under both production and financial records. Schools should emphasise that anything that involves money falls under financial records. The question was fairly answered.



## Question 5

The expectation was for candidates to arrange information given into financial and production records as indicated below;

<b>Production record</b>	<b>Financial records</b>
-Harvested 20 boxes of tomatoes	-Bought 10 packets of seed for P30 each -Paid 2 casual labourers p100 in total - Paid P25 for the water bill -Paid labour for preparing plots

- ✓ Most candidates were able to itemize the information given into production and financial records. However, some candidates included the items under both production and financial records. Schools should emphasise that anything that involves money falls under financial records. The question was fairly answered.