



**NATIONAL EXAMINATION  
AND SCHOOL INSPECTION  
AUTHORITY**

**T124**

**Wednesday, 21/7/2021**

**08:30 – 11:30 AM**

**Names**

Index number

**TVET NATIONAL EXAMINATION, RTQF LEVEL 5, 2020-2021**

**QUESTIONS and ANSWERS BOOKLET**

OPTION/TRADE: ROAD CONSTRUCTION

**SUBJECT: Road Construction and Maintenance**

ACADEMIC YEAR: **2020-2021**

\* Read carefully the instructions on page (i) & (ii).

**FOR EXAMINER'S USE ONLY**

[illegible]



# **TVET NATIONAL EXAMINATION, RTQF LEVEL 5, 2020-2021**

## **INSTRUCTIONS TO CANDIDATES: PART I (Answer Booklet)**

1. A candidate should fill in the actual names and the index number on the cover of this questions and answer booklet on the provided place (Black Box).
2. It is illegal for a candidate to write any of his/her names, index number or a school name inside the answer booklet.
3. A candidate should check if all pages of the answer booklet are complete. No candidate should remove or tear any pages or part of it from the answer booklet.
4. A candidate should answer in the language in which the examination is set. (See page **(ii)**)
5. A candidate should sign on the sitting plan when submitting the answer booklet. He/she has also to check if the answer booklet is well sealed.
6. No extra paper is allowed in the examinations room. If a candidate is caught with it his/her results will be nullified.
7. No candidate is allowed to write answers not related to the subject being sat for, otherwise it will be considered as a cheating case.
8. Write your answers on the 12 lined pages (From page 1 of 12 to page 12 of 12).
9. Use the last non-lined pages as draft.
10. Results for any candidate who is caught in examination malpractices are nullified. The cheating can be recognized during examinations administration, marking exercise or even thereafter.

# **TVET NATIONAL EXAMINATION, RTQF LEVEL 5, 2020-2021**

**OPTION/TRADE: ROAD CONSTRUCTION**

**SUBJECT: Road Construction and Maintenance**

**DURATION: 3 hours**

## **INSTRUCTIONS TO CANDIDATES: PART II (Question paper)**

The paper is composed of two (2) Sections as follows:

- |  |                   |
|--|-------------------|
| <b>Section I: Attempt all the Twelve (12) questions</b>          | <b>(60 marks)</b> |
| <b>Section II: Attempt any Four (4) questions out of Six (6)</b> | <b>(40 marks)</b> |

### **Allowed materials:**

- Ruler or square
- Calculator

### **Note:**

***Every candidate is required to carefully comply with the provided assessment instructions.***

- (01) List any five (5) excavation equipment used in road demolition works. **/5 marks**
- (02) Mention any two (2) trimming steps to be followed while trimming the damaged area. **/5 marks**
- (03) a) Define clearly the word “recycling” **/2 marks**
- b) Differentiate virgin materials to recycled materials. **/3 marks**
- (04) Discuss the use of the following tools as used in road construction:
- a) Boning roads
  - b) Wheel barrow
  - c) Pick axe
  - d) Measuring box
  - e) Head pan. **/5 marks**
- (05) Identify any five (5) uses of an excavator machine. **/5 marks**
- (06) Site preparation aids in preventing injury and death on construction sites. Site preparation includes removing debris, leveling the ground, filling holes, cutting tree roots, and marking gas, water, and electric pipelines. Discuss the ways to prevent injuries and improve safety. **/5 marks**
- (07) a) What is road defect? **/2 marks**
- b) List any three (3) examples of defects on concrete (rigid) pavement. **/3 marks**

(08) Match elements in **Column A** with those in **Column B**:

/5 marks

Column A	Column B
a) Rutting	i. thin overlay
b) Pothole	ii. crack sealing
c) Transverse cracking	iii. full dept patching
d) Block cracking	iv. wearing course and binder course
e) Pavement layer	v. Cold mill and overlay or thin surface patch

(09) Enumerate any five (5) causes of failures in rigid pavements.

/5 marks

(10) List down different forms of asphalt.

/5 marks

(11) Identify any (5) materials needed for load layer reconstruction.

/5 marks

(12) Discuss any five (5) uses of an excavator machine as equipment for a road construction.

/5 marks

**Section II: Attempt any Four (4) questions out of Six (6)**

**(40 marks)**

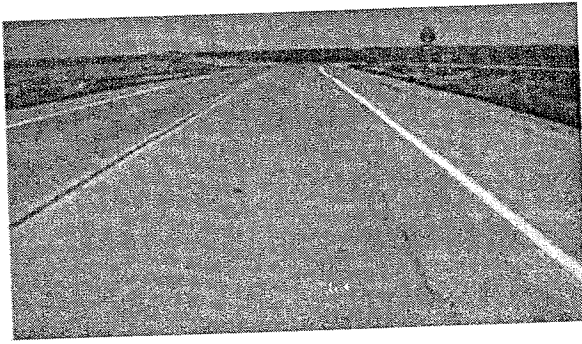
(13) a) On a topographic map shown at 1/2500, the center line of a new road project has two (2) straights alignments  $Al_1=12,3cm$  and  $Al_2=8,7cm$ . Between them, one(1) simple horizontal curve of 15cm radius(R) and central angle ( $\Delta$ )=  $45^\circ$  is introduced. Using a net sketch, calculate the length of the new road project.

/5 marks

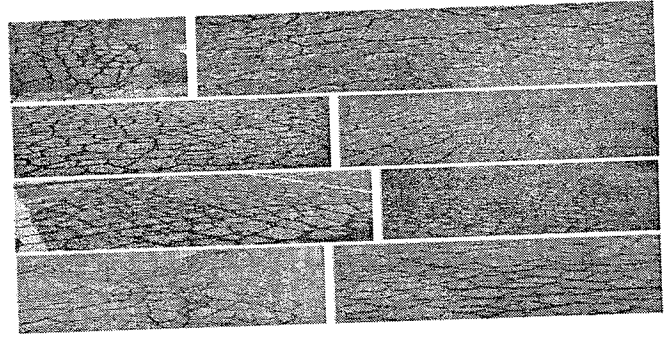
b) Calculate the contour gradient of the line x-y if the horizontal distance between the points x and y is 8cm to 1/2000.

/5 marks

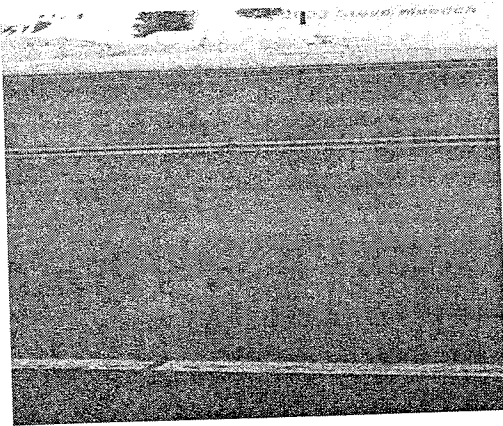
**(14) a)** Name the following road pavement distresses



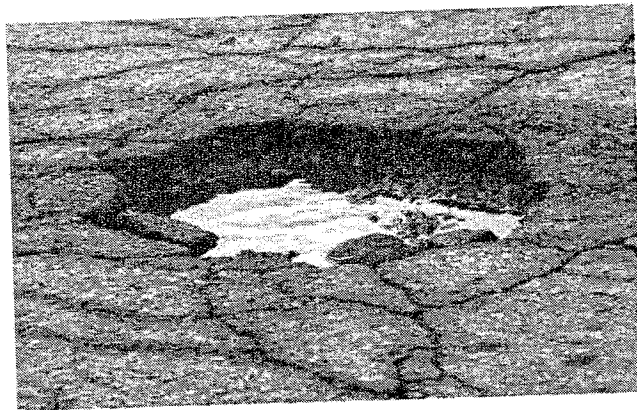
**i.**



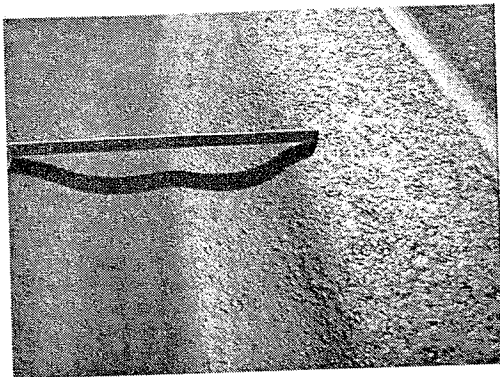
**ii.**



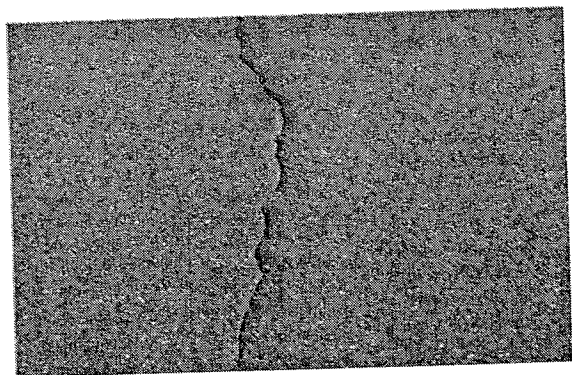
**iii.**



**iv.**



**v.**



**vi.**

**b)** List any four (4) major categories of common asphalt pavement surface distresses. **/10 marks**

**(15)** Different types of road pavements exist. They include rigid and flexible pavements. Differentiate rigid from flexible pavement. **/10 marks**

- (16) The table below shows different properties of bitumen and asphalt Complete it:

/10 marks

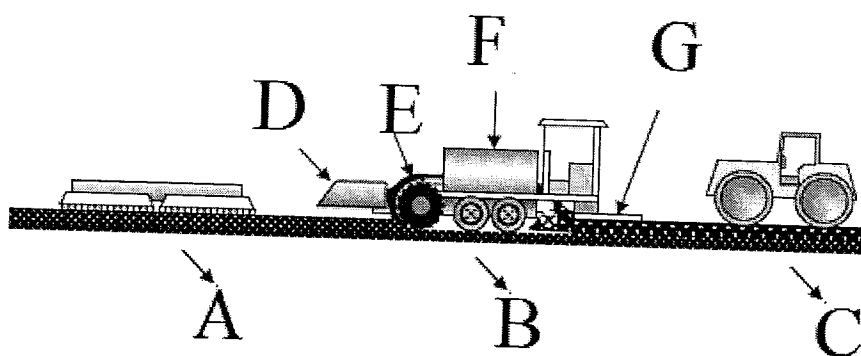
Property	Asphalt	Bitumen
a) Color	?	?
b) State	?	?
c) Carbon content	?	?
d) Water resistance	?	?
e) Setting time	?	?

- (17) a) What does RCM stand for in road material recycling? Explain clearly where RCM comes from.

/3 marks

- b) Fill out the parts of schematic of hot in-situ recycling of asphalt (remix process):

/7 marks



- (18) a) Explain clearly the term pavement milling.

/2 marks

- b) Identify four (4) situations in which the pavement milling can be performed.

/8 marks





