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| **SUBJECT and** **GRADE**  | ENGINEERING GRAPHICS AND DESIGN GRADE 12  |
| **TERM 2**  | *Week 5*  |
| **TOPIC**  | INTERPENETRATION (Nov 2009 Paper 1 Question 2)  |
| **AIM OF LESSON**  | Learners are required to draw a penetration of two solid structures. The square prism penetrates a hexagonal prism at an angle of 30.̊ Develop the square branch piece.  |
| **RESOURCES**  | ***Paper based resources***  | ***Digital resources (Lesson on the content)***  |
| INTERPENETRATION Nov 2009 Paper 1: Question 2 *(JP 77) (JP 81)* See attached drawings. | <https://youtu.be/wmtaEEBFVE0><https://youtu.be/9wnvqz4ZYRY> |
| **INTRODUCTION**  | **REVISION:**  Revision work from grade 11: Four basic geometric shapes: prisms, pyramids, cones and cylinders ***WEEK 5: LESSON 1*** Start by copying the given views. Emphasize that all solids start with the drawing of the basic shape ***WEEK 5: LESSON 2***  Start by copying the given views.  Emphasize that all solids start with the drawing of the basic shape   |

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| **CONCEPTS AND** **SKILLS**  | Learners must be able to: Draw solid structures as within the activities provided. Draw solid structures penetration one another at an angle. The skill to see and draw hidden detail  | **CAN YOU**? * Copy the given views?
* Identify the different sides / corners on a view?
* Draw solid structures penetrating one another at an angle?
* Identify where hidden detail will be if instructed to draw it in?

Learners must adhere to all drawing criteria.  |
| **ACTIVITIES/** **ASSESSMENT**  | Complete the activities/questions on Interpenetrations attached. *RECOMMENDATION*: See attached grade 12 exercise for INTERPENETRATIONS Standard of Exercise meet all external examination requirements Draw to scale 1: 1 Read the instruction on the question given. ALL drawings must comply with the guidelines contained in the SANS 10143. |
| **CONSOLIDATION**  | * Define all the terminology relevant to the topic/s covered in this lesson:
* Printing of measurements are in some cases important.
* Practice and complete the drawings if you did not finish in time.
* Use the correct line types: Construction lines, hidden lines, ext.
* Practice daily.
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| **VALUES**  | After engaging with this lesson you should: * Realise the importance of interpenetration drawings
* Know that neatness and accuracy is important when doing drawings.
* Realise that a wrong drawing can lead to a waste of resources.
* Appreciate the importance of geometry drawings.
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|  |  |  |  | **VRAAG 2: DEURDRINGING EN ONTWIKKELING GEGEE:****Die onvolledige vooraansig, bo-aansig en onvolledige linkeraansig van ‘n ankerblok wat gebruik word om** **‘n boog oor ‘n stadion te bevestig. Die ankerblok is ‘n betongietstukwat bestaan uit ‘n seskantige prismatiese voetstuk A en ‘n vierkantige takstuk B wat om die voetstuk gevorm is. Die asse van beide dele lê in ‘n gemeenskaplike vertikale vlak.****INSTRUKSIES****Teken, volgens skaal 1 : 100 die volgende aansigte van die volledige ankerblok wat die deurdringingskurwe tussen die twee dele duidelik toon. TOON ALLE ONSIGBARE BESONDERHEDE:*** **Die bo-aansig. Gebruik punt S as verwysing.**
* **Die volledige linkeraansig.**
* **Die volledige vooraansig.**
* **Ontwikkel die oppervlak van takstuk B.**

 Too n ALLE no dig e konstruksies en berekeninge. **[40]** |
| **QUESTION 2: INTERPENETRATION AND DEVELOPMENT GIVEN:****The incomplete front view, top view and incomplete left view of an anchor used to secure an arch over a stadium. The anchor is a concrete casting in the form of a hexagonal prismatic footing A and a square branch piece B, that has been shaped to fit around the footing. The axes of both pieces lie in a common vertical plane.****INSTRUCTIONS:****Draw to scale 1 : 100 the following views of the complete anchorclearly showing the curve of the interpenetration that will be formed between the two pieces. SHOW ALL HIDDEN DETAIL:*** **The top view using point S as a reference.**
* **The complete left view.**
* **The complete front view. [40]**
* **Develop the surface of branch piece B.**

S how A LL n ece ssary con stru ction a nd c alcu la tions. |
| **S** |  |  |  |  |
| ASSESSERINGSKRITERIA / ASSESSMENT CRITERIA |
| **1** | BO-AANSIG & KONSTRUKSIE **(14 x ,5)**TOP VIEW & CONSTRUCTION | **7** |  |
| **2** | VOORAANSIG / FRONT VIEW **(26 x ,5)** | **13** |  |
| **3** | LINKERAANSIG / LEFT VIEW **(14 x ,5)** | **7** |  |
| **4** | ONTWIKKELING / DEVELOPMENT **(13 x 1)** | **13** |  |
|  | **TOTAAL / TOTAL** | **40** |  |



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| **V1 V~~R~~ 2** | **3** |  | **O** |  | **VRAAG 2:** **DEURDRINGING EN ONTWIKKELING GEGEE:**D i e on v ol led ig e v o o raa ns ig en b oaa ns i g v an 'n reë lm a ti ge v ierk a nt ig e pri s m a w at ge v orm i s o m ron d o m 'n reg te reël m at ig e s e s k an ti ge p ris m a t e p as .D i e as s e v an b eid e pri s m as l ê in 'n gem e en s k a pli k e v e rti k al e v la k .D i e hu lpa an s ig v a n di e v ie rk an t ige p ris m a . D i e po s is ie v an p u n t O op d ie t ek e n v el .**INSTRUKSIES**T ek en v o lge ns s k a al 1 :1 die v olg en de a a n s igt e v a n die TW E E p ris m a s2 .1 D i e ge gew e b oa a ns i g2 .2 D i e lin k era an s ig2 .3 D i e v ol led ig e v oo raa ns ig v an d ie d e u rdrin gi n gs k urw e du ide lik t e t oo n.2 .4 O nt w i k k el d ie o pp erv l ak k e v an S L E G S d ie v a n di e v ie rk an t ige p ris m a. **[40]** T o o n A LL E v erbo rge b es o nd erh ede en v o ul yn e.**QUESTION 2:** **INTERPENETRATION AND DEVELOPMENT GIVEN:**T he inc o m p let e f ro n t v i ew a nd t he to p v ie w of a reg ul ar s qu are p ris m t ha t h as be en s h ap ed t o f it arou nd a righ t re gu lar he x ag on al pri s m . Th e ax e s of b ot h pri s m s lie in a c o m m o n v ert ic a l pl an e. T he au x i lia ry v iew of th e s qu a re p ris m .T he po s it ion o f p o i nt O on t h e dra w in g s h eet .**INSTRUCTIONS:**2 . 1 D raw , t o s c al e 1: 1, t he f o l low in g v ie w s of th e T W O p ris m s .2 . 1. 1 Th e gi v en t o p v ie w2 . 1. 2 Th e le ft v ie w2 . 1. 3 Th e c om ple t e fro nt v ie w , c lea rly s ho w i ng t he c u rv e o f in t erp ene t rat ion .2 . 1. 4 D ev elo p t he s u rfa c e of t he s q ua re p ris m . **[40]**S how A LL n ec e s s ary c on s t ruc t ion and c a lc ula ti on s . |
| **P1 QE 2** | **3** |
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| 341550453570**X****Y**42**O** |
| ASSESSERINGSKRITERIA / ASSESSMENT CRITERIA |
| **1** | BOAANSIGTOP VIEW **(10 x ,5)** | **5** |  |
| **2** | LINKERAANSIGLEFT VIEW **(14 x ,5)** | **7** |  |
| **3** | VOORAANSIG **(24 x ,5)**FRONT VIEW | **12** |  |
|
| **4** | ONTWIKKELING / DEVELOPMENT **(16 x 1)** | **16** |  |
|  | **TOTAAL / TOTAL** | **40** |  |
| NOV 2012/JP 81 VRAAG 2QUESTION 2 | DEURDRINGING EN ONTWIKKELING INTERPENETRATION AND DEVELOPMENT | NAAM / NAME:DATUM / DATE: | **GRAAD**12 **GRADE**  |

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| **V1 VR 2** | **3** | **4****4****4****4****4****4****4****4****4****4****4** | **4****2****2** | **4****2** | **4****4****4** | **VRAAG 2:** **DEURDRINGING EN ONTWIKKELING GEGEE:**D i e on v ol led ig e v o o raa ns ig en b oaa ns i g v an 'n reë lm a ti ge v ierk a nt ig e pri s m a w at ge v orm i s o m ron d o m 'n reg te reël m at ig e s e s k an ti ge p ris m a t e p as .D i e as s e v an b eid e pri s m as l ê in 'n gem e en s k a pli k e v e rti k al e v la k .D i e hu lpa an s ig v a n di e v ie rk an t ige p ris m a . D i e po s is ie v an p u n t O op d ie t ek e n v el .**INSTRUKSIES**T ek en v o lge ns s k a al 1 :1 die v olg en de a a n s igt e v a n die TW E E p ris m a s2 .1 D i e ge gew e b oa a ns i g2 .2 D i e lin k era an s ig2 .3 D i e v ol led ig e v oo raa ns ig v an d ie d e u rdrin gi n gs k urw e du ide lik t e t oo n.2 .4 O nt w i k k el d ie o pp erv l ak k e v an S L E G S d ie v a n di e v ie rk an t ige p ris m a. **[40]** T o o n A LL E v erbo rge b es o nd erh ede en v o ul yn e. |
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| **3****1** |
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| **1** | BOAANSIGTOP VIEW **(10 x ,5)** | **5** |  |
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