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2) Déterminer la matrice d'inertie $I(T/R_A)$ de la tige dans le repère $R_A(x, y, z)$.

$x = y = 0$ donc $I_{xy} = I_{yz} = I_{xz} = 0$ et $I_{xx} = 0$

$$I_{yy} = I_{yy} = \int_0^R 2\pi r dr = 2\int_0^R 2\pi r^2 dr = \frac{\pi}{3} \left[\frac{r^3}{3} \right]_{r=0}^R = \frac{\pi R^3}{3}$$

et $I_{zz} = I_{yy}$

$$I(T/R_A) = \frac{\pi R^3}{3} \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & I_{yy} \end{bmatrix}$$

3) Calculer l'expression de l'écoulement cinématique $E_c(T/R_A)$ de la tige par rapport au repère R_A en appliquant la théorie de Koenig correspondant à l'écoulement cinématique \mathbf{v} .

D'après la théorie de Koenig correspondant à l'écoulement cinématique \mathbf{v} ,

$$E_c(T/R_A) = \frac{1}{2} m \left[\dot{V}(T/R_A) \right]^2 + V_c(T/R_A)$$

avec :

$$V_c(T/R_A) = \frac{1}{2} \dot{R} (T/R_A) I_{zz} \cdot \dot{\alpha} T/R_A + \ddot{\alpha} (T/R_A) I_{zz}$$

soit :

$$E_c(T/R_A) = \frac{1}{2} (0 + 0) \dot{R}^2 + \frac{1}{2} \dot{\alpha}^2 \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & I_{yy} \end{bmatrix} = \frac{1}{2} m R^2 \dot{\alpha}^2$$

4) Calculer l'expression de l'écoulement cinématique $E_c(T/R_A)$ de la tige dans le repère $R_A(x, y, z)$.

On considère dans un plan vertical une tige mince et homogène rotule T en mouvement sur l'effet de son pivot et la force de liaison qui maintient son extrémité A en contact avec un rail circulaire de centre O et de rayon R comme le montre la figure en page 4. La tige a une masse m et une longueur $AB = 2R$. On admet que le mouvement de l'extrémité A se fait sans frottement.

5) Calculer l'expression de l'écoulement cinématique $E_c(T/R_A)$ de la tige dans la base orthonormée directe $\{T, \mathbf{u}_1, \mathbf{u}_2\}$ du repère cartésien $R_A(x, y, z)$ rapporté à \mathbf{u}_1 .

La vitesse vitesse normale de la tige par rapport au repère R_A ainsi que la force de liaison m sont données par

$$\ddot{\alpha}(T/R_A) = \dot{\alpha} \cdot \ddot{\alpha}(A) = -R \dot{\alpha}^2 \mathbf{u}_1$$

et que la vitesse :

$$\dot{V}(T/R_A) = \dot{\alpha}^2 (T/R_A) I_{zz} = R \dot{\alpha}^2 \mathbf{u}_1$$

6) Déterminer l'expression de vitesse position $\ddot{\mathbf{U}}$ du centre de masse C de la tige en fonction de R , $\dot{\alpha}$ et $\ddot{\alpha}$. Déduire alors le vecteur vitesse instantanée $\dot{V}(C/R_A)$ ainsi que le centre de tour modalité.

7) Calculer :

$$\ddot{\mathbf{U}} = \ddot{\mathbf{U}}_A + \ddot{\mathbf{U}}_{AC} = \mathbf{R} \left[\dot{\alpha} \mathbf{u}_1 \mathbf{u}_1^T + \dot{\alpha} \mathbf{u}_1 \mathbf{u}_2^T + \dot{\alpha} \mathbf{u}_2 \mathbf{u}_1^T + \dot{\alpha} \mathbf{u}_2 \mathbf{u}_2^T \right]$$

Soit :

$$\ddot{\mathbf{U}} = \mathbf{R} \left[\dot{\alpha} \mathbf{u}_1 \mathbf{u}_1^T + \dot{\alpha} \mathbf{u}_2 \mathbf{u}_2^T + \dot{\alpha} \mathbf{u}_1 \mathbf{u}_2^T + \dot{\alpha} \mathbf{u}_2 \mathbf{u}_1^T \right]$$

7) Calculer :

$$\dot{V}(C/R_A) = \mathbf{R} \left[\dot{\alpha} \mathbf{u}_1 \mathbf{u}_1^T + \dot{\alpha} \mathbf{u}_2 \mathbf{u}_2^T + (\dot{\alpha} \mathbf{u}_1 + \dot{\alpha} \mathbf{u}_2) \mathbf{u}_1^T + (\dot{\alpha} \mathbf{u}_1 + \dot{\alpha} \mathbf{u}_2) \mathbf{u}_2^T \right]$$

et que la vitesse :

$$\dot{V}(C/R_A) = \mathbf{R}^T \left[\dot{\alpha}^2 (I_{zz} - 2 \dot{\alpha}^2 \mathbf{u}_1 \mathbf{u}_1^T - 2 \dot{\alpha}^2 \mathbf{u}_2 \mathbf{u}_2^T) + \dot{\alpha}^2 \mathbf{u}_1 \mathbf{u}_2^T + \dot{\alpha}^2 \mathbf{u}_2 \mathbf{u}_1^T \right]$$

ou encore :

$$\dot{V}(C/R_A) = \mathbf{R}^T \left[\dot{\alpha}^2 (I_{zz} + 2 \dot{\alpha}^2 \cos(\dot{\alpha} - \theta)) \right]$$

8) Donner les éléments de réduction au point A des forces et moments \mathbf{F}_A et \mathbf{C}_A (en forces et moments) Tant:

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Nom	Prénom	Groupe TD	Note sur 20
Khalid	Khalid	A. Soltani	10/20

CONTROLE DE BREVETAGE (DÉPARTEMENT)

On considère dans un plan vertical une tige mince et homogène rotule T en mouvement sur l'effet de son pivot et la force de liaison qui maintient son extrémité A en contact avec un rail circulaire de centre O et de rayon R comme le montre la figure en page 4. La tige a une masse m et une longueur $AB = 2R$. On admet que le mouvement de l'extrémité A se fait sans frottement.

5) On exprimera sous la forme vectorielle dans la base orthonormée directe $\{T, \mathbf{u}_1, \mathbf{u}_2\}$ du repère cartésien $R_A(x, y, z)$ rapporté à \mathbf{u}_1 .

La vitesse vitesse normale de la tige par rapport au repère R_A ainsi que la force de liaison m sont données par

$$\ddot{\alpha}(T/R_A) = \dot{\alpha} \cdot \ddot{\alpha}(A) = -R \dot{\alpha}^2 \mathbf{u}_1$$

et que la vitesse :

$$\dot{V}(T/R_A) = \dot{\alpha}^2 (T/R_A) I_{zz} = R \dot{\alpha}^2 \mathbf{u}_1$$

6) Déterminer l'expression de vitesse position $\ddot{\mathbf{U}}$ du centre de masse C de la tige en fonction de R , $\dot{\alpha}$ et $\ddot{\alpha}$. Déduire alors le vecteur vitesse instantanée $\dot{V}(C/R_A)$ ainsi que le centre de tour modalité.

7) Calculer :

$$\ddot{\mathbf{U}} = \ddot{\mathbf{U}}_A + \ddot{\mathbf{U}}_{AC} = \mathbf{R} \left[\dot{\alpha} \mathbf{u}_1 \mathbf{u}_1^T + \dot{\alpha} \mathbf{u}_2 \mathbf{u}_2^T + \dot{\alpha} \mathbf{u}_1 \mathbf{u}_2^T + \dot{\alpha} \mathbf{u}_2 \mathbf{u}_1^T \right]$$

Soit :

$$\ddot{\mathbf{U}} = \mathbf{R} \left[\dot{\alpha} \mathbf{u}_1 \mathbf{u}_1^T + \dot{\alpha} \mathbf{u}_2 \mathbf{u}_2^T + \dot{\alpha} \mathbf{u}_1 \mathbf{u}_2^T + \dot{\alpha} \mathbf{u}_2 \mathbf{u}_1^T \right]$$

7) Calculer :

$$\dot{V}(C/R_A) = \mathbf{R} \left[\dot{\alpha} \mathbf{u}_1 \mathbf{u}_1^T + \dot{\alpha} \mathbf{u}_2 \mathbf{u}_2^T + (\dot{\alpha} \mathbf{u}_1 + \dot{\alpha} \mathbf{u}_2) \mathbf{u}_1^T + (\dot{\alpha} \mathbf{u}_1 + \dot{\alpha} \mathbf{u}_2) \mathbf{u}_2^T \right]$$

et que la vitesse :

$$\dot{V}(C/R_A) = \mathbf{R}^T \left[\dot{\alpha}^2 (I_{zz} - 2 \dot{\alpha}^2 \mathbf{u}_1 \mathbf{u}_1^T - 2 \dot{\alpha}^2 \mathbf{u}_2 \mathbf{u}_2^T) + \dot{\alpha}^2 \mathbf{u}_1 \mathbf{u}_2^T + \dot{\alpha}^2 \mathbf{u}_2 \mathbf{u}_1^T \right]$$

ou encore :

$$\dot{V}(C/R_A) = \mathbf{R}^T \left[\dot{\alpha}^2 (I_{zz} + 2 \dot{\alpha}^2 \cos(\dot{\alpha} - \theta)) \right]$$

8) Donner les éléments de réduction au point A des forces et moments \mathbf{F}_A et \mathbf{C}_A (en forces et moments) Tant:

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To earn the Snowflake ARA-C01 certification, candidates must pass a rigorous exam that covers a wide range of topics related to Snowflake architecture and functionality. ARA-C01 exam consists of 60 multiple-choice questions and is timed for 90 minutes. ARA-C01 exam is computer-based and can be taken at any authorized testing center or remotely from a candidate's home or office.

The Snowflake ARA-C01 Exam consists of 90 multiple-choice questions that must be completed within two hours. The questions are designed to test an individual's knowledge of Snowflake's architecture, including multi-cluster warehouses, virtual warehouses, and resource management. It also covers topics such as data modeling, security, performance optimization, and data integration.

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Snowflake SnowPro Advanced Architect Certification Sample Questions (Q107-Q112):

NEW QUESTION # 107

What does a Snowflake Architect need to consider when implementing a Snowflake Connector for Kafka?

- A. The Kafka connector supports key pair authentication, OAUTH, and basic authentication (for example, username and password).
- B. The default retention time for Kafka topics is 14 days.
- C. **The Kafka connector will create one table and one pipe to ingest data for each topic. If the connector cannot create the table or the pipe it will result in an exception.**
- D. Every Kafka message is in JSON or Avro format.

Answer: C

Explanation:

The Snowflake Connector for Kafka is a Kafka Connect sink connector that reads data from one or more Apache Kafka topics and loads the data into a Snowflake table. The connector supports different authentication methods to connect to Snowflake, such as key pair authentication, OAUTH, and basic authentication (for example, username and password). The connector also supports different encryption methods, such as HTTPS and SSL1. The connector does not require that every Kafka message is in JSON or Avro format, as it can handle other formats such as CSV, XML, and Parquet2. The default retention time for Kafka topics is not relevant for the connector, as it only consumes the messages that are available in the topics and does not store them in Kafka. The connector will create one table and one pipe to ingest data for each topic by default, but this behavior can be customized by using the `snowflake.topic2table.map` configuration property³. If the connector cannot create the table or the pipe, it will log an error and retry the operation until it succeeds or the connector is stopped⁴. References:

- * Installing and Configuring the Kafka Connector
- * Overview of the Kafka Connector
- * Managing the Kafka Connector
- * Troubleshooting the Kafka Connector

NEW QUESTION # 108

A new table and streams are created with the following commands:

```
CREATE OR REPLACE TABLE LETTERS (ID INT, LETTER STRING);
CREATE OR REPLACE STREAM STREAM_1 ON TABLE LETTERS;
CREATE OR REPLACE STREAM STREAM_2 ON TABLE LETTERS APPEND_ONLY = TRUE;
```

The following operations are processed on the newly created table:

```
INSERT INTO LETTERS VALUES (1, 'A');
INSERT INTO LETTERS VALUES (2, 'B');
INSERT INTO LETTERS VALUES (3, 'C');
TRUNCATE TABLE LETTERS;
INSERT INTO LETTERS VALUES (4, 'D');
INSERT INTO LETTERS VALUES (5, 'E');
INSERT INTO LETTERS VALUES (6, 'F');
DELETE FROM LETTERS WHERE ID = 6;
```

What would be the output of the following SQL commands, in order?

```
SELECT COUNT (*) FROM STREAM_1;
SELECT COUNT (*) FROM STREAM_2;
```

- A. 2 & 3
- B. 4 & 6
- C. **4 & 3**
- D. 2 & 6

Answer: C

Explanation:

In Snowflake, a stream records data manipulation language (DML) changes to its base table since the stream was created or last

consumed. STREAM_1 will show all changes including the TRUNCATE operation, while STREAM_2, being APPEND_ONLY, will not show deletions like TRUNCATE. Therefore, STREAM_1 will count the three inserts, the TRUNCATE (counted as a single operation), and the subsequent two inserts before the delete, totaling 4. STREAM_2 will only count the three initial inserts and the two after the TRUNCATE, totaling 3, as it does not count the TRUNCATE or the delete operation.

NEW QUESTION # 109

A Snowflake Architect is designing a multiple-account design strategy.

This strategy will be MOST cost-effective with which scenarios? (Select TWO).

- A. The company security policy mandates the use of different Active Directory instances for the development, test, and production environments.
- B. **The company needs to support different role-based access control features for the development, test, and production environments.**
- C. **The company needs to share data between two databases, where one must support Payment Card Industry Data Security Standard (PCI DSS) compliance but the other one does not.**
- D. The company wants to clone a production database that resides on AWS to a development database that resides on Azure.
- E. The company must use a specific network policy for certain users to allow and block given IP addresses.

Answer: B,C

Explanation:

A multiple-account design strategy is a way of organizing Snowflake accounts into logical groups based on different criteria, such as cloud provider, region, environment, or business unit. A multiple-account design strategy can help achieve various goals, such as cost optimization, performance isolation, security compliance, and data sharing¹. In this question, the scenarios that would be most cost-effective with a multiple-account design strategy are:

* The company wants to clone a production database that resides on AWS to a development database that resides on Azure. This scenario would benefit from a multiple-account design strategy because it would allow the company to leverage the cross-cloud replication feature of Snowflake, which enables replicating databases across different cloud platforms and regions. This feature can help reduce the data transfer costs and latency, as well as provide high availability and disaster recovery².

* The company security policy mandates the use of different Active Directory instances for the development, test, and production environments. This scenario would benefit from a multiple-account design strategy because it would allow the company to use different federated authentication methods for each environment, and integrate them with different Active Directory instances. This can help improve the security and governance of the access to the Snowflake accounts, as well as simplify the user management and provisioning³.

The other scenarios would not be most cost-effective with a multiple-account design strategy, because:

* The company needs to share data between two databases, where one must support Payment Card Industry Data Security Standard (PCI DSS) compliance but the other one does not. This scenario can be handled within a single Snowflake account, by using secure views and secure UDFs to mask or filter the sensitive data, and applying the appropriate roles and privileges to the users who access the data. This can help achieve the PCI DSS compliance without incurring the additional costs of managing multiple accounts⁴.

* The company needs to support different role-based access control features for the development, test, and production environments. This scenario can also be handled within a single Snowflake account, by using the native role-based access control (RBAC) features of Snowflake, such as roles, grants, and privileges, to define different access levels and permissions for each environment. This can help ensure the security and integrity of the data and the objects, as well as the separation of duties and responsibilities among the users.

* The company must use a specific network policy for certain users to allow and block given IP addresses.

This scenario can also be handled within a single Snowflake account, by using the network policy

* feature of Snowflake, which enables creating and applying network policies to restrict the IP addresses that can access the Snowflake account. This can help prevent unauthorized access and protect the data from malicious attacks.

References:

* Designing Your Snowflake Topology

* Cross-Cloud Replication

* Configuring Federated Authentication and SSO

* Using Secure Views and Secure UDFs to Comply with PCI DSS

* [Understanding Access Control in Snowflake]

* [Network Policies]

NEW QUESTION # 110

Running EXPLAIN on a query does not require a running warehouse

- A. FALSE
- B. TRUE

Answer: B

NEW QUESTION # 111

An Architect on a new project has been asked to design an architecture that meets Snowflake security, compliance, and governance requirements as follows:

- 1) Use Tri-Secret Secure in Snowflake
- 2) Share some information stored in a view with another Snowflake customer
- 3) Hide portions of sensitive information from some columns
- 4) Use zero-copy cloning to refresh the non-production environment from the production environment To meet these requirements, which design elements must be implemented? (Choose three.)

- A. Create a materialized view.
- B. Create a secure view.
- C. Use Dynamic Data Masking.
- D. Define row access policies.
- E. Use the Business-Critical edition of Snowflake.
- F. Use the Enterprise edition of Snowflake.

Answer: B,C,E

Explanation:

These three design elements are required to meet the security, compliance, and governance requirements for the project.

* To use Tri-Secret Secure in Snowflake, the Business Critical edition of Snowflake is required. This edition provides enhanced data protection features, such as customer-managed encryption keys, that are not available in lower editions. Tri-Secret Secure is a feature that combines a Snowflake-maintained key and a customer-managed key to create a composite master key to encrypt the data in Snowflake1.

* To share some information stored in a view with another Snowflake customer, a secure view is recommended. A secure view is a view that hides the underlying data and the view definition from unauthorized users. Only the owner of the view and the users who are granted the owner's role can see the view definition and the data in the base tables of the view2. A secure view can be shared with another Snowflake account using a data share3.

* To hide portions of sensitive information from some columns, Dynamic Data Masking can be used.

Dynamic Data Masking is a feature that allows applying masking policies to columns to selectively mask plain-text data at query time. Depending on the masking policy conditions and the user's role, the data can be fully or partially masked, or shown as plain-text4.

NEW QUESTION # 112

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