

In [104]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [105]:

```
df = pd.read_csv('/kaggle/input/mall-customers/Mall_Customers.csv')
```

In [106]:

```
df.head()
```

Out[106]:

	CustomerID	Gender	Age	Annual Income (k\$)	Spending Score (1-100)
0	1	Male	19	15	39
1	2	Male	21	15	81
2	3	Female	20	16	6
3	4	Female	23	16	77
4	5	Female	31	17	40

In [107]:

```
df.shape
```

Out[107]:

(200, 5)

In [108]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 200 entries, 0 to 199
Data columns (total 5 columns):
 #   Column                                Non-Null Count  Dtype
---  -
 0   CustomerID                           200 non-null    int64
 1   Gender                               200 non-null    object
 2   Age                                   200 non-null    int64
 3   Annual Income (k$)                   200 non-null    int64
 4   Spending Score (1-100)                200 non-null    int64
dtypes: int64(4), object(1)
memory usage: 7.9+ KB
```

In [109]:

```
X = df.iloc[:, [3,4]].values
```

In [110]:

```
X
```

Out[110]:

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```

In [111]:

```
from sklearn.cluster import KMeans
wcss = []
```

In [112]:

```
for i in range(1,11):
    kmeans = KMeans(n_clusters= i, init='k-means++', n_init=10, random_state=0)
    kmeans.fit(X)
    wcss.append(kmeans.inertia_)
```

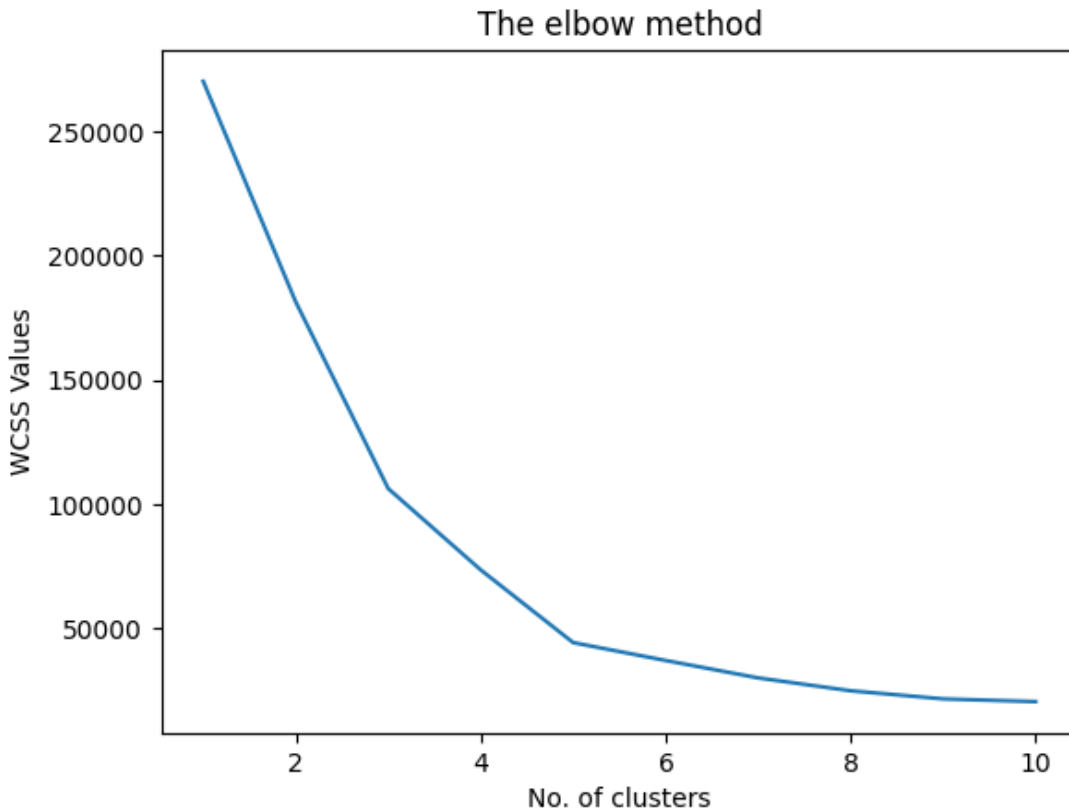
In [113]:

```
wcss = wcss[:10]
print(f"Length of wcss: {len(wcss)}")
```

Length of wcss: 10

In [114]:

```
plt.plot(range(1,11), wcss)
plt.title('The elbow method')
plt.xlabel('No. of clusters')
plt.ylabel('WCSS Values')
plt.show()
```



In [115]:

```
kmeansmodel = KMeans(n_clusters = 5, init='k-means++', n_init=10)
```

In [116]:

```
y_kmeans = kmeansmodel.fit_predict(X)
```

In [117]:

```
plt.scatter(X[y_kmeans == 0,0], X[y_kmeans == 0,1], s= 80, c= "red", label='Customer 1'
)
plt.scatter(X[y_kmeans == 1,0], X[y_kmeans == 1,1], s= 80, c= "blue", label='Customer 2
')
plt.scatter(X[y_kmeans == 2,0], X[y_kmeans == 2,1], s= 80, c= "yellow", label='Customer
3')
plt.scatter(X[y_kmeans == 3,0], X[y_kmeans == 3,1], s= 80, c= "cyan", label='Customer 4
')
plt.scatter(X[y_kmeans == 4,0], X[y_kmeans == 4,1], s= 80, c= "black", label='Customer
5')
plt.scatter(kmeans.cluster_centers[:, 0], kmeans.cluster_centers[:, 1], s= 100, c= '
magenta', label= 'Centroids')
plt.title('Clusters of customers')
plt.xlabel('Annual Income (k$)')
plt.ylabel('Spending Score (1-100)')
plt.legend()
plt.show()
```

