Problem Statement: To Analyize the sales data and find out which group of people are more likely to buy the products.

In [39]:
```
# import python libraries

import numpy as np
import pandas as pd
import matplotlib.pyplot as plt # visualizing data
%matplotlib inline
import seaborn as sns
```

In [40]:
```
# import csv file
df = pd.read_csv('Diwali Sales Data.csv', encoding= 'unicode_escape')
```

In [41]:
```
df.shape
```

Out[41]:
```
(11251, 15)
```

In [42]:
```
df.head()
```

Out[42]:

	User_ID	Cust_name	Product_ID	Gender	Age Group	Age	Marital_Status	State	Zo
0	1002903	Sanskriti	P00125942	F	26-35	28	0	Maharashtra	Weste
1	1000732	Kartik	P00110942	F	26-35	35	1	Andhra Pradesh	Southe
2	1001990	Bindu	P00118542	F	26-35	35	1	Uttar Pradesh	Cent
3	1001425	Sudevi	P00237842	M	0-17	16	0	Karnataka	Southe
4	1000588	Joni	P00057942	M	26-35	28	1	Gujarat	Weste

In [43]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 11251 entries, 0 to 11250
Data columns (total 15 columns):
 #   Column            Non-Null Count  Dtype  
---  ------            --------------  -----  
 0   User_ID           11251 non-null  int64  
 1   Cust_name         11251 non-null  object 
 2   Product_ID        11251 non-null  object 
 3   Gender            11251 non-null  object 
 4   Age Group         11251 non-null  object 
 5   Age               11251 non-null  int64  
 6   Marital_Status    11251 non-null  int64  
 7   State             11251 non-null  object 
 8   Zone              11251 non-null  object 
 9   Occupation        11251 non-null  object 
 10  Product_Category  11251 non-null  object 
 11  Orders            11251 non-null  int64  
 12  Amount            11239 non-null  float64
 13  Status            0 non-null      float64
 14  unnamed1          0 non-null      float64
dtypes: float64(3), int64(4), object(8)
memory usage: 1.3+ MB
```

In [44]:
```
#drop unrelated/blank columns
df.drop(['Status', 'unnamed1'], axis=1, inplace=True)
```

In [45]:
```
#check for null values
pd.isnull(df).sum()
```

Out[45]:
```
User_ID              0
Cust_name            0
Product_ID           0
Gender               0
Age Group            0
Age                  0
Marital_Status       0
State                0
Zone                 0
Occupation           0
Product_Category     0
Orders               0
Amount              12
dtype: int64
```

In [46]:
```
# drop null values
df.dropna(inplace=True)
```

In [47]:
```
# change data type
df['Amount'] = df['Amount'].astype('int')
```

In [48]:
```
df['Amount'].dtypes
```

Out[48]:
```
dtype('int32')
```

In [49]:
```
df.columns
```

Out[49]:
```
Index(['User_ID', 'Cust_name', 'Product_ID', 'Gender', 'Age Group', 'Age',
       'Marital_Status', 'State', 'Zone', 'Occupation', 'Product_Category',
       'Orders', 'Amount'],
      dtype='object')
```

In [50]:
```
#rename column
df.rename(columns= {'Marital_Status':'Shaadi'})
```

Out[50]:

	User_ID	Cust_name	Product_ID	Gender	Age Group	Age	Shaadi	State	Zone
0	1002903	Sanskriti	P00125942	F	26-35	28	0	Maharashtra	Western
1	1000732	Kartik	P00110942	F	26-35	35	1	Andhra Pradesh	Southern
2	1001990	Bindu	P00118542	F	26-35	35	1	Uttar Pradesh	Central
3	1001425	Sudevi	P00237842	M	0-17	16	0	Karnataka	Southern
4	1000588	Joni	P00057942	M	26-35	28	1	Gujarat	Western
...	...	...	...	...	...	...	...	...	...
11246	1000695	Manning	P00296942	M	18-25	19	1	Maharashtra	Western
11247	1004089	Reichenbach	P00171342	M	26-35	33	0	Haryana	Northern
11248	1001209	Oshin	P00201342	F	36-45	40	0	Madhya Pradesh	Central
11249	1004023	Noonan	P00059442	M	36-45	37	0	Karnataka	Southern
11250	1002744	Brumley	P00281742	F	18-25	19	0	Maharashtra	Western

11239 rows × 13 columns

In [51]:

```
# describe() method returns description of the data in the DataFrame (i.e. cou
df.describe()
```

Out[51]:

	User_ID	Age	Marital_Status	Orders	Amount
count	1.123900e+04	11239.000000	11239.000000	11239.000000	11239.000000
mean	1.003004e+06	35.410357	0.420055	2.489634	9453.610553
std	1.716039e+03	12.753866	0.493589	1.114967	5222.355168
min	1.000001e+06	12.000000	0.000000	1.000000	188.000000
25%	1.001492e+06	27.000000	0.000000	2.000000	5443.000000
50%	1.003064e+06	33.000000	0.000000	2.000000	8109.000000
75%	1.004426e+06	43.000000	1.000000	3.000000	12675.000000
max	1.006040e+06	92.000000	1.000000	4.000000	23952.000000

In [24]:

```
# use describe() for specific columns
df[['Age', 'Orders', 'Amount']].describe()
```

Out[24]:

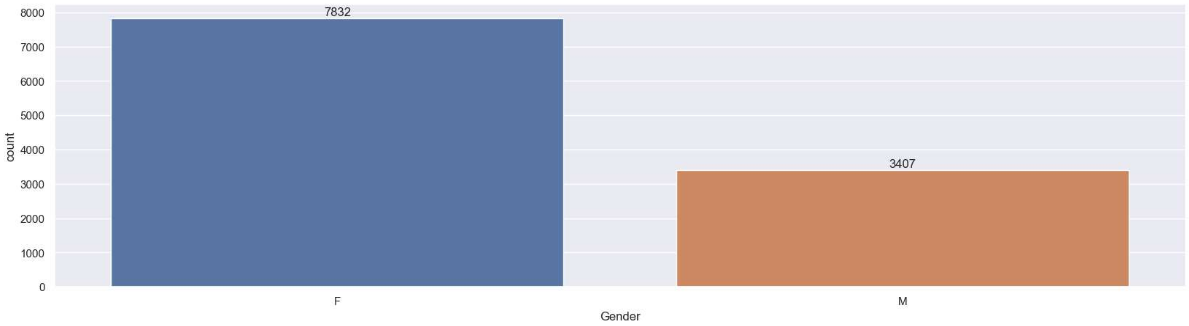
	Age	Orders	Amount
count	11239.000000	11239.000000	11239.000000
mean	35.410357	2.489634	9453.610553
std	12.753866	1.114967	5222.355168
min	12.000000	1.000000	188.000000
25%	27.000000	2.000000	5443.000000
50%	33.000000	2.000000	8109.000000
75%	43.000000	3.000000	12675.000000
max	92.000000	4.000000	23952.000000

Exploratory Data Analysis

Gender

In [52]:

```
# plotting a bar chart for Gender and it's count

ax = sns.countplot(x = 'Gender',data = df)

for bars in ax.containers:
    ax.bar_label(bars)
```

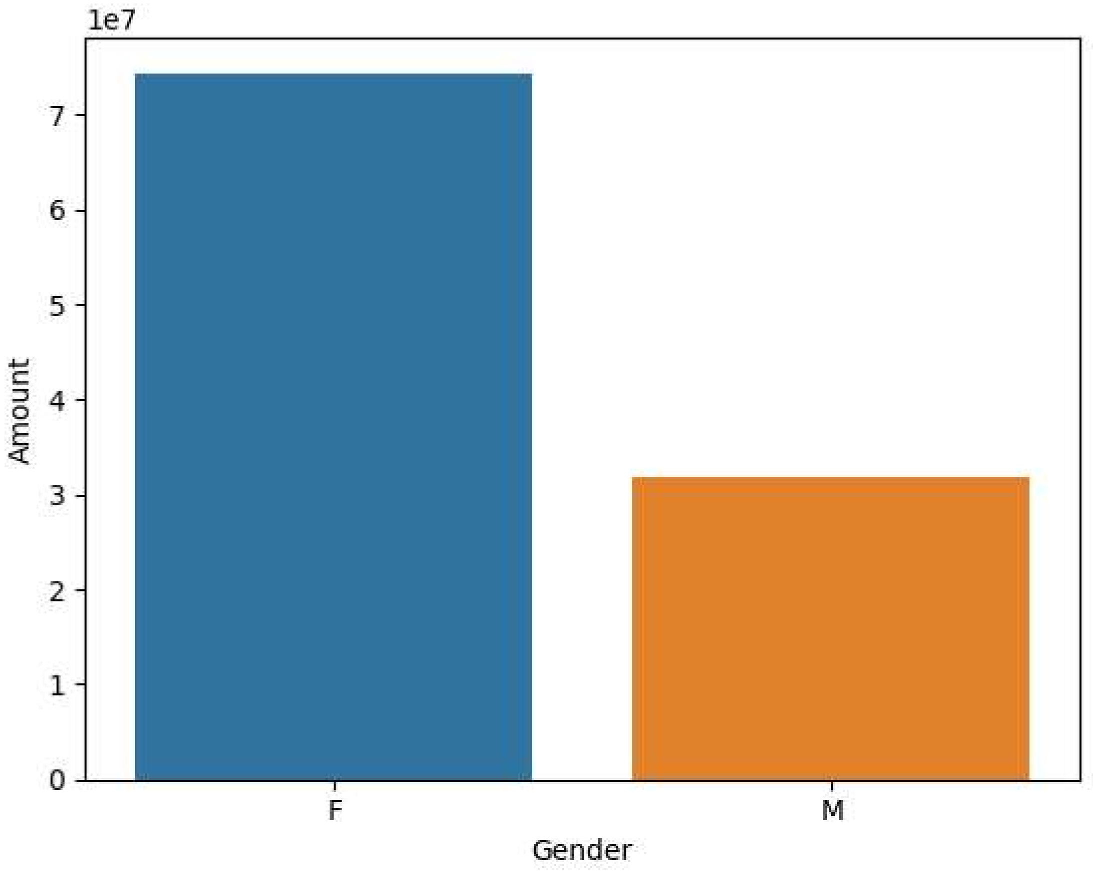


In [26]:

```
# plotting a bar chart for gender vs total amount

sales_gen = df.groupby(['Gender'], as_index=False)['Amount'].sum().sort_values

sns.barplot(x = 'Gender',y= 'Amount' ,data = sales_gen)
```

Out[26]:

```
<AxesSubplot:xlabel='Gender', ylabel='Amount'>
```

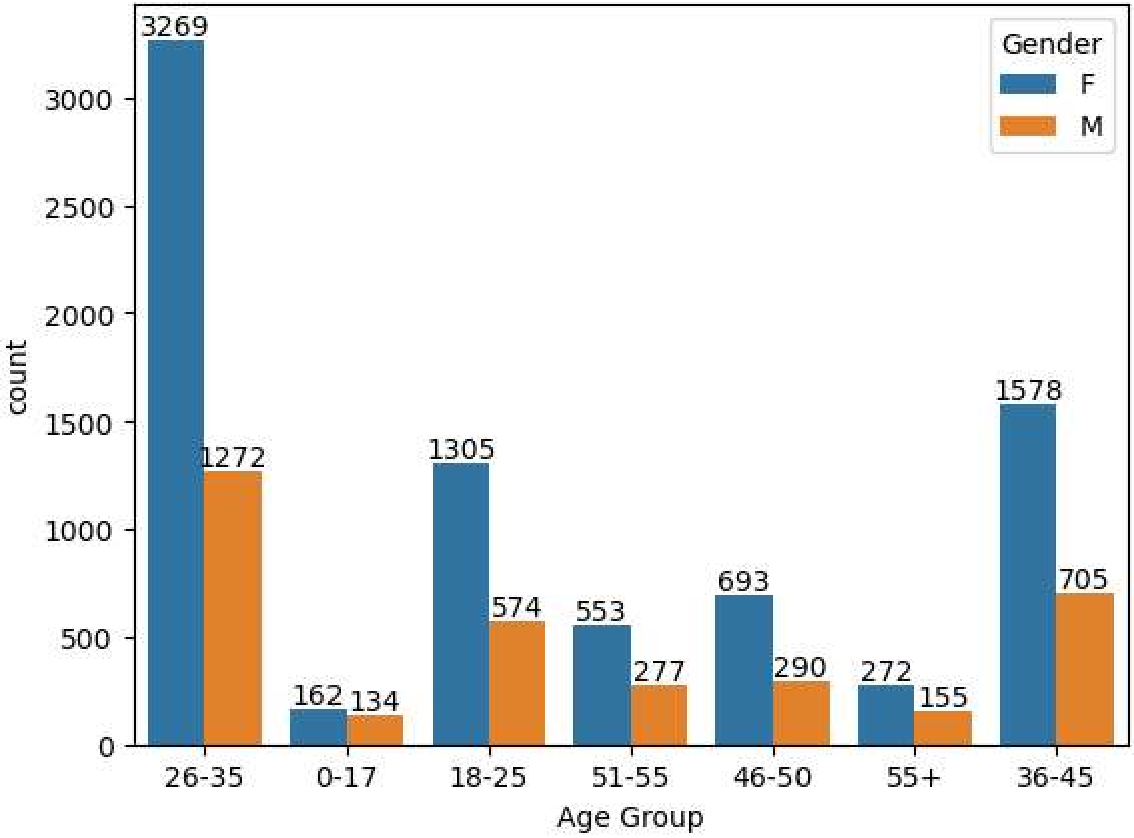


From above graphs we can see that most of the buyers are females and even the purchasing power of females are greater than men

Age

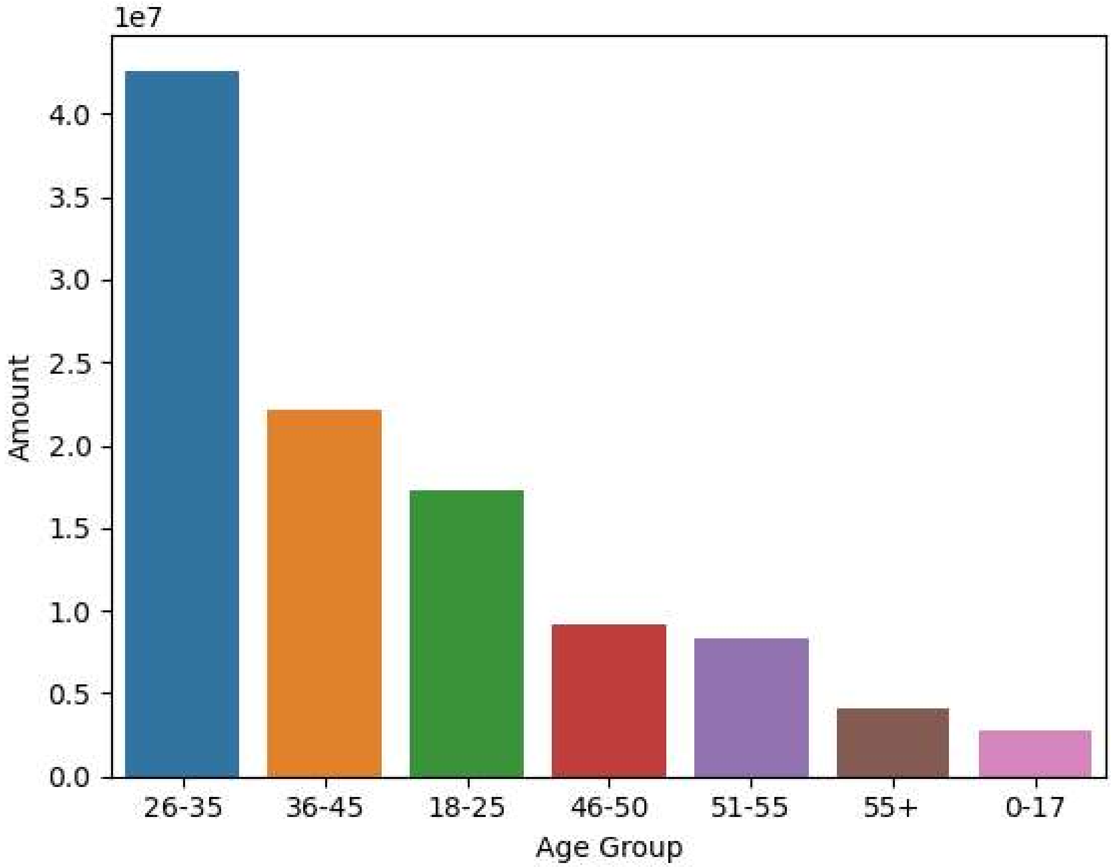
In [27]:

```
ax = sns.countplot(data = df, x = 'Age Group', hue = 'Gender')

for bars in ax.containers:
    ax.bar_label(bars)
```



```
In [28]: # Total Amount vs Age Group
         sales_age = df.groupby(['Age Group'], as_index=False)['Amount'].sum().sort_valu

         sns.barplot(x = 'Age Group',y= 'Amount' ,data = sales_age)
```

```
Out[28]: <AxesSubplot:xlabel='Age Group', ylabel='Amount'>
```

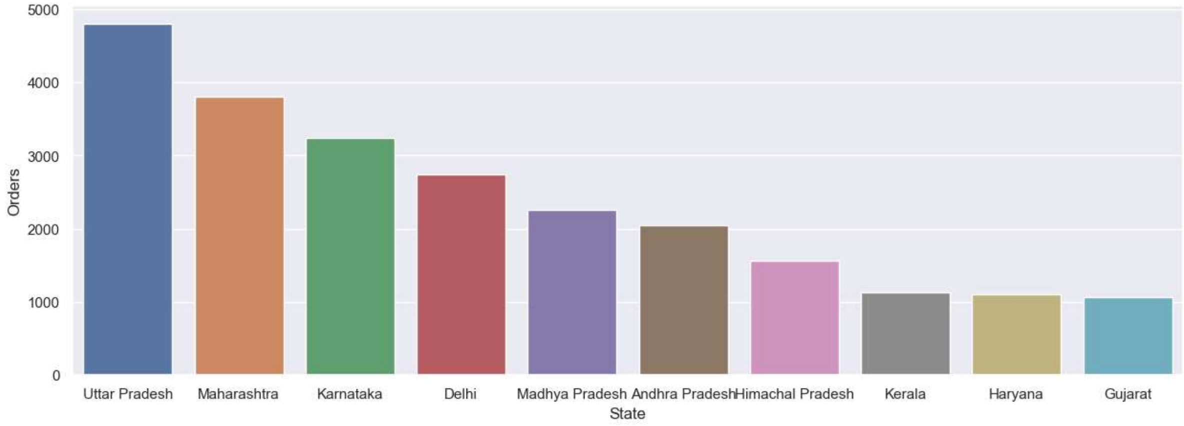


From above graphs we can see that most of the buyers are of age group between 26-35 yrs female

State

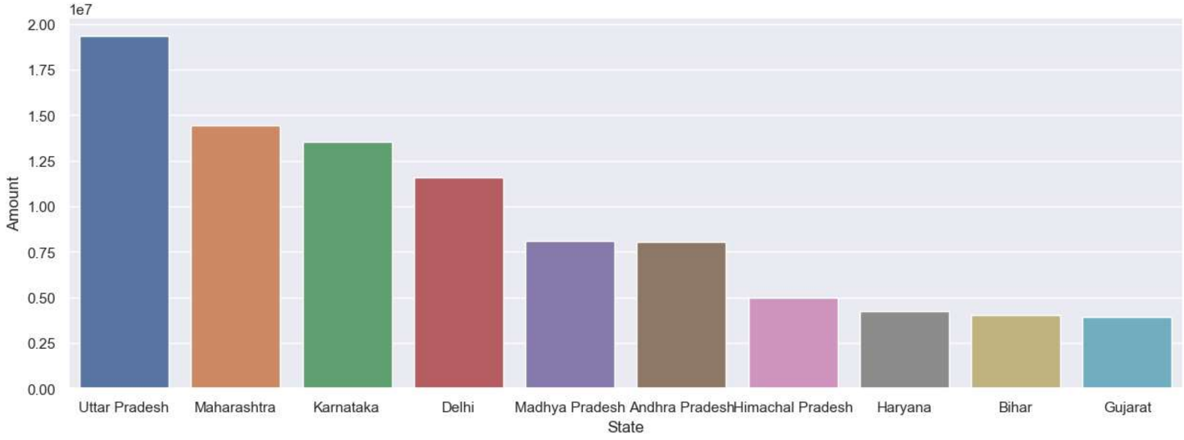
In [29]:
```
# total number of orders from top 10 states

sales_state = df.groupby(['State'], as_index=False)['Orders'].sum().sort_value

sns.set(rc={'figure.figsize':(15,5)})
sns.barplot(data = sales_state, x = 'State',y= 'Orders')
```

Out[29]:
```
<AxesSubplot:xlabel='State', ylabel='Orders'>
```



In [30]:
```
# total amount/sales from top 10 states

sales_state = df.groupby(['State'], as_index=False)['Amount'].sum().sort_value

sns.set(rc={'figure.figsize':(15,5)})
sns.barplot(data = sales_state, x = 'State',y= 'Amount')
```

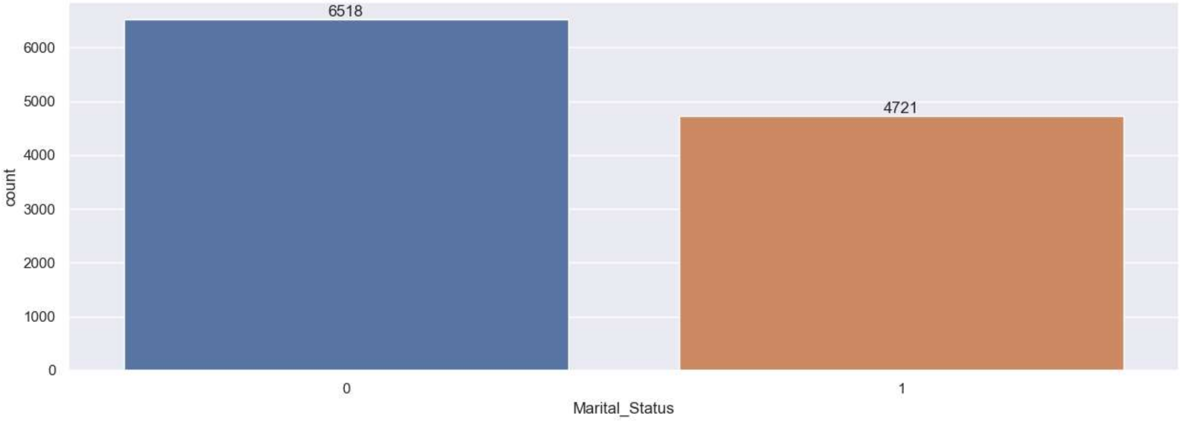
Out[30]:
```
<AxesSubplot:xlabel='State', ylabel='Amount'>
```



From above graphs we can see that most of the orders & total sales/amount are from Uttar Pradesh, Maharashtra and Karnataka respectively

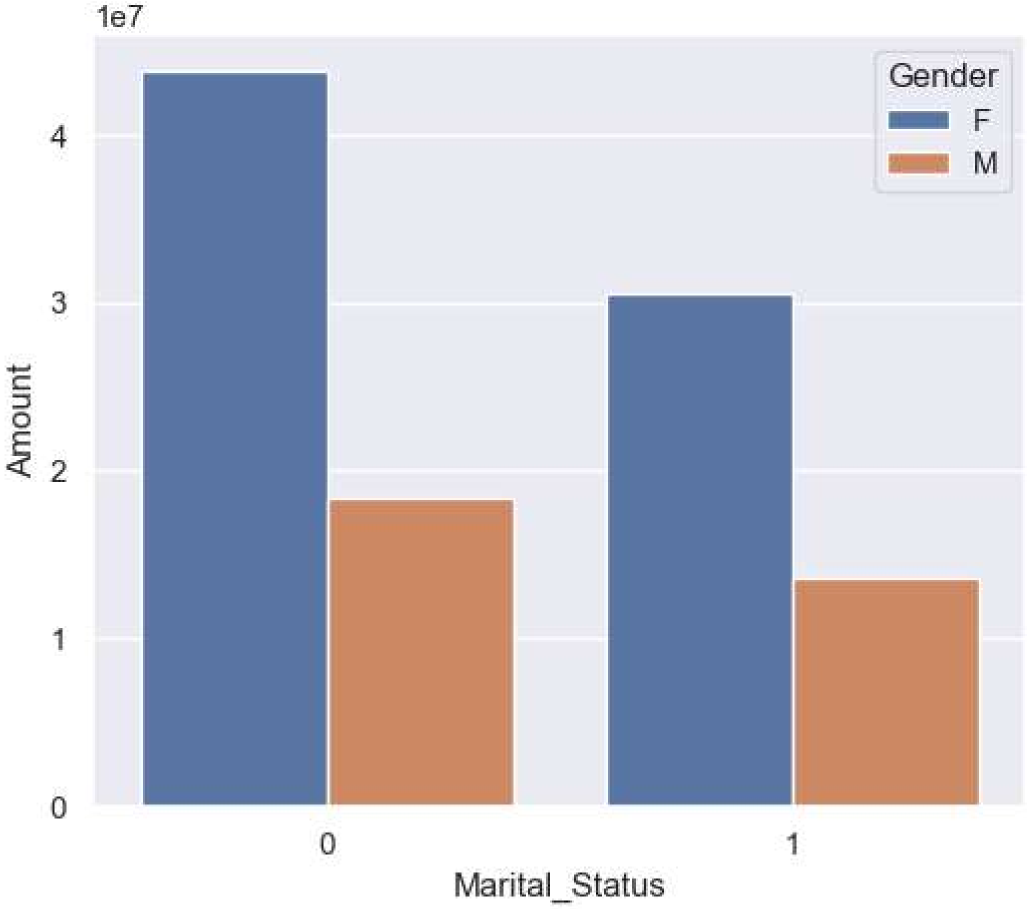
Marital Status

In [31]:
```
ax = sns.countplot(data = df, x = 'Marital_Status')

sns.set(rc={'figure.figsize':(7,5)})
for bars in ax.containers:
    ax.bar_label(bars)
```



In [32]:
```
sales_state = df.groupby(['Marital_Status', 'Gender'], as_index=False)['Amount

sns.set(rc={'figure.figsize':(6,5)})
sns.barplot(data = sales_state, x = 'Marital_Status',y= 'Amount', hue='Gender'
```

Out[32]:
```
<AxesSubplot:xlabel='Marital_Status', ylabel='Amount'>
```

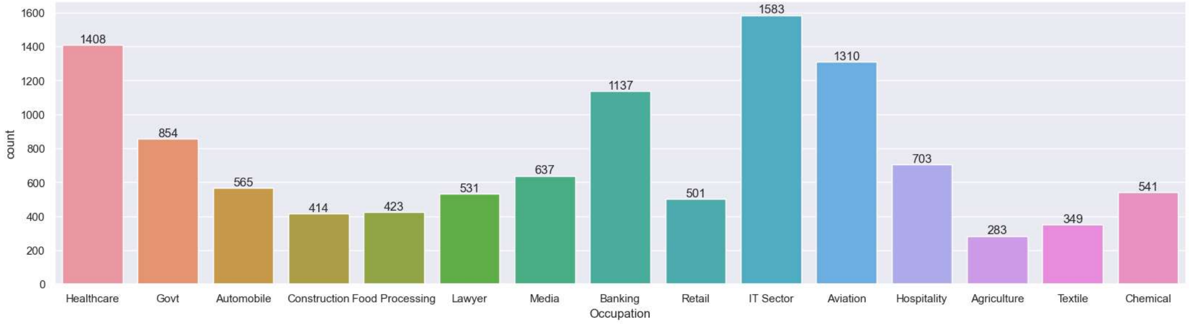


From above graphs we can see that most of the buyers are married (women) and they have high purchasing power

Occupation

In [33]:

```
sns.set(rc={'figure.figsize':(20,5)})
ax = sns.countplot(data = df, x = 'Occupation')

for bars in ax.containers:
    ax.bar_label(bars)
```

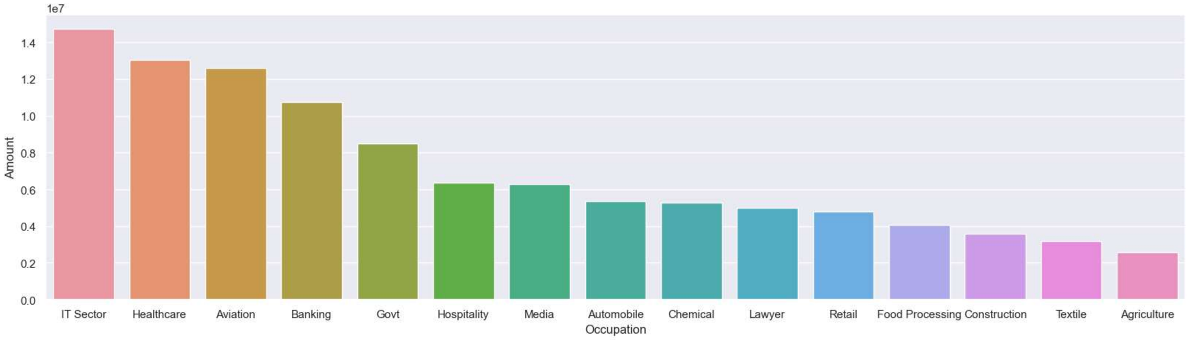


In [34]:

```
sales_state = df.groupby(['Occupation'], as_index=False)['Amount'].sum().sort_

sns.set(rc={'figure.figsize':(20,5)})
sns.barplot(data = sales_state, x = 'Occupation',y= 'Amount')
```

Out[34]:

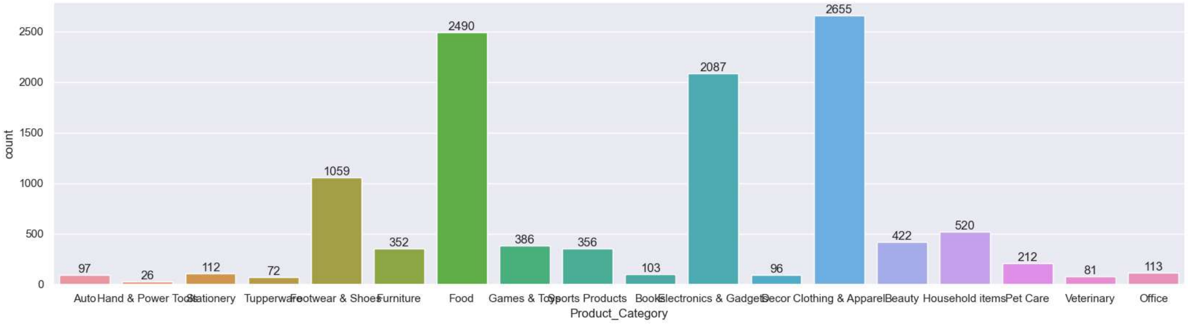
```
<AxesSubplot:xlabel='Occupation', ylabel='Amount'>
```



From above graphs we can see that most of the buyers are working in IT, Healthcare and Aviation sector

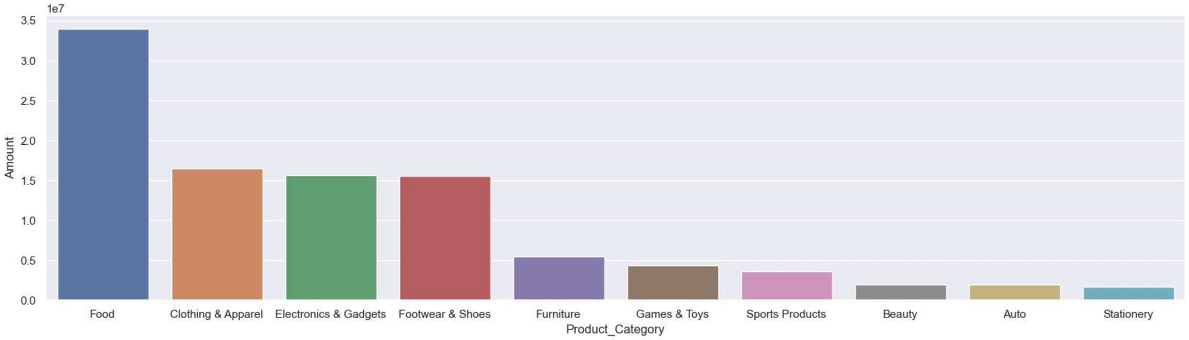
Product Category

In [35]:
```
sns.set(rc={'figure.figsize':(20,5)})
ay = sns.countplot(data = df, x = 'Product_Category')

for bars in ay.containers:
    ay.bar_label(bars)
```



In [36]:
```
sales_state = df.groupby(['Product_Category'], as_index=False)['Amount'].sum()

sns.set(rc={'figure.figsize':(20,5)})
sns.barplot(data = sales_state, x = 'Product_Category',y= 'Amount')
```

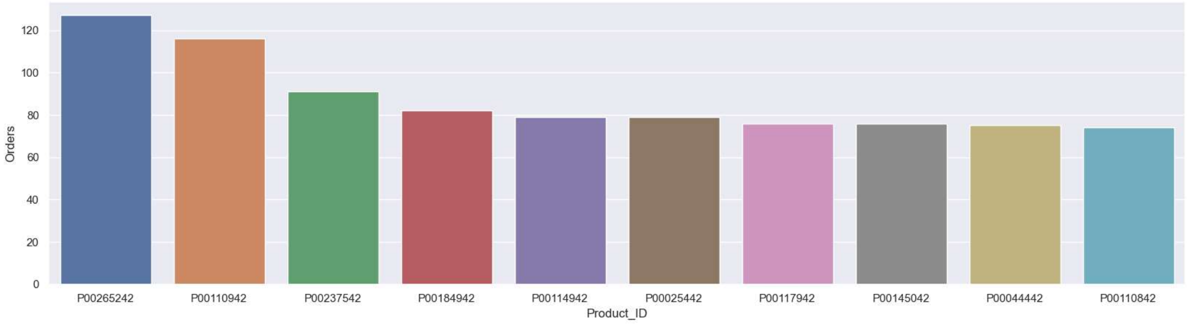
Out[36]:
```
<AxesSubplot:xlabel='Product_Category', ylabel='Amount'>
```



From above graphs we can see that most of the sold products are from Food, Clothing and Electronics category

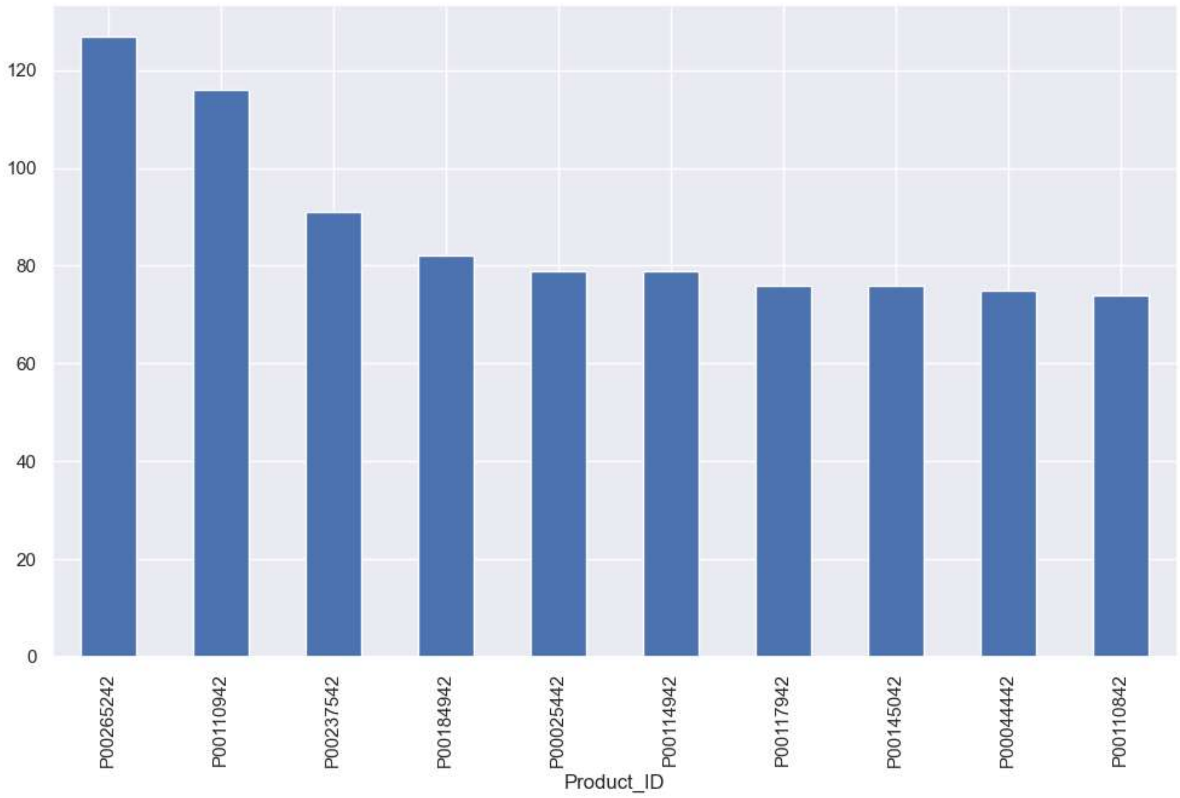
```
In [37]: sales_state = df.groupby(['Product_ID'], as_index=False)['Orders'].sum().sort_

         sns.set(rc={'figure.figsize':(20,5)})
         sns.barplot(data = sales_state, x = 'Product_ID',y= 'Orders')
```

```
Out[37]: <AxesSubplot:xlabel='Product_ID', ylabel='Orders'>
```



```
In [38]: # top 10 most sold products (same thing as above)

         fig1, ax1 = plt.subplots(figsize=(12,7))
         df.groupby('Product_ID')['Orders'].sum().nlargest(10).sort_values(ascending=Fa
```

```
Out[38]: <AxesSubplot:xlabel='Product_ID'>
```



Conclusion:

Married women age group 26-35 yrs from UP, Maharastra and Karnataka working in IT, Healthcare and Aviation are more likely to buy products from Food, Clothing and Electronics category

Thank you!

```
In [ ]:
```

```
In [ ]:
```

```
In [ ]:
```