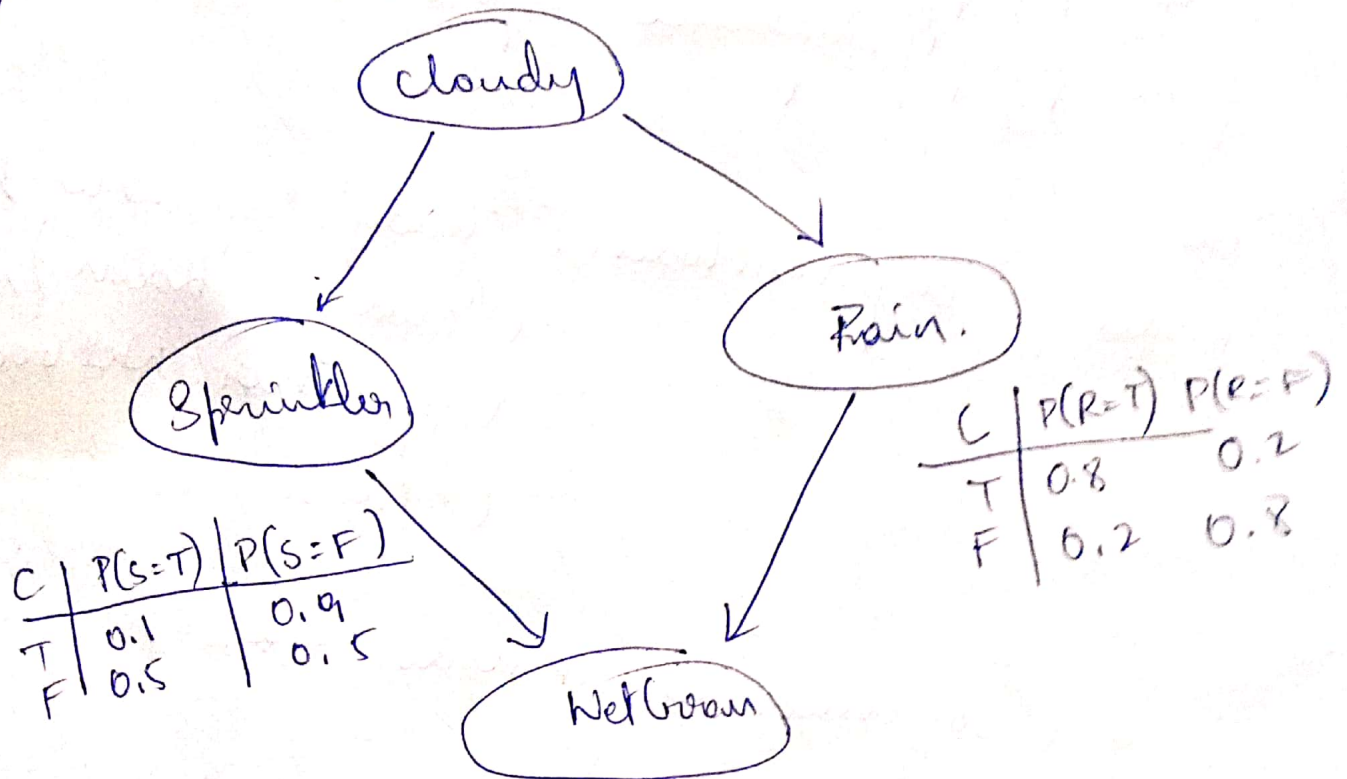


$$\frac{P(C=T)}{0.5} \quad \frac{P(C=F)}{0.5}$$

8 (Q)



S	R	P(W=T)	P(W=F)
T	T	0.99	0.01
T	F	0.9	0.1
F	T	0.9	0.1
F	F	0.0	1.0

(1)

10/10

Code :-

P. SAI DEEKSHITH

IBM18CS148

```
from pgmpy.models import BayesianModel
from pgmpy.factors.discrete import TabularCPD
from pgmpy.inference import VariableElimination
```

```
model = BayesianModel([('cloudy', 'sprinkler'),
                        ('cloudy', 'Rain'),
                        ('sprinkler', 'Wet Grass'),
                        ('Rain', 'Wet Grass')])
```

```
print("Bayesian network nodes are:")
```

```
print(model.nodes())
```

```
print("Bayesian network edges are:")
```

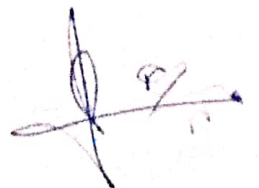
```
print(model.edges())
```

```
cpd_cloudy = TabularCPD(variable='cloudy', variable_card=2, values=[[0.5], [0.5]])
```

```
cpd_sprinkler = TabularCPD(variable='sprinkler', variable_card=2, values=[[0.1, 0.5], [0.9, 0.5]])
```

```
cpd_rain = TabularCPD(variable='Rain', variable_card=2, values=[[0.1, 0.5], [0.9, 0.5]])  
evidence = ['cloudy'], evidence_card=[2]
```

(2)




```
cpd-rain = TabularCPD(variable='Rain',
    values=[1, 0.8, 0.2], [0.2, 0.8]), evidence =
    ['cloudy'], evidence_card = [2])
```

```
cpd-wetgears = TabularCPD(variable='WetGears',
    values=[1, 0.99, 0.9, 0.9, 0.0], [0.01, 0.1, 0.1, 1.0],
    evidence_card = [2], evidence =
    ['sprinkler', 'Rain'], evidence_card = [2, 2])
```

```
model.add_cpds(cpd-cloudy, cpd-sprinkler,
    cpd-rain, cpd-wetgears)
```

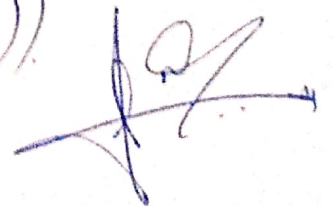
```
print("Checking Consistency:")
print(model.check_model())
```

```
model model.get_independencies()
```

```
# CPDs
```

```
print(model.get_cpds('cloudy'))
print(model.get_cpds('sprinkler'))
print(model.get_cpds('Rain'))
print(model.get_cpds('Wetgears'))
```

(3)



```
infer = VariableElimination(model)
print('Probability of sprinkler and Wetgrass  
given cloudy')
q = infer.query(variables = ['sprinkler', 'Wetgrass',  
evidence = {'cloudy': 1})
print(q)
```