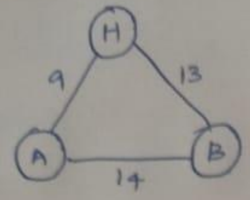
Given:



$\rho = 0.1$

$Q = 90$

$\alpha = 0.3$

$\beta = 0.4$

Initial Pheromone values:

$\tau_{HA} = \tau_{AH} = 0.15$

$\tau_{HB} = \tau_{BH} = 0.26$

$\tau_{AB} = \tau_{BA} = 0.48$

Step 1:

Find Next Transition Probability

$$NTP_{ij} = \frac{(\tau_{ij})^{\alpha}(\eta_{ij})^{\beta}}{\sum_{h \notin v} (\tau_{ih})^{\alpha}(\eta_{ij})^{\beta}}$$

Find P_{HA} and P_{HB}

$visit_K = \boxed{H}$

$$P_{HA} = \frac{(0.15)^{0.3}(1/9)^{0.4}}{(0.15)^{0.3}(1/9)^{0.4} + (0.26)^{0.3}(1/13)^{0.4}}$$

$$= \frac{(0.5660)(0.4152)}{(0.566)(0.4152) + (0.6676)(0.3584)}$$

$$= \frac{0.2350}{0.235 + 0.2393}$$

$$P_{HA} = \frac{0.235}{0.4743} = 0.4955$$

$$\boxed{P_{HB} = \frac{0.2393}{0.4743} = 0.5045} \text{ max}$$

Now, ant moves to B by updating the Pheromone.

Pheromone updation:

$$\boxed{\tau_{ij}^{new} = (1-\rho)\,\tau_{ij}^{old} + \Delta\tau_{ij}^{K}}$$

$$\Delta\tau_{ij}^{K} = \begin{cases} Q/f_K & ; \text{if } K^{th} \text{ ant passes } ij \\ 0 & ; \text{otherwise} \end{cases}$$

[Since ant moved from H to B, calculate $\Delta\tau_{HB}$] $\Delta\tau_{HB} = \frac{90}{13} = 6.9231$

$\tau_{HA} = \tau_{AH} = (1-0.1)(0.15) + 0 = 0.135$

$\tau_{HB} = \tau_{BH} = (1-0.1)(0.26) + 6.9231 = 7.1571$

$\tau_{AB} = \tau_{BA} = (1-0.1)(0.48) + 0 = 0.432$

Step 2:

$visit_K = \boxed{H-B}$

From B, ant moves to A since only one non-visited vertex. Therefore, update the pheromone.

Pheromone updation:

Calculate $\Delta \tau_{BA} = \frac{Q}{f}$ for others consider 0.

$\tau_{HA} = (0.9)(0.135) + 0 = 0.1215$

$\tau_{HB} = (0.9)(7.1571) + 0 = 6.4414$

$\tau_{AB} = (0.9)(0.432) + \frac{90}{14} = 6.8174$

Step 3:

$visit_K$: $\boxed{H-B-A}$

Now back to home. Update the pheromone:

$\tau_{HA} = (0.9)(0.1215) + \frac{90}{9} = 10.1094$

$\tau_{HB} = (0.9)(6.4414) + 0 = 5.7973$

$\tau_{AB} = (0.9)(6.8174) + 0 = 6.1357$

Therefore shortest path is

$\boxed{H-B-A-H.}$