**NN220 Celestial Navigation – STELLA In Class Exercise (3)**

**STELLA**

**Assumptions:**

Height of Eye is 60ft

Index Error 3.5’ On the Arc

Air Temp 50°F (10°C)

Pressure 1000 mb.

**Question 1**.

It is 160100ZDEC21. You are the Navigator of USS Winston Churchill and are conducting CELNAV training whilst on transit through the Mediterranean. You have a good fix that puts you in 32º 56’N 028**º** 05’E. You are on course 275ºT at 12 knots.Enter this into STELLA as your reference position.

**Question 2**.

You start work on preparing your Morning star sights.

1. Using the RISE/SET/ TRANSIT function, determine the following:

|  |  |  |  |
| --- | --- | --- | --- |
| **Start Time of Nautical Twilight** | 160408ZDEC21 | **DR Position** | 32°59.3’N  027°20.4’E |
| **Start Time of Civil Twilight** | 160440ZDEC21 | **DR Position** | 32°59.8’N  027°12.9’E |
| **Time of Sunrise and Azimuth** | 160507ZDEC21  117° | **DR Position** | 33°00.3’N  027°06.5’E |

1. Using the SKY CHART function, determine the best 3 stars for sights at Morning Twilight. Identify the 2 alternate bodies by the Height Calculated and Azimuth.

|  |  |  |
| --- | --- | --- |
| **Celestial Body** | **Height Calculated** | **Azimuth (Zn)** |
| Procyon | 28° | 257°T |
| Dubhe | 61° | 352°T |
| Arcturus | 52° | 101°T |
| Kochab | 43° | 016°T |
| Pollux | 41° | 280°T |

1. Using the SELECTED STARS function, determine the 4 other Stars (Not the Best Stars) Altitude and Azimuth at 160432ZDEC21.

|  |  |  |
| --- | --- | --- |
| **Celestial Body** | **Height Calculated** | **Azimuth (Zn)** |
| Alphecca | 43°38’ | 083°T |
| Arcturus | 56°48’ | 106°T |
| Regulus | 56°48’ | 237°T |
| Dubhe | 59°57’ | 347°T |

**Question 3.**

Preparing to conduct Morning Stars, you are dismayed to see that it is partly cloudy therefore you can only see four celestial bodies. You therefore obtain the following sights:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Celestial Body** | **Time (Z)** | **Altitude** | **Azimuth** | **Quality** |
| Unknown Vega | 04:32:00Z | 14°00.9 | 052 | Good |
| Arcturus | 04:38:00Z | 58°08.6 | 108 | Good |
| Mars | 04:54:30Z | 16°04.1 | 128 | Avg |
| Unknown Regulus | 05:02:00Z | 51°31.8 | 245 | Good |

1. Identify the 2 unknown Bodies you sighted.

Vega and Regulus

1. Using the results of the star sights, what is the ship’s position at the time of last observation?

|  |  |
| --- | --- |
| **Latitude** 32°59.3’N | **Accuracy** ± 6.7’ |
| **Longitude** 027°12.2’E | **Accuracy** ± 4.3’ |

**Question 4**.

1. Use STELLA to determine the time and azimuth of Sunset and the time of Civil and Nautical Twilight for the evening based on your new fix position. Write your answers in DTG format.

Sunset 161517ZDEC21

Azimuth 242°

Nautical Twilight 161544ZDEC21

Civil Twilight 161615ZDEC21

1. At sunset you take an azimuth to the sun and get 243°T. Your Height of Eye is 60ft. What is your gyro Error?

1°W

**Question 5**

It is important to keep you fix updated during the day, therefore you take 3 sights of the Sun’s Lower Limb before evening stars. Calculate the updated fix position based on the following sights at Lower Limb:

|  |  |  |
| --- | --- | --- |
| **Time (Z)** | **Altitude** | **Quality** |
| 0800Z | 25°39.7 | Good |
| 1035Z | 33°15.2 | Good |
| 1330Z | 16°49.9 | Good |

1. Using the results of the Sun sights, what is the ship’s position at the time of last observation?

|  |  |
| --- | --- |
| **Latitude** 33°08.5’N | **Accuracy** ±0.3’ |
| **Longitude** 0.25°11.9’E | **Accuracy** 0.6’ |

Today’s running fix has worked out extremely well. A good effort by the bridge team and now to prove it was correct with Evening Stars!