SHREE L. R. TIWARI DEGREE COLLEGE
(Arts | Commerce | Science)
Approved by Goverment of Maharashtra & Affiliated to University of Mumbai

USAV 101 AIR NAVIGATION NOV 2022

Time Duration - 02:30 Hrs Marks : 75

Q1) Answer the following:

i) Attempt any one (10 marks)

a) Write a note on Geodetic and Geocentric Latitudes.

b) Write a note on Rhumb line.

ii) Attempt any two (5 marks each)

a) Write a note on Great Circle and Small Circles.

b) Write a note on Variation with Diagram?

c) Explain the Prime Meridian and Anti Meridian?

Q.2) Answer the following:

i) Attempt any one (10 Marks)

a) Determine the value of convergency between J (5812N 00400W) and K (5812N 00600E).

1) What is the Rhumb line track from J to K?

2) What is the initial great circle track from K to J?

b) On a Mercator chart, the chart length between two meridians, 160E and 160W, is 30 cms at 30S. What is the scale of the chart at 30S?

ii) Attempt any two (5 Marks each)

a) Given TAS= 410 kts , Track (T)= 015°, W/V= 315/75kt. Calculate the HDG (°T) and GS.

b) GC bearing of D from C=230° , CA=2° in Southern hemisphere find the GC bearing of C from D

c) On Track from P to Q the distance being 200nm: after flying for 50 nm the aircraft finds itself 10 nm to left of course. What is the drift correction?

d) The Chart distance between meridians is 10° apart at latitude 65° North is 3.75 inches. The chart scale at this latitude approximates?

Q.3)Answer the following:

i) Attempt any one (10 marks)

a) Write a note on Orthomorphism.

b) What are the advantages of a Lambert's Chart.

ii) Attempt any 2 (5 marks each)

a) What are the Three types of Projection's? Explain any one of them.

b) Explain how does the Scale differ on a Lambert's Chart.

c) A Mercator chart scale is 1:3000000 at 35° N. Give the length in inches of a straight line on a chart from A (N 38° E42°) to B (N38° E34°).

d) Explain Scale errors and Chart Convergence.

Q.4) Answer the following:

i) Attempt any 3 (5 marks each)

a) Given ;

C 35°N____?°E, D 35°N, 45°15' E,

Distance A-B= 280 nm

B is to the East of A.

Required : Longitude of position A?

b) Write a note on Departure.

c) What are the properties of an ideal chart?

d) Explain deviation, application of variation and deviation.

e) Explain Isogonals, Igonic line, Isoclinals, Aclinic lines.

f) Explain the Oblique Mercator Chart.

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Time Duration - 02:30 Hrs **Marks : 75**

Q1) Answer the following:

i) Attempt any one **(10 marks)**

a) Write a note on Magnetism.
b) Write a note on Great Circle and Small Circles .

ii) Attempt any two **(5 marks each)**

a) Write a note on Rhumb line?
b) Write a note on Variation with Diagram?
c) Explain the Prime Meridian and Anti Meridian?

Q.2) Answer the following:

i) Attempt any one **(10 Marks)**

a) Position **X (64°00'S 11°50'W)**. Position **Y (64°00'S 05°10'W)**. (With Diagram)
Give:
1. The convergency between the meridians of X and Y.
2. The approximate initial great circle track from Y to X.
3. The rhumb line track from X to Y.

b) An aircraft is flying from Mumbai to Delhi, planned track 074°M, distance 70nm, heading 065°M. Having flown 30nm, the pilot 'pinpoints' the aircraft position overhead Bhopal, 4nm left of planned track.
a. What is the track error overhead Bhopal?
b. What is the Track Made Good (TMG) from Mumbai?
c. What was the expected drift?
d. What has the actual drift been?
e. What alteration of heading should be made over Bhopal to fly direct to Delhi?
f. What is the new heading to be flown from overhead Bhopal?

ii) Attempt any two **(5 Marks each)**

a) Given TAS= 465 kts , Track=(T)= 007°, W/V= 300/80kt. Calculate the HDG (°T) and GS.
b) GC bearing of D from C=230° , CA=2° in Southern hemisphere find the GC bearing of C from D
c) On Track from P to Q the distance being 135 nm: after flying for 45 nm the aircraft finds itself 9nm to right of course. What is the drift correction?
d) The Chart distance between meridians is 10° apart at latitude 65° North is 3.75 inches. The chart scale at this latitude approximates?

Q.3)Answer the following:

i) Attempt any one (10 marks)

a) Explain General chart properties.

b) What are the Properties of a Lambert's Chart.

ii) Attempt any 2 (5 marks each)

a) What are the Three types of Projection's. Explain any one of them.

b) How does the Scale differ on a Lambert's Chart explain.

c) Short note on Orthomorphism.

d) Explain Perspective and Non-Perspective Charts.

Q.4) Answer the following:

i) Attempt any 3 (5 marks each)

a) Given ;

C (**35°N _____ °E) D (35°N, 45°15' E)**,

Distance A-B= 280 nm

B is to the East of A.

Required : Longitude of position A?

b) Write a note on Convergency

c) What are the properties of an ideal chart?

d) Explain deviation, application of variation and deviation.

e) Explain Isogonals, agonic line, isoclinals, aclinic lines.

f) A flight is to be made along the parallel of latitude from A **at(48°00'N 04°00'W)** to B at (**48°00'N 02°27'E**). Calculate the distance.

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