

SECTION A 30 marks

1. Find GMT at longitude 120E when LMT is 1932 on 2nd Aug.
 - (a) 1932 on 2nd Aug
 - (b) 0800 on 2nd Aug
 - (c) 1132 on 2nd Aug
 - (d) 1132 on 1st Aug

2. What is the approximate compression of the earth?
 - (a) 3%
 - (b) 0.03%
 - (c) 0.3%
 - (d) 1/3000

3. A rhumbline cuts all meridians at the same angle. This gives a
 - (a) The shortest distance between two points
 - (b) A line which could never be a great circle track
 - (c) A line of constant direction
 - (d) A line with a reciprocal heading

4. What is the definition of magnetic variation?
 - (a) The angle between direction indicated by a compass and magnetic north
 - (b) The angle between true North and Compass North
 - (c) The angle between true North and Magnetic North
 - (d) The angle between magnetic North and Magnetic Heading

5. A direct Mercator graticule is?
 - (a) Rectangular
 - (b) Square
 - (c) Circular
 - (d) Convergent

6. Using your navigation calculator, calculate TAS to the nearest KT. Temperature (°C) +8, Mach No. 0.85
 - (a) 448
 - (b) 556
 - (c) 655
 - (d) 450

7. Find the TAS when CAS is 200 at FL 200 and the air temperature is - 10°C.
 - (a) 300
 - (b) 282
 - (c) 450
 - (d) 600

8. The most important property for an air navigation chart to possess is:
- Correct presentation of area
 - The portrayal of accurate angles in relation to those on the earth's surface
 - A constant scale
 - The presentation of a great circle path as a straight line
9. In relation to Lambert's conformal conic, which of the following is correct?
- Rhumb lines (with the exception of the meridians) will appear as curved lines towards the nearer pole
 - All rhumb lines will appear as curved lines convex towards the nearer pole
 - The scale increases continuously with change in latitude
 - None of the above responses is correct
10. An aircraft flies a great circle track from 56° N 070° W to 62° N 110° E. The total distance travelled is?
- 1788 NM
 - 3720 NM
 - 5420 NM
 - 2040 NM
11. An aircraft flies from position A ($54^{\circ} 00'$ N $035^{\circ} 10'$ E) to position B ($24^{\circ} 20'$ N $010^{\circ} 00'$ E). What is the earth's convergency at position B?
- 90°
 - 39.2°
 - 15.9°
 - 25.2°
12. Given:
- True HDG = 233° ,
TAS = 480 kt,
Track (T) = 240° ,
GS = 523 kt.
Calculate the W/V?
- 115/70kt
 - 110/75kt
 - 110/80kt
 - 105/75kt
13. An aircraft is planned to fly from position 'A' to position 'B', distance 320 NM, at an average GS of 180 kt. It departs 'A' at 1200 UTC. After flying 70 NM along track from 'A', the aircraft is 3 MIN ahead of planned time. Using the actual GS experienced, what is the revised ETA at 'B'?
- 1340 UTC
 - 1401 UTC

- (c) 1347 UTC
- (d) 1333 UTC

14. An aircraft and an NDB are in the Northern Hemisphere. The aircraft's heading is 236°M . variation is 13°W at the aircraft and 11°W at the NDB. The relative bearing (RBI) of the NDB is 226°(R) . Convergency between the aircraft's meridian and the meridian of the NDB is 4° . What bearing should be plotted from the NDB on a Mercator chart?

- (a) 271°(T)
- (b) 269°(T)
- (c) 273°(T)
- (d) 275°(T)

15. An aircraft at position $2700\text{N } 17000\text{W}$ travels 3000 km on a track of 180°(T) , then 3000 km on a track of 090°(T) , then 3000 km on a track of 000°(T) , then 3000 km on a track of 270°(T) . What is its final position?

- (a) $2700\text{N } 17000\text{W}$
- (b) $0000\text{N/S } 17000\text{W}$
- (c) $2700\text{N } 17318\text{W}$
- (d) $2700\text{N } 14300\text{W}$

SECTION B 40 marks

1. An aircraft is flying from Oxford to Cambridge, planned track 074°M, distance 70 NM, heading of 065°M .Having flown 30NM, the pilot 'pinpoint' the aircraft position overhead Cranfield, 4NM left of the planned track. (3 marks)
 - a. What is the track error overhead Cranfield?
 - b. What is the Track Made Good (TMG) from Oxford?
 - c. What is the expected drift?
 - d. What has the actual drift been?
 - e. What alteration of the heading should be made over Cranfield to fly direct to Cambridge?
 - f. What is the new heading to be flown from overhead Cranfield?
2. What is the change of longitude between 162°36'W to 140° 42'E. (1 mark)
3. You are flying from Q to Which is a required track of 125°T. You find that your position is 40 nm from R and 2 nm left of the required track. What track must you fly to arrive overhead R?(1 mark)
4. (6 marks)

	ALT FT	TEM P C	CA S KT	TA S KT	TRAC K (T)	W/V	HD G (T)	VA R	HD G (M)	DE V	HD G C	G S K T	DIS T NM	TIM E MIN S
1	200 0	-10	16 0		100	330/1 7		5W		1W			50	
2	470 0	-2	17 0		227	300/1 0		3E		2E			112	

5. Identify the following symbols. (2 marks)

Chart one number 1 and 4

Chart two numbers 6 and 12
6. Define convergency (2 marks)
7. Name and explain three charts projection with an aid of diagram giving examples of charts in each. (6 marks)
8. Scale of Mercator chart at the equator is 1:1,000,000, what is the scale at 60°N(S). (2 marks)
9. Mercator chart scale at 52°S is 1: 2,000,000. What is the scale at the equator? (2 marks)
10. On a chart 5cm represent 7 nautical miles. What is the scale? (1 mark)

11. An aircraft starts at position 0410S 17822W and heads true north for 2950 nm, then turns 90 degrees left, and maintains a rhumbline track for 314 kilometers. What is the final position? (2 marks)

12. Define a nautical mile. (1 mark)

13. Given the following; (3 marks)

CAS 190 kt cruising

Pressure altitude 9000 ft

Temperature ISA -10°C

W/V 320/40 kt

A to B is distance 350 nm

Course 350°

Endurance 3 hours

(a) What is distance to PET

(b) What is ETA for the PET

14. Given the following (3 marks)

Departure to destination is 500 nm

Safe endurance is 4 hours

Groundspeed out is 150 kt

Groundspeed home is 130 kt

What is distance and time to the point of safe return from departure point?

15. Calculate headwind and crosswind component (2 marks)

Given ATIS W/V 310/30

Runway 27.

16. An aircraft departs A (169° 47'W) at 19:19:00 LMT on 23rd June. The destination is B at (173°58'E), the flying time is 7:27:00. Determine the ETA at B in LMT. (3 marks)