

THAKUR COLLEGE OF SCIENCE AND COMMERCE

PROGRAM: F.Y.B.Sc. (AVIATION)

SUBJECT: AIR NAVIGATION

MAX. MARKS: 75

DURATION: 02:30

Q1. Attempt any three of the following:- (15)

- a) State the principle and working of an Directional Gyro Indicator.
- b) State the errors of a Directional Gyro Indicator.
- c) Write a short note on the construction of an Artificial Horizon.
- d) Write a short note on "Turn and Slip Indicator".

Q2. Attempt any three of the following:- (15)

- a) State the properties of a Polar Stereographic Chart.
- b) State the properties of an Oblique Mercator Chart.
- c) Solve the following:-
 - i) An aircraft is stationary at 50°N. Assuming the DGI has no random error and is corrected for apparent drift due to the earth's rotation at 50°N, calculate the hourly wander rate.
 - ii) An aircraft is stationary at 60°N. Calculate the hourly wander rate, for an uncompensated gyro.
- d) Write a short note on the erection system of an Directional Gyro Indicator.

Q3. Attempt any three of the following:- (15)

- a) State the occasions when a compass swing is required to be carried out?
- b) State the principle and operation of an Radio Altimeter.
- c) State any 5 modes of GPWS.
- d) Write a short note on permanent magnetism and soft iron magnetism.

Q4. Solve the following:- (15)

A/C 'A' leaves place 'X' 16°30'N 175°30'W at 0600 LMT on 14/05/2008 and flies due south at G/S of 200kts. Another a/c 'B' leaved from place 'Y' 05°00'S 155°00'W at 0600 LMT on 14/05/2008 and flies due east , eventually both aircraft's meet. Find:-

- a) Place of meeting
- b) G/S of second aircraft
- c) LMT and date of meeting
- d) GMT and date of meeting.

Q5. Solve the following:- (15)

- 1) LMT at 03°27' E is 1816, 18th April. What is LMT at 165° 32' E?
- 2) LMT at 179° 50'W is 2300, 15th December. What is LMT at 179° 50'E?
- 3) What is LMT and date at A (30°N 170°W) when it is 2020 LMT on 28th October at B (70°S 176°E)?
- 4) A/C "A" travels in westerly direction from 25°N 45°E at 0800 LMT at a ground speed of 200 kts. It flies for 4 hrs and reaches the destination "B". Find the following:-
 - a) Co-ordinates of "B".
 - b) LMT and UTC at "b" when aircraft reaches destination.

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Q1. Attempt any three of the following:- (15)

- a) State the limitations of an Directional Gyro Indicator.
- b) State the errors of a Directional Gyro Indicator.
- c) State the errors of an Artificial Horizon.
- d) Write a short note on "Turn and Slip Indicator".

Q2. Attempt any three of the following:- (15)

- a) State the properties of a Transverse Mercator Chart.
- b) State the limitations of an Artificial Horizon.
- c) Solve the following:-
 - i) An aircraft is stationary at 50°N . Assuming the DGI has no random error and is corrected for apparent drift due to the earth's rotation at 50°N , calculate the hourly wander rate.
 - ii) An aircraft is stationary at 60°N . Calculate the hourly wander rate, for an uncompensated gyro.
- d) Write a short note on the erection system of an Directional Gyro Indicator.

Q3. Attempt any three of the following:- (15)

- a) State the occasions when a compass swing is required to be carried out?
- b) State Kepler's Laws.
- c) State the principle of GPWS.
- d) Explain how is Windshear detected in an "EGPWS".

Q4. Solve the following:- (15)

A/C 'A' leaves place 'X' $16^{\circ}30'\text{N}$ $175^{\circ}30'\text{W}$ at 0600 LMT on 14/05/2008 and flies due south at G/S of 200kts. Another a/c 'B' leaved from place 'Y' $05^{\circ}00'\text{S}$ $155^{\circ}00'\text{W}$ at 0600 LMT on 14/05/2008 and flies due east , eventually both aircraft's meet. Find:-

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- 3) What is LMT and date at A (30°N 170°W) when it is 2020 LMT on 28th October at B (70°S 176°E)?
- 4) A/C "A" travels in westerly direction from 25°N 45°E at 0800 LMT at a ground speed of 200 kts. It flies for 4 hrs and reaches the destination "B". Find the following:-
 - a) Co-ordinates of "B".
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