

9AJ10

Time : 2½ Hours

Marks : 75

Instructions:

1. All questions are compulsory
2. Figures to right indicate marks.
3. Draw neat & labelled diagram wherever necessary.

Q.1 A. Attempt **any 04** of the following questions: (20)

1. Define the following:
(a) Cycle, (b) Hertz, (c) Amplitude, (d) Frequency, (e) Wavelength.
2. Solve the following:-
 - a) Wavelength is 3m, what is the frequency?
 - b) Frequency is 100 kHz, what is the wavelength?
 - c) Wavelength is 3 cm, what is the frequency?
 - d) Frequency is 1 GHz, what is the wavelength?
 - e) Wavelength is 10 km, what is the frequency?
3. Draw the table of the Radio spectrum along with wavelength and frequency.
4. Write a short note on Ground waves?
5. Draw the table of the Radio spectrum along with wavelength and frequency.

Q.2 Attempt **any 03** of the following questions: (15)

1. Explain the principle of operation of VOR?
2. Explain QDM, QDR, QTE and QUJ?
3. State the Marker beacons in ILS?
4. Explain the factors affecting VOR Range and accuracy.
5. State any 2 operational Categories of an ILS?

Q.3 Attempt **any 04** of the following questions: (20)

1. Explain and draw the Pitot - Static system in an aircraft.
2. Explain the principle of construction and working of a simple altimeter.
3. State the types of wander in a gyroscope.

Q.1. A 5 a) QDM = 090°, Hdg = 270°, QDR = ? , Rel brg = ?
b) QDR = 180°, Hdg = 090°, QDM = ? , Rel brg = ?

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4. Explain the principle of construction and working of a Machmeter.
5. State the advantages and disadvantages of electric and suction gyros.
6. Explain the effect of compressibility in the measurement of Air Temperature.

Q.4 Attempt any 04 of the following questions: (20)

1. State and explain the types of modulation of radio waves.
2. Explain skip distance, dead space in the propagation of a radio wave.
3. State the errors of an Air Temperature Measurement.
4. Explain the working of Search and rescue operation.
5. Write a short note on Super refraction?

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1AJ21

Time : 2½ Hours

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Q.1 Attempt either A or B

- A. 1. Write a short note on Visual Flight Rule & Special VFR. (10)
2. What all information should be mentioned in arrival report? (5)

OR

- B. 1. Differentiate between Distress Phase and Urgency Phase. (8)
2. Write a short note on navigation lights to be displayed on ground and in air. (7)

Q.2 Attempt either A or B.

- A. 1. Write a short note on Inadvertent changes to flight plan. (8)
2. What actions should be taken in case of weather deteriorating below VMC? (7)

OR

- B. 1. Write a short note on Intended changes to flight plan. (8)
2. Who has the Right of Way in case of converging aircraft at same level? (7)

Q3. Attempt either A or B.

- A. 1. Draw and explain ground air visual signals used by survivors. (5)
2. Draw and explain ground air visual signals used by rescue units. (10)

OR

- B. 1. What are procedures to be followed in case PIC observes another A/C or surface A/C in distress? (10)
2. Write a short note on Search and Rescue Equipment and its frequencies. (5)

Q.4 Attempt either A or B.

- A. Explain in brief classification of airspaces and also mention speed limitations, radio communication requirement and ATC clearances. (15)

OR

- B. Write in detail about Alerting Services. (15)

Q5. Define (Any 5)

- a. Minimum Safe Height.
- b. Cruising Levels.
- c. Horizontal Plane.
- d. Longitudinal axis of aeroplane.
- e. Area control service.
- f. Aerodrome control service.
- g. Air Taxiing
- h. Controlled Aerodrome.

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4AJ31

Time : 2½ Hours

Marks : 75

- Q.1 Attempt either A or B.
- A. 1. Define Radiation fog and what conditions favourable for formation are. 08
2. What time of the day does radiation fog occur? What kind of pressure pattern is associated with it? Which places it is found in India? 07

OR

- B. 1. Define Advection fog and what conditions favorable for formation are. 08
2. What is steaming fog and frontal fog? 07

- Q.2 Attempt either A or B.
- A. Define Thunderstorm. Explain life cycle of thunderstorm with diagram. 15

OR

- B. What all aviation hazards are associated with thunderstorm and explain any 3? 15

- Q.3 Attempt either A or B.
- A. 1. With neat label diagram explain tornado. 10
2. What are effects on aircraft associated with microburst? 05

OR

- B. 1. What do you understand by term Visibility, Slant Visibility and Vertical Visibility? 08
2. What does RVR stand for? When it is reported and how it is measured? 07

- Q.4 Attempt either A or B.
- A. 1. Write a note on cloud species. 10
 - 2. Define cloud ceiling and how is cloud base measured? 05

OR

- B. 1. Write a short note on flying conditions in clouds. 07
- 2. On what 2 basis are cloud classified. Explain both in detail. 08

- Q.5 Write a short note on **(Any 3)** 15
- a. High Clouds.
 - b. Medium Clouds.
 - c. Low Clouds
 - d. Icing associated with thunderstorm.

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6AJ41

Time : 2½ Hours

Marks : 75

- Q.1 Write a short note on any 3 of the following: 15
- a) Super Stall
 - b) Errors of ASI
 - c) Supercritical Wing
 - d) Acceleration and Turning Errors
 - e) Rigidity and Precession
- Q.2 Write a short note on any 3 of the following: 15
- a) Markings on an ASI
 - b) Effect of non-standard Temperature and Pressure on Altimeter
 - c) Turn and Slip Indicator
 - d) Approach Climb and Landing Climb
 - e) Coffin's Corner
- Q.3 Write a short note on any 3 of the following: 15
- a) Aperiodicity
 - b) Anti-Skid system
 - c) Tuck Under
 - d) VSI
 - e) Properties of a gyroscope
- Q.4 Write a short note on any 3 of the following: 15
- a) Define: QNH, QFE, QNE, QFF, V_{MCA}
 - b) Airspeed Indicator Markings
 - c) Normal Shock Wave
 - d) APU
 - e) IVSI

Q.5 Write a short note on any 3 of the following:

15

- a) Subdivisions of Aerodynamic Flow. Define M_{FS} and M_{CRIT} .
- b) Solve the following:
 1. An aircraft is stationary at $60^{\circ}N$. Calculate the hourly wander rate, for an uncompensated gyro.
 2. An aircraft is stationary at $50^{\circ}N$. Assuming the DGI has no random error and is corrected for apparent drift due to the earth's rotation at $50^{\circ}N$, calculate the hourly wander rate.
 3. What is the hourly drift rate of a DGI in an aircraft at $25^{\circ}S$, if the gyro has been corrected for $10^{\circ}N$?
 4. Suppose at Nairobi Airport (elevation 5500 ft) that the actual temp (SAT) is $+ 34^{\circ}C$. Calculate Density Altitude
 5. An aircraft has one altimeter set to QFE and one to aerodrome QNH 1000 mb. If the airfield elevation is 300 ft, immediately before take-off the altimeter with QFE set will read _____ and the other _____. If the QFE altimeter is set to 1013 mb when passing through the transition altitude 3000ft, it will read _____. (Assume 1 mb = 30 ft)
- c) Define: Altitude, Height, Transition Altitude, Transition Level, Transition Layer
- d) Vortex Generators
- e) Errors affecting Pressure Altimeter

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