DEPARTMENT OF AERONAUTICAL ENGINEERING

U20AE604 - Air Traffic Control and Planning

Two Marks Question with Answer

Unit - I

1. What is air traffic control?
   Air traffic control (ATC) is a service provided by ground-based controllers who direct aircraft on the ground and through controlled airspace, and can provide advisory services to aircraft in non-controlled airspace.

2. What is air traffic service?
   Air traffic service (ATS) is a service which regulates and assists aircraft in real-time to ensure their safe operations.
   In particular, ATS is to:
   - prevent collisions between aircraft; provide advice of the safe and efficient conduct of flights;
   - conduct and maintain an orderly flow of air traffic;
   - notify concerned organizations of and assist in search and rescue operations.

3. What are the Objectives of ATS?
   - Prevent collisions between aircraft
   - Prevent collisions between aircraft on the maneuvering area and obstructions on that area
   - Expedite and maintain an orderly flow of air traffic;
   - Provide advice and information useful for the safe and efficient conduct of flights.
   - Notify appropriate organizations regarding aircraft in need of search and rescue aid, and assist such organizations as required.

4. What is altimeter setting?
   Altimeter setting is the value of the atmospheric pressure used to adjust the sub-scale of a pressure altimeter so that it indicates the height of an aircraft above a known reference surface.[1] This reference can be the mean sea level pressure (QNH), the pressure at the nearby surface airport or the pressure level of 1,013.25 hectopascals (29.92 inches of mercury) which gives the standard flight levels

5. What are the basic types of flight rule?
   - VFR – (Visual flight rule)
   - IFR - (Instruments flight rule)

6. What is VHR?
   VHF Omni Directional Radio Range (VOR) is a type of short-range radio navigation system for aircraft, enabling aircraft with a receiving unit to determine their position and stay on course by receiving radio signals transmitted by a network of fixed ground radio beacons. It uses frequencies in the very high frequency (VHF) band from 108.00 to 117.95 MHz.

7. Define decision altitude or decision height.
   The Decision Altitude (DA) or Decision Height (DH) is a specified altitude or height in the Precision Approach or approach with vertical guidance at which a Missed Approach must be initiated if the required visual reference to continue the approach has not been established.
   Decision altitude (DA) is referenced to mean sea level and decision height (DH) is referenced to the threshold elevation.

8. What is the importance of ATC?
   An air traffic control applies separation rules to the aircraft that they direct. Separation rules are used to regulate the distance between airplanes and aircraft by requiring a minimum distance between them. This is to increase safety and reduce unnecessary risk for pilots and passengers.
   - prevent collisions between aircraft; provide advice of the safe and efficient conduct of flights;
   - conduct and maintain an orderly flow of air traffic;

- notify concerned organizations of and assist in search and rescue operations.

9. What is advisory airspace and advisory route?
   Advisory airspace is airspace of defined dimensions, or designated route, within which air traffic advisory service is available.
   Advisory route is a designated route along which air traffic advisory service is available

10. What is Air Traffic Advisory Service.
    Air Traffic Advisory Service is a service provided within advisory airspace to ensure separation, insofar as practical, between aircraft which are operating on IFR flight plans.

11. Explain Transition altitude,
    Transition Altitude-The altitude at or below which the vertical position of an aircraft is controlled by reference to altitudes and above which controlled by reference to flight level

12. Explain Transition level, and Transition layer.
    Transition Level-The lowest flight level available for use, above the transition altitude.
    Transition Layer-The airspace between the transition altitude and the transition level.

13. What are the three components of an ATS network? OR List the parts of ATC.
    - Air traffic control service,
      - Area control service:
      - Approach control service:
      - Aerodrome control service:
    - Flight information service and
    - Alerting service

14. How is airspace separated?

Controlled Airspace	Uncontrolled Airspace	Special Purpose Airspace
1. Class A 2. Class B	1. Class G 2. Class F	Prohibited areas Restricted areas

3. Class C 4. Class D 5. Class E		Warning areas Military operation areas (MOAs) Alert areas Controlled firing areas (CFAs) Special Conservation Areas

15. What is mean by controlled airspace?

Controlled airspace is airspace of defined dimensions within which air traffic control services are provided to IFR flights and to VFR flights in accordance with the airspace classification.

Controlled Airspace is a generic term which covers ATS airspace classes A, B, C, D, & E. Controlled Airspace includes Control Areas, Terminal Control Areas, Airways and Control Zones.

16. What is mean by uncontrolled airspace?

Uncontrolled airspace is airspace where an Air Traffic Control (ATC) service is not deemed necessary or cannot be provided for practical reasons. According to the airspace classes set by ICAO, both class F and class G airspace are uncontrolled.

17. Define air traffic flow management (ATFM)

ATFM is an enabler of **air traffic management** (ATM) efficiency and effectiveness. It contributes to the safety, efficiency, cost-effectiveness, and environmental sustainability of an ATM system. It is also a major enabler of global interoperability of the **air** transport industry.

18. What is mean by CNS/ATM?

CNS/ATM stands for Communications, Navigation and Surveillance Systems for Air Traffic Management. The system uses various systems including satellite systems, and varying levels of automation to achieve a seamless global Air Traffic Management system

19. Define Air traffic services reporting office.

A unit established for the purpose of receiving reports concerning air traffic services

20. Define Flight information region.
    Airspace of defined dimensions within which flight information service and alerting service are provided.

Unit - II

1. Define area control service.
   Area control service: the provision of air traffic control service for en-route controlled flights except the aircraft associated with arrival or departure routes or ground movements.
   The area control service shall be provided by area control centre or, where no area control centre is established, by the unit providing approach control service in a control area of limited extent.

2. What is the purpose of ATC clearance?
   A clearance issued by ATC is predicated on known traffic and known physical airport conditions. An ATC clearance means an authorization by ATC, for the purpose of preventing collision between known Aircraft, for an aircraft to proceed under specified conditions within controlled airspace.

3. Define VFR.
   Visual Flight Rules (VFR) are a set of regulations under which a pilot operates an aircraft in weather conditions generally clear enough to allow the pilot to see where the aircraft is going.
   VFR is the rules that govern the operation of aircraft in VMC (conditions in which flight solely by visual reference is possible).

4. Define Visual meteorological conditions (VMC).
   Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, equal to or better than specified minima

5. Define IFR.
   Instrument Flight Rules (IFR) are rules which allow properly equipped aircraft to be flown under instrument meteorological conditions (IMC).
   IFR flight depends upon flying by reference to instruments in the flight deck, and navigation is accomplished by reference to electronic signals.

6. Define Instrument meteorological conditions (IMC)
   Instrument meteorological conditions (IMC) is an aviation flight category that describes **weather conditions** that require pilots to fly primarily by reference to **instruments**, and therefore under **instrument** flight rules (IFR), rather than by outside visual references under visual flight rules (VFR).

7. Define Special VFR flight.
   A VFR flight cleared by air traffic control to operate within a control zone in meteorological conditions below VMC.

8. Define RNAV.
   RNAV is a method of navigation which permits the operation of an aircraft on any desired flight path; it allows its position to be continuously determined wherever it is rather than only along tracks between individual ground navigation aids.

9. Define RNP.
   Required navigation performance (RNP) is a type of performance-based navigation (PBN) that allows an aircraft to fly a specific path between two 3Ddefined points in space.
   RNP requires on-board navigation performance monitoring and alerting capability to ensure that the aircraft stays within a specific containment area.

10. Define Performance-based navigation (PBN).
    Area navigation based on performance requirements for aircraft operating along an
    ATS route, on an instrument approach procedure or in a designated airspace.

11. What is flight plan?
    Flight plans are documents filed by a pilot or flight dispatcher with the local Civil Aviation Authority (e.g. DGCA in the INDIA) prior to departure which indicate the plane's planned route or flight path.

12. What is the first step of flight plan?

Select aircraft (setup your own aircraft or use a demo aircraft). Enter airport of departure, airport of destination. Enter Date of **Flight** and Off Block Time (in UTC). Choose **Flight** Rules and Type of **Flight**.

13. What is position report?

Position reports are notifications given by a pilot to ATC to aide in controlling and accurate estimates of the progress of every aircraft operating on an IFR flight plan. Position report contains

- Aircraft identification
- Position
- Time
- Flight level or altitude
- Next position and time over
- Ensuring significant point.

14. Define 'Alerting service'.

Alerting service will accomplish the objectives of notifying appropriate organizations regarding aircraft in need of search and rescue aid.
Alerting service shall be provided:

- for all aircraft provided with air traffic control service
- in so far as practicable, to all other aircraft having filed a flight plan or otherwise known to the air traffic services
- to any aircraft known or believed to be the subject of unlawful interference

15. What are the various types of landing other than conventional landing?

Light aircraft landing situations, and the pilot skills required, can be divided into four types:

- Normal landings
- Crosswind landings - where a significant wind not aligned with the landing area is a factor
- Short field landings - where the length of the landing area is a limiting factor
- Soft and unprepared field landings - where the landing area is wet, soft or has ground obstacles

16. What is vertical separation?

    Vertical separation is obtained by requiring aircraft using prescribed altimeter setting procedures to operate at levels expressed in terms of flight levels or altitude in accordance with the provisions in ATS Surveillance System and aerodrome control procedures.

17. What is lateral separation?

    Lateral separation shall be applied so that the distance between aircraft is never less than a specified amount. It is achieved by requiring aircraft to fly on different tracks or in different geographical locations as determined by visual observations, the use of navigational aids or by the use of area navigation (RNAV) equipment.

18. Define Flight level.

    A surface of constant atmospheric pressure which is related to a specific pressure datum, 1013.2 hectopascals (hPa), and is separated from other such surfaces by specific pressure intervals.

19. What is ATC Clearances?

    Clearances are issued solely for expediting and separating air traffic and are based on known traffic conditions which affect safety in aircraft operation. The traffic conditions include:

    - aircraft in the air;
    - aircraft on the manoeuvring area;
    - vehicles on the manoeuvring area;
    - obstructions not permanently installed on the manoeuvring area.

20. Give an example for ATC Clearance.

    "United Four Seventeen descend and maintain six thousand."

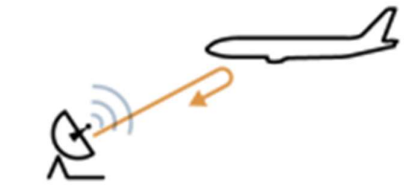
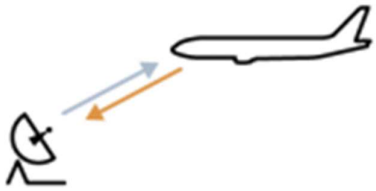
    NOTE-The pilot is expected to commence descent upon receipt of the clearance and to descend at the suggested rates until reaching the assigned altitude of 6,000 feet.

Unit – III

1. What is the basic principle of radar?
   A radar "radio detection and ranging" system transmits electromagnetic energy and analyzes the energy reflected back to it (by an object).

2. What is radar? Explain its types.
   A radar system makes use of high-speed electromagnetic waves to determine the location (distance), the velocity, the direction being travelled, and the elevation (altitude) of both stationary and non-stationary objects. These objects can include weather formations, motor vehicles, ships, aircraft, spacecraft, and even terrain.
   - Primary Surveillance Radar *(*PSR*)*
   - Secondary Surveillance Radar (SSR)

3. Distinguish between the primary and secondary radar.

Primary Radar *(*PSR)	**Secondary Radar (SSR)**
PSR Primary Surveillance Radar is a conventional radar sensor that illuminates a large portion of space with an electromagnetic wave and receives back the reflected waves from targets within that space.	A transponder (SSR) is a receiver/transmitter which will generate a reply signal upon proper interrogation; the interrogation and reply being on different frequencies.
	

4. What is ACAS?
   Airborne collision avoidance system or ACAS is an aircraft system based on secondary surveillance radar (SSR) transponder signals which operate independently of ground based equipment to provide advice to the pilot on potential conflicting aircraft that are equipped with SSR transponders

5. Mention the importance of ACAS
   The Airborne Collision Avoidance System II (ACAS II) was introduced in order to reduce the risk of mid-air collisions or near mid-

air collisions between aircraft. It serves as a last-resort safety net irrespective of any separation standards.

6. What is a flight information service?
   Flight information service providing advice and information useful for the safe and efficient conduct of flights. The information includes:
   - weather conditions reported or forecast at departure, destination and alternate aerodromes
   - collision hazards, to aircraft operating in airspace classes C, D, E, F and G

7. How PAR approach is used to control air traffic?
   Precision approach radar (PAR) is a type of radar guidance system designed to provide lateral and vertical guidance to an aircraft pilot for landing, until the landing threshold is reached. After the aircraft reaches the decision height (DH) or decision altitude (DA), guidance is advisory only.

8. Define Radio navigation service.
   A service providing guidance information or position data for the efficient and safe operation of aircraft supported by one or more radio navigation aids.

9. What is SIGMET?
   SIGMET or **Significant Meteorological Information** is a weather advisory that contains meteorological information concerning the safety of all aircraft. There are two types of SIGMETs - convective and non-convective.

10. What is AIRMET?
    AIRMET, or **Airmen's Meteorological Information**, is a concise description of weather phenomena that are occurring or may occur (forecast) along an air route that may affect aircraft safety. Compared to SIGMETs, AIRMETs cover less severe weather: moderate turbulence and icing, sustained surface winds of 30 knots or more, or widespread restricted visibility

11. Why VHF is not considered as a desirable frequency choice for a long range air surveillance radar?
    - Resolution in range and angle are poor due to narrow bandwidths and large beam widths.
    - This portion of electromagnetic spectrum is crowded with other than radar services.
    - Low altitude coverage ally poor.

12. Define navigation by dead reckoning?
    The position of the craft at any instant of time is calculated from the previously determined position, the speed of its motion with respect to earth along with the direction of its motion and the time elapsed.

13. What are the sources of errors in VOR system?
    - Ground station and aircraft equipment
    - Site irregularities
    - Terrain features
    - Polarization

14. What are the two types of radio ranges in use?
    - Low frequency four course radio range
    - VHF Omni directional radio range

15. Give the Secondary Radar systems.
    - DME (Distance Measuring Equipment)
    - TACAN (Tactical Air Navigation)

16. What is meant by Doppler navigation?
    It employs the Doppler Effect to determine the velocity of the craft in a frame of coordinates fixed with respect to the aircraft.

17. What are the types of landing aids?
    - Instrument landing system
    - Microwave Landing system
    - Ground controlled approach.

18. Define SHORAN?

Short Navigation System is a secondary radar system in which fix is obtained by the craft, which carriers the interrogator, by simultaneously interrogating two ground beacons.

19. What is meant by Doppler navigation?

It employs the Doppler Effect to determine the velocity of the craft in a frame of coordinates fixed with respect to the aircraft

20. What is meant by Localizer?

The localizer operates in the VHF band (108-110 MHZ) and consists of a transmitter with an antenna system. The radiation of which has two lobes, one with a predominant modulation of 90 Hz and other with 150 Hz.

Unit – IV

1. Define Aerodrome.

Aerodrome A defined area on land or water (including any buildings, installations, and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

2. What is aerodrome data?

Aerodrome data includes

- Aerodrome chart
- Aerodrome location.
- Aerodrome reference point
- Aerodrome reference code
- Aerodrome reference temperature
- Aerodrome elevation

3. Define aerodrome reference point.

The aerodrome reference point shall be located near the initial or planned geometric centre of the aerodrome and shall normally remain where first established. The position of the aerodrome reference point shall be measured and reported to the aeronautical information services authority in degrees, minutes and seconds.

4. Define aerodrome reference code.
   An aerodrome reference code — code number and letter — which is selected for aerodrome planning purposes shall be determined in accordance with the characteristics of the aeroplane for which an aerodrome facility is intended.

5. Define aerodrome reference temperature.
   The aerodrome reference temperature shall be the monthly mean of the daily maximum temperatures for the hottest month of the year (the hottest month being that which has the highest monthly mean temperature). This temperature shall be averaged over a period of five years.

$$T_a + \frac{T_m - T_a}{3},$$

6. Define aerodrome elevation.
   Aerodrome elevation is the Elevation of the highest point of the landing area is reported as Aerodrome elevation. Aerodrome elevation is reported in meters, to an accuracy of one-half meter.

7. Define Aeroplane reference field length.
   The minimum field length required for take-off at maximum certificated take-off mass, sea level, standard atmospheric conditions, still air and zero runway slope, as shown in the appropriate aeroplane flight manual prescribed by the certificating authority or equivalent data from the aeroplane manufacturer. Field length means balanced field length for aeroplanes, if applicable, or take-off distance in other cases.

8. What is the length of primary runway?
   A runway of at least 6,000 ft (1,829 m) in length is usually adequate for aircraft weights below approximately 200,000 lb (90,718 kg). Larger aircraft including wide-bodied will usually require at least 8,000 ft (2,438 m) at sea level and somewhat more at higher altitude airports.

9. Explain the three cases to be considered in basic runway length.
   - **Elevation correction** - 7% per 300 meter rise above the mean sea level.
   - **Temperature correction** -1% for every 1 degree centigrade rise at airport reference temperature above the standard atmospheric temperature at that elevation.
   - **Gradient correction**- 20% for every 1% of effective gradient.

10. Distinguish between the primary and secondary runways.

Primary runway	Secondary runways
It is designated as main runway	It is an emergency runway
Primary runway serve as instrument runway	It provides additional wind direction coverage or the capacity to expedite traffic handling.

11. Define ILS

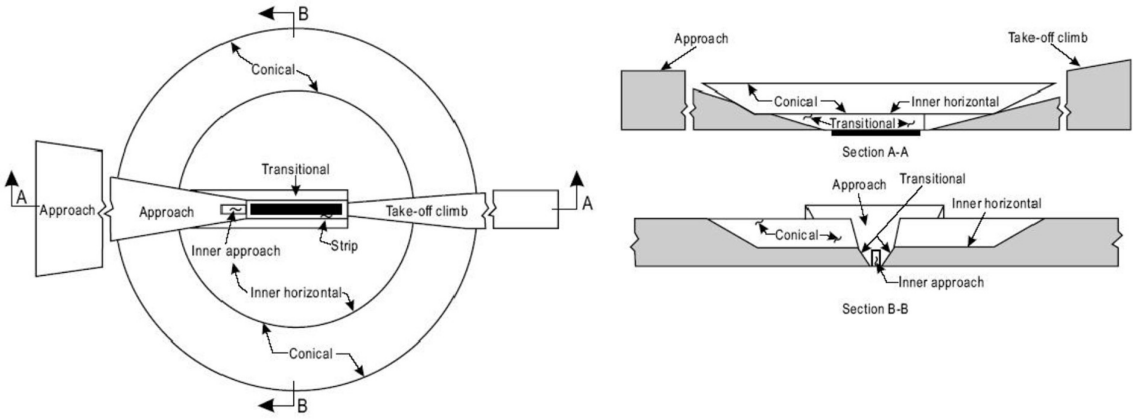
    An instrument landing system operates as a ground-based instrument approach system that provides precision lateral and vertical guidance to an aircraft approaching and landing on a runway, using a combination of radio signals and, in many cases, high-intensity lighting arrays to enable a safe landing during instrument meteorological conditions (IMC), such as low ceilings or reduced visibility due to fog, rain, or blowing snow.

12. Mention different categories of airport.
    - International commercial service airport
    - Non primary Commercial Service Airports or
    - Domestic service airport
    - Cargo service airport
    - Defence airport
    - Private owned airport or non public airport

13. Why there should be obstacle restriction?

    The Obstacle Limitation Surfaces (OLS) are a series of surfaces that define the limits to which objects may project into the airspace. In order conducted safely and to prevent the aerodromes from becoming unusable by the growth of obstacles around the aerodromes.

14. What are the patterns followed in obstacle restriction?
    - Primary surface
    - Approach surface
    - Transition surface
    - Horizontal surface
    - Conical surface



15. Define Clearway.

    A defined rectangular area on the ground or water under the control of the appropriate authority, selected or prepared as a suitable area over which an aeroplane may make a portion of its initial climb to a specified height

16. What is meant by Dependent parallel approaches?

    Simultaneous approaches to parallel or near-parallel instrument runways where radar separation minima between aircraft on adjacent extended runway centre lines are prescribed.

17. What is Non-precision approach runway?

    An instrument runway served by visual aids and a non-visual aid providing at least directional guidance adequate for a straight-in approach.

18. What is Precision approach runway, category?

    An instrument runway served by ILS and/or MLS and visual aids intended for operations with a decision height not lower than 60 m (200

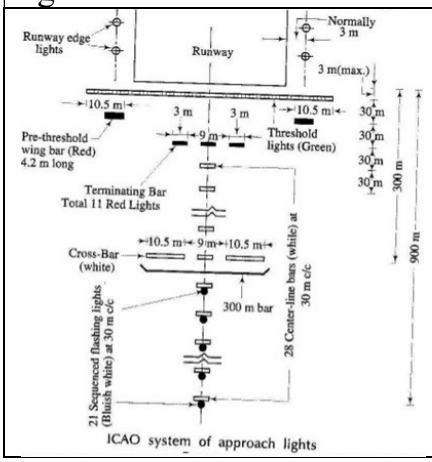
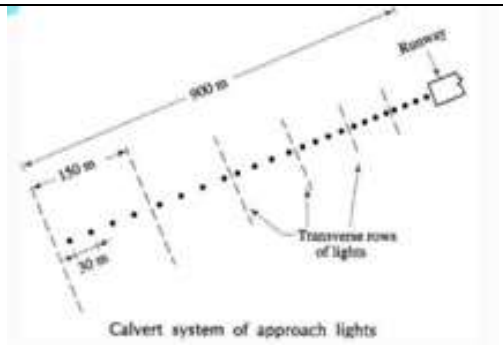
ft) and either a visibility not less than 800 m or a runway visual range not less than
550 m.

19. Define Declared distances.
    - *Take-off run available (TORA).* The length of runway declared available and suitable for the ground run of an aeroplane taking off.
    - *Take-off distance available (TODA).* The length of the take-off run available plus the length of the clearway, if provided.
    - *Accelerate-stop distance available (ASDA).* The length of the take-off run available plus the length of the stop way, if provided.
    - *Landing distance available (LDA).* The length of runway which is declared available and suitable for the ground run of an aeroplane landing.

20. Define Obstacle free zone (OFZ).
    The airspace above the inner approach surface, inner transitional surfaces, and balked landing surface and that portion of the strip bounded by these surfaces, which is not penetrated by any fixed obstacle other than a low-mass and frangibly mounted one required for air navigation purposes.

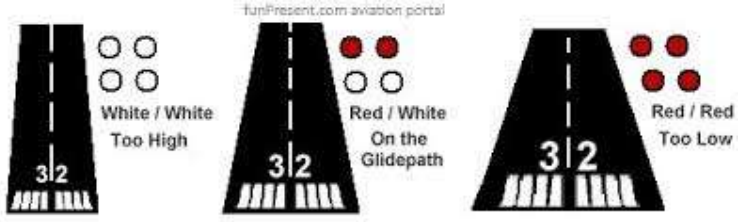
Unit – V

1. Distinguish between ICAO system and calvert system.

ICAO system	Calvert system
Only one crossbar 300m from the threshold	Six transverse rows light placed at a distance 150m
Roll guidance is principally provided by transverse rows of lights.	Roll guidance is provided by bar 4.2m in length, placed at distance 30m
 ICAO system of approach lights	 Calvert system of approach lights

2. What is VASI?

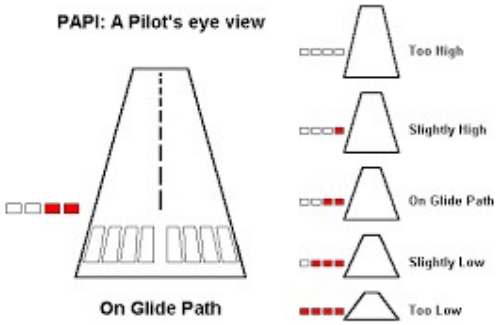
   The **visual approach slope indicator** (**VASI**) is a system of lights on the side of an airport runway threshold that provides visual descent guidance information during approach. These lights may be visible from up to 8 kilometres (5.0 mi) during the day and up to 32 kilometres (20 mi) or more at night.



3. What is PAPI?

   A **precision approach path indicator** (**PAPI**) is a visual aid that provides guidance information to help a pilot acquire and maintain the correct approach (in the vertical plane) to an **airport** or an aerodrome. It

is generally located beside the runway approximately 300 meters beyond the landing threshold of the runway.



4. What are the six groups of the airport markings?
   - Runway designation
   - Centerline
   - Threshold markers
   - Touchdown zone
   - Side stripes
   - Shoulder line

5. What is aerodrome beacon and where it is located?
   An aerodrome beacon or rotating beacon is a beacon installed at an airport or aerodrome to indicate its location to aircraft pilots at night.
   An aerodrome beacon is mounted on top of a towering structure, often a control tower, above other buildings of the airport. It produces flashes similar to that of a lighthouse.

6. What is the purpose of aerodrome beacon lights?
   An aerodrome beacon or rotating beacon is a beacon installed at an airport or aerodrome to indicate its location to aircraft pilots at night.
   - White and Green — Lighted land airport
   - White and Yellow — Lighted water airport
   - Green, Yellow, and White — Lighted heliport
   - White, White, Green — Military Airport
   - White, Green, Amber — Hospital and/or Emergency Services Heliport

7. What are the minimum lighting requirements for an aerodrome?
   - Runway lighting
   - Taxiway lighting
   - Threshold lighting
   - Approach lighting
   - Aerodrome beacon

8. List the types of color of marking used in runways.
   Markings for runways are white.
   Markings defining the landing area on a heliport are also white except for hospital heliports which use a red "H" on a white cross.
   Markings for taxiways, areas not intended for use by aircraft (closed and hazardous areas), and holding positions (even if they are on a runway) are yellow.

9. Name some visual aid for wind direction.
   - Wind socks
   - Wind cone
   - Tetrahedron
   - Wind tee

10. Define Runway guard lights.
    A light system intended to caution pilots or vehicle drivers that they are about to enter an active runway.

11. What are ICAO standard markings?
    - Runway-Holding Position Markings
    - Intermediate Holding Position Markings
    - ICAO Sign Characteristics
    - Mandatory Instruction Signs
    - Mandatory Instruction Marking
    - Surface Painted Signs

12. What is the purpose of windsocks?
    Windsocks are used to tell **wind** speed and the **direction** of the **wind** speed itself. Windsocks typically are used at **airports** to

indicate the **direction** and strength of the **wind** to pilots and at chemical plants where there is risk of gaseous leakage.

13. Explain the general requirements for marking of airport?

Markings for runways are white. **Markings** defining the landing area on a heliport are also white except for hospital heliports which use a red "H" on a white cross. **Markings** for taxiways, areas not intended for use by aircraft (closed and hazardous areas), and holding positions (even if they are on a **runway**) are yellow.

14. What is approach lighting system?

An approach lighting system, or ALS, is a lighting system installed on the approach end of an airport runway and consisting of a series of light bars, strobe lights, or a combination of the two that extends outward from the runway end.

15. Define REIL

Runway end identifier lights (REIL) are installed at many airports to provide rapid and positive identification of the approach end of a particular runway. The system consists of a pair of synchronized flashing lights located laterally on each side of the runway threshold. REILs may be either omnidirectional or unidirectional facing the approach area.

16. What is Decision bar?

Decision bars are always located 1000′ farther away from the threshold in the direction of the arriving aircraft, and serve as a visible horizon to ease the transition from instrument flight to visual flight.

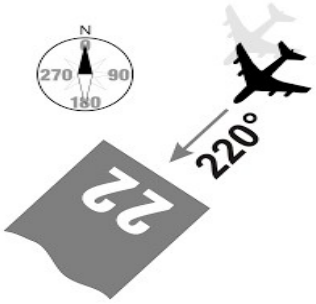
17. What is Runway edge lighting

Runway edge lighting is used to outline the edges of runways during periods of darkness or restricted visibility conditions. These light systems are classified according to the intensity they are capable of producing:

- High intensity runway lights (HIRL)
- Medium intensity runway lights (MIRL)
- Low intensity runway lights (LIRL)

18. Define runway designator

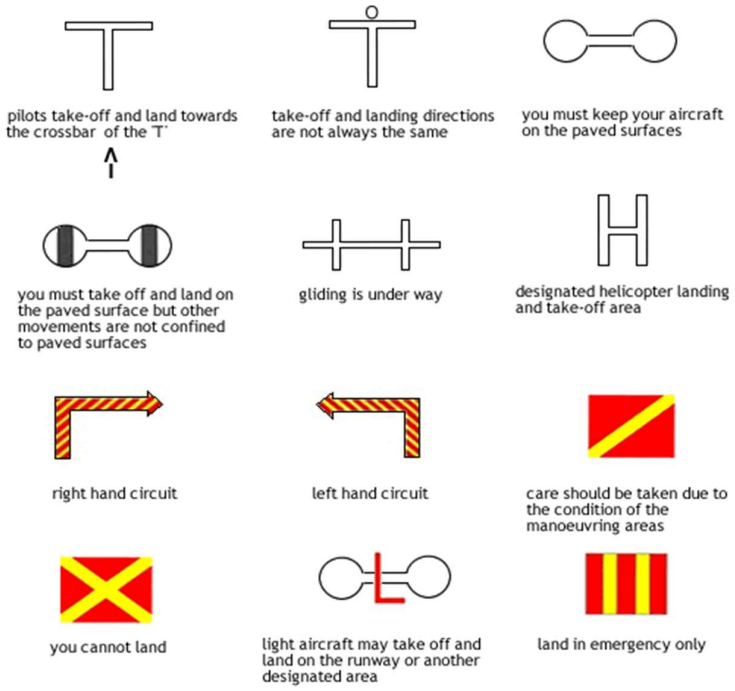
A runway designator consists of a two-digit number, which is the whole number nearest to one tenth of the magnetic North when viewed from the direction of approach. For example, if the azimuth of the centreline is 220 then the runway designator will be 22



19. State the characteristic of signaling area.

The Signal Square, or signal area, contained symbols to indicate visually to over-flying aircraft conditions on the aerodrome.

- It had sides 40 feet long, with a white-painted border.
- The surface inside the square was smooth and level, surfaced in bitumen, ashes, sealed gravel, turf or even bare earth.
- There were four basic signals; the red square signal, the dumb bell signals, the landing T, and the right hand circuit indicator.



20. Explain Runway threshold markings

Runway threshold markings identify the beginning of the runway that is available for landing and come in two configurations: They either consist of eight longitudinal stripes of uniform dimensions disposed symmetrically about the runway centerline, or the number of stripes is related to the runway width.

DEPARTMENT OF AERONAUTICAL ENGINEERING
PART -B QUESTIONS
U20AE604 - AIR TRAFFIC CONTROL AND PLANNING

Q.No.	QUESTIONS	
	UNIT-I	
	BASIC CONCEPTS	
1.	Explain the objectives, parts and scope and provision of ATS service. **(APR 2016)**	**13**
2.	Discuss in detail about scope and provision of ATC? **(May/June 2013)**	
3.	Write a note on,	
	(i) VFR operations.	**8**
	(ii) IFR operations. **(Nov/Dec 2013) (Nov/Dec 2016)**	**8**
4.	Describe the classification of ATS airspaces with neat diagrams. **(Nov/Dec 2017)**	**13**
5.	What are the various kinds of separation followed by ATS services? **(May/June 2012)**	**13**
6.	Explain in detail about altimeter setting procedures and its working. **(Nov/Dec 2013) (Nov/Dec 2016) (Nov/Dec 2015)**	**10**
7.	Explain the Division of responsibility of control.	**10**
8.	Explain briefly about establishment, designation and identification of units providing ATS. **(May/June 2012)(Nov/Dec 2015) (May/June 2012)**	**13**
9.	What are the four operation positions in a control tower and what are the duties assigned to each? **(Nov/Dec 2011)**	**13**
10.	Discuss the ways of Airspace control is set up **(May / June 2012)**	**13**
	UNIT-II	
	AIR TRAFFIC SERVICES	
1.	Explain Area control services assigned from Air Traffic Services.	**10**

2. Explain the assignment of cruising levels minimum flight altitude. **10**

(APR 2016) (Nov/Dec 2017)

3. Explain ATS routes and significant points.

(APR 2016)

4. Explain the concepts of,

(i) RNAV **8**

(ii)RNP **8**

(Apr/ May 2015) (Nov/Dec 2016)

5. Explain the procedures of lateral and longitudinal separations based on distance and time. **13**

(Nov/Dec 2015) (Nov/Dec 2016)

6. Discuss briefly about Flight plans **8**

(Nov/Dec 2015)

7. Discuss briefly about Position report **8**

(Apr/ May 2015)

8. Write a note on ATC clearance **10**

(May/June 2013) (Nov/Dec 2015) (Nov/Dec 2016) (Nov/Dec 2017)

9. How do military and civilian ATC coordinate themselves? **13**

(Nov/Dec 2011)

10. What is the purpose of holding pattern and what are the variables affect the size of holding pattern? **13**

(Nov/Dec 2011)

UNIT-III
FLIGHT INFORMATION SERVICES

1. What is mean by RADAR? Explain the basic RADAR terminologies and RADAR services used for flight information services. **13**

(APR 2016)

2. Explain the use of radar in the approach control service on an ATC

(Nov/Dec 2015) (APR 2016)

3. Explain in detail about primary and secondary RADAR identification procedures. **13**

(Nov/Dec 2015) (Nov/Dec 2016) (Nov/Dec 2017)

4. Explain,

(i) Rules of air. **8**

(May/June 2013)

(ii)Alerting services. **8**

(May/June 2012)

5. Write short note on Flight Information and advisory service. **8**

(May/June 2013) (Apr/May 2015) (Nov/Dec 2016)

6. Write short note on advisory service.

(May/June2012)

7. Write short note on Co-ordination and emergency procedure. **8**

9. Explain the coordination between radar and non-radar control

(Nov/Dec 2017)

10. What are the precautions takes for emergency belly landing, when there is no enough runway length? **13**

(May /June 2012)

UNIT-IV
AERODROME DATA

1. Explain Aerodrome data

(i) Aerodrome reference code. **4**

(ii) Aerodrome reference point. **4**

(iii) Aerodrome reference temperature **4**

(iv) Aerodrome elevation. **4**

(APR 2016)

2. Explain Instruments runways. **8**

(Nov/Dec 2015)

3. Explain Obstacle restriction. **8**

(APR 2016) (Nov/Dec 2016)

4. Explain the length calculations and basic needs of primary and secondary runway. **13**

(Nov/Dec 2015) (Nov/Dec 2016)

5. What are the physical characteristics of primary, secondary and parallel runways? **13**

(May/June 2013) (Nov/Dec 2017)

6. Describe with a neat sketch a typical runway and mark its salient features **13**

(Apr/May 2015)

7. Describe the concepts of runway width and minimum distance between parallel runways. **13**

(Nov/Dec 2015) (Nov/Dec 2017)

8. Explain the primary and secondary runway specification with color codes. **13**

(Nov/Dec 2016)

9. Calculate the actual length of the runway form the following data **13**
Airport Elevation: RL100
Airport reference temperature: 28^0C
Basic length of runway: 600m
Highest part along the length: RL 98.2
Lowest point along the length: RL 95.2

(APR/MAY 2010)

10. Describe the procedure for the design of aerodrome. **13**

(APR/MAY 2010)

UNIT-V
NAVIGATION AND OTHER SEVICES

1. Explain in detail about the Visual aids for navigation wind director indicator. **8**
(Apr/May 2015) (Nov/Dec 2015) (Nov/Dec 2016) (Nov/Dec 2017)

2. Explain in detail about the Landing direction indicator. **8**

(May/June 2013)

3. Briefly discuss various the various requirements of an airport markings system and lights systems **13**

(Nov/Dec 2016)

4. Explain in detail VASI and PAPI. **13**

(May/June 2013) (Apr/May 2015) (APR 2016)

5. Elaborate the Simple approach lighting system and various lighting systems used in aerodromes. **13**

(Nov/Dec 2015) (Nov/Dec 2017)

6. Explain,
(i) Visual aids for denoting obstacles. **8**
(ii) Objects to be marked and lighter **8**

7. What is Aerodrome beacon? **10**

(May/June 2013)

8. Explain the working of the precision Approach Path Indicator **13**

(APR 2016)

9. Explain the landing procedure with various lighting system **13**

(Nov/Dec 2011)

10. Explain in detail about the **13**
(i) Airway aids and the terminal aids
(ii) External aids and Internal aids

(APR/MAY 2010)