

**INDIA METEOROLOGICAL
DEPARTMENT
QUESTION BANK
OF
ADVANCED METEOROLOGICAL
TRAINING COURSE (AMTC)
SEMESTER-I EXAMINATION
BASED ON 174-181 BATCHES
(2013-2021)**

**PAPER-VII: OBSERVATIONAL
SYSTEMS**

**India Meteorological Department
Meteorological Training Institute
Advanced Meteorological Training Course
SEMISTER-I
PAPER- VII: Observational Systems**

Q. 1 Fill in the blanks

1. ----- is an instrument used for measurement of the duration of bright sunshine during a day.
2. _____ and _____ chemicals are used for generation of Hydrogen economically.
3. _____ is the instrument used for the detection of cloud base height in an airport.
4. _____ is used for the purpose of continuous monitoring of wind direction and wind speed only, at the touch down zone of the runway.
5. _____ Gas is normally used at India for Radio sonde.
6. radiometers are used as primary standard for calibrating secondary std. radiation instruments.
7. 1 Knot = -----Kmph.
8. Accuracy required in measurement of upper air pressure from surface upto 100hPa, as per WMO is _____HPA.(1hpa/2hpa/1.5hpa)
9. Allard's law is applicable to the _____ of lights.
10. An altimeter will show the altitude as _____ if the aircraft is standing on the runway and its setting is done according to QFE.
11. An onshore wind sets in late morning is called _____.
12. Anemometer measure_____. (Wind speed, Air density, Wind direction)
13. At Tropopause the Air temperature almost remain _____
14. Basic sensor in GPS Radio sonde for finding upper air winds is _____.(GPS/ Pressure sensor)
15. black body isabsorber of radiation.

16. Carbon dioxide traps and reradiates it.
17. Chemicals used for generation of Hydrogen are _____.
18. Cloud direction are measured in ----- point of compass.
19. Datum point is an object whose _____ is already known.
20. Degree of hotness and coldness of the body is called as--- ----- .
21. For recording of rainfall we use _____.
22. For RVR measurements, the instruments to be kept at a lateral distance of _____ from the central line of the runway.
23. For safety of Aircraft, Takeoff / Landing is always happen _____
24. For upper air observations the _____ and _____ gas are used to fill the Balloon.
25. GPS Radiosonde computes upper air winds from _____ .
26. Height of Optical unit of RVR Instrument should be _____ meters above
27. IMD has a network of Stations in its RS/RW upper air network.
28. In GPS Radio sonde pressure sensor is also used to have better accuracy at _____ (Lower Levels / Higher levels).
29. In PPAA part of the P.B. message, wind data of the std. hpa level up to _____ hpa level are
30. In Temp code TTAA stands for _____ (Standard / significant) levels of upper air.
31. Instrument called ----- for measuring the direction of movement of cloud.
32. Leveling of theodolite is necessary for getting correct _____ angle.
33. Maximum wind level should be situated above _____ hpa level.
34. Maximum wind speed measured by Doppler radar is _____ .
35. METAR/SPECI prepared from _____ (1min/2min/3min/10min) average of
36. MOR is _____ .
37. On a Fog conditions, if an observer at Runway is able to view & counts Five Runway Lights Runway Visual Range is _____ meters, assuming two successive Lights are separated by distance of 60mts.
38. One of the WMO GUAN standard station in IMD's upper air network is Portblair / Srinagar / Chennai / Goa (Choose correct one).

39. Order of Observations: (1) (2) (3) (4)
40. Pilot Balloon observations gives upper Air _____(Wind/ Temperature/ Pressure).
41. Pyrheliometer with solar tracker is used to measure _____.
42. QFE is the Atmospheric pressure at _____(Runway Touch Down / MBR/ ATC) and QNH is the Atmospheric pressure at _____(Mean sea level as per ICAO atmosphere/ Atmospheric Pressure at airport/ Pressure at Runway Touch Down)
43. Radar cross section is _____ of wavelength.
44. Rim of the non-recording raingauge should be exactly horizontal and remain at height of -----.
45. Runway Visual Range (RVR) reported is representative of _____ (Runway Touch Down / Whole Runway Complex).
46. Runway visual Range depends on Transmittance,_____ & _____.
47. Stevenson Screens are shades for exposing_____ in a Meteorological
48. Sunshine duration is measured by _____.
49. Surface observations taken before release of Radiosonde balloon and are used in computations of upper air parameters. The Surface observations used for computing upper air parameters are called _____. (Base Check / Pre ascent Check)
50. The antenna used in IMS-1500 system is ofType.
51. The balloon is tracked initially through the _____ telescope for a few minutes.
52. The fall of temperature continues up to ----- which is a transition layer which separates a warm stratosphere which lies above it.
53. The GPS based radiosounding system operates at frequency.
54. The line joining projection of moving balloon horizontally is known as _____of the balloon.
55. The Stevenson's screen door opening to the north in ----- and south in -----.
56. The unit employed for reporting pressure for meteorological purposes is the hecto-Pascal which is defined as equal to ----- dynes/Sq. Cm.
57. When wind direction is 269 and speed is 115 knots the group ddfff in PB message is reported as _____.

58. When wind direction is 272 and speed is 115 knots the group ddfff in PB message is reported as _____.
59. Wind is measured with reference to ----- of compass in Knots or Kmph.
60. In Fortin barometer pressure is read in ----- .
61. In kew pattern barometer pressure is read in-----..
62. In minimum thermometer ----- is used as sensing liquid.
63. Instrument used to measure diffuse Radiation is.....
64. -----is an instrument used for measurement of the duration of bright sunshine during a day.
65. 1hpa= -----InHg.
66. Levelling of theodolite is necessary for getting correct _____ angle.
67. Rim of the non-recording raingauge should be exactly horizontal and remain at height of -----.
68. The balloon is tracked initially through the _____ telescope for a few minutes.
69. The elevation angle is denoted by _____.
70. The line joining projection of moving balloon horizontally is known as _____of the balloon.
71. The Thermometer Screen's door opening to the north and at such a height that the bulbs of the wet and dry bulb thermometer shall be between ----- and ----- metres above the ground.
72. When wind direction is 271 and speed is 115 knots the group ddfff in PB message is reported.
73. Mercury barometer is used to measure _____. (atmospheric pressure, air
74. Mercury barometers are calibrated at a temperature of -----.
75. Meteorological visibility generally refers to the _____ of atmosphere.
76. Ozone absorbs ultraviolet radiation which _____it up in _____ parts of the layer.
77. Pan Evaporimeters are used for measurement of _____. (Sunshine, air turbulence, Average water density, Evaporation of water)
78. Precipitation is expressed as the ----- to which it would cover a horizontal projection of the earth's surface.
79. Pyrgometer is used for measurement of

80. Radiosonde observations are taken globally twice in a day at timings _____ and _____ UTC (GMT).
81. Surface observations taken before release of Radiosonde balloon and are used in computations of upper air parameters. The Surface observations used for computing upper air parameters are called _____.(Base Check / Pre ascent Check)
82. The density of moist air is ----- than that of the dry air.
83. The C.G.S. unit of the atmospheric pressure is -----.
84. The dry bulb thermometer measures temperature of -----.
85. The end of the mercury column is curved and this surface is known as -----.
86. The hair hygograph is an instrument which gives a continuous record of the -----.
87. The instrument used for measuring the visibility is ----- .
88. The mechanism of SRRG is based on ----- action.
89. The pressure of the atmosphere at any point is the -----which stand vertically above the unit area with the point as its centre.
90. The pressure of the atmosphere at any point is the -----which stand vertically above the unit area with the point as its centre.
91. The smaller collector has a diameter of ----- mm corresponding to 100 sq. cm. and the bigger one is of -----mm diameter corresponding to 200 sq.cm.
92. The smaller collector has a diameter of ----- mm corresponding to 100 sq. cm. and the bigger one is of -----mm diameter corresponding to 200 sq.cm.
93. The Stevenson's screen door opening to the north in -----hemisphere.
94. The Stevenson's screen door opening to the north in -----and south in -----
95. Non recording raingauge collector has a diameter of 112.9 mm corresponding to area of -----.
96. The balloon is tracked initially through the _____ telescope for a few minutes.
97. The smaller collector has a diameter of ----- mm corresponding to 100 sq. cm. and the bigger one is of -----mm diameter corresponding to 200 sq.cm.
98. Datum point is an object whose _____ is already known.
99. During the night P.B. observation _____ is attached to the balloon.
100. Maximum wind level should be situated above _____ hpa level.
101. When the sky is clear _____ colour balloon is used for PB ascent.

102. When wind direction is 271 and speed is 110 knots the group ddfff in PB message is reported as _____.
103. Minus 40° F temperature = -----° temperature
104. The rim of the raingauge should be exactly horizontal and remain at a height of ----- cm. above the ground level.
105. We use pyrhelimeter for measuring
106. The sensor used in Thermoelectric pyrhelimeter is
107. The wavelength range of visible solar radiation is.....
108. The pressure of the atmosphere at any point is the ----- which stands vertically above unit area with the point at its centre.
109. The unit employed for reporting pressure for meteorological purposes is the hecto-Pascal which is defined as equal to ----- dynes/Sq. Cm.
110. Under the standard conditions, a column of mercury of 760mm exerts a pressure = -----
111. Upper Air observations are taken globally at _____ and _____ UTC.
112. UV B radiation is very _____ for living being.
113. When wind direction is 277 and speed is 115 knots the group ddfff in PB message is reported as _____.
114. Wind direction is determined with reference to _____ points of compass
115. Wind is defined as air in motion and is expressed in terms of -----and-----
116. Wind is Displayed/ reported to ATC should of _____ 1min/2min/10min
117. Wind is measured with reference to ----- of compass in Knots or Kmph.
118. With the help of wet bulb temperature and -----temperature and by using Hygrometric table we get humidity and dew point temperature.
119. WMO Accuracy for measurement of Atmospheric Pressure from Surface to 100hpA level is _____ (1hpA/0.5hpA/2hpA)

Q. 2 *State with brief reasons whether the following are true or false*

1. 77XXXX in TTAA indicates pressure level at which Maximum wind,
2. A tail with flags is attached with the balloon during day time P.B. observation.
3. Atm Pressure computed by GPS Radiosonde is more accurate at Higher Altitudes.
4. Before drawing the trajectory a suitable scale should be chosen
5. Caustic Soda and Ferro silicon are used for generation of Hydrogen.
6. Cloudy nights are normally warmer.
7. Constant rate of ascent is assumed for day PB ascent.
8. Cumulonimbus clouds have a flat top.
9. Datum point determination is necessary.
10. Dry air is heavier than that of the moist air.
11. Dry bulb thermometer measures temperature of surrounding air.
12. For computation of MOR by Transmissometer, the Contrast of Threshold is taken as 5%.
13. For computation of Runway Visual Range Meteorological Optical Range, Runway Light
14. For the purpose of take off and landing of aircrafts, headwind components are preferred.
15. Good land marks are of dark colour.
16. GPS based systems are semi-automatic systems.
17. GPS Radiosonde compute upper air Winds from Positional Co-ordinates Latitude, Longitude and Altitude
18. GPS Radiosonde computes Upper air Pressure from Temperature & Altitude of the flight.
19. Height of ORG is kept at 30cm agl.
20. High clouds may be reported when sky is overcast with low cloud.
21. Hydrogen gas to be filled in balloon with Radio sonde payload up to Free lift.
22. In analog CWIA, hygroclip is used as the sensor for temperature and dewpoint.
23. In Kew Pattern barometer pressure is read in inches.
24. In Minimum thermometer, alcohol is used as sensing liquid.

25. In P.B. message 50 is added in date (YY)
26. In P.B. message 55 is added in date (YY)
27. In P.B. message 60 is added in date (YY)
28. Intensity and Back Ground Luminance are required.
29. K-index is computed by the GPS Radiosonde. When K-index exceeds 30, The atmosphere is Warm and Moist in lower levels and relatively cool at higher levels at 500hPa. When it reaches 41 indicate strong possibility of Thunderstorm.
30. K-index is computed by the GPS Radiosone. When K-index exceeds 30, The atmosphere is Warm and Moist in lower levels and relatively cool at higher levels at 500hPa. When it reaches 41 indicate strong possibility of Thunderstorm.
31. Land marks used for measurement of visibility during day time only are used in night.
32. Lightning occurs in stratus cloud
33. Lightning occurs in Stratocumulus (Sc) cloud.
34. Lightning occurs in stratus cloud.
35. Maximum thermometer is kept in slightly tilted position.
36. Mercury is being used in thermometers.
37. Minimum thermometer is filled with mercury.
38. Pyranometer is only thermopile based instruments for measurement of short wave Radiation.
39. Rate of rainfall is less than 4 mm per hour in heavy rain.
40. Severe Weather Threat Index (SWEAT) >300 corresponds to Severe Thunderstorms.
41. Severe Weather Threat Index (SWEAT) is one of the product of GPS Radiosond
42. SODAR system works on Microwave Frequencies.
43. Solar radiation is long wave radiation.
44. Solar tracker is being used for measure Direct solar radiation.
45. Some countries use Helium in the place of Hydrogen as the gas is non hazardous.
46. The direction of door opening of Stevenson screen is north in the Northern hemisphere.

47. The direction of door opening of Stevenson screen is north in the Northern hemisphere.
48. The code 77PPP dddff represents the maximum wind speed “ff” in direction “ddd” at pressure level PPP.
49. The direction of door opening of Stevenson screen is north in the Northern hemisphere.
50. The roof of Stevenson screen is double louvered
51. The sensor used in UV A radiometer is thermopile.
52. There should be at least one datum point in each direction quadrants of the P.B. observatory.
53. Tracking of pilot balloon (PB) in optical theodolites is a fully automatic observation.
54. TTAA temp code gives Upper air information for all standard levels up to 100hpA.
55. TTBB denotes Upper Air Significant Weather Data
56. Upper Air computation software interpolates as per WMO standards the missing interval data.
57. UV (Ultra Violet) radiation is harmful.
58. UV Radiation has thermopile used solar radiation instruments.
59. Water bottle of wet bulb thermometer should be place below the bulb of the
60. Wet bulb temperature gives in conjunction with the dry bulb temperature, the humidity of the air inside the Thermometer Screen and its dew point temperature.
61. Wind Profiler is Clear Air Doppler Radar Detects Reflection from Turbulence and eddies
- 62.** Wind vane is an instrument measuring wind direction w.r.t. 16 points of compass

Q. 3 Answer the following questions.

1. Buoy's Ball's Law?
2. Beaufort's Scale
3. Dew point temperature
4. SODAR systems are complementary to Wind Profilers,
5. Wind profilers are advantageous over PB for wind observation.
6. Intermediate frequency (IF) of SAMEER radio theodolite is 33 MHz.
7. What are the sources of error in Mercury Barometer?
8. Brief working Principle of Doppler Radar.
9. Write working Principle and operation of Transmissometer.
10. What are sources of error in windvane and anemometer?
11. Calibration of Transmissometer
12. What are the sensors required to be installed near Runway touchdown for the safety of
13. What are exposure conditions for installation of anemometer?
14. What are the advantages and disadvantages of Aneroid barometer?
15. Define Precipitation.
16. Why cumulus clouds are conspicuously absent over a cool water surface?
17. Why cumulonimbus clouds have a flat top?
18. Airport Met Instrument system for different categories of airports
19. Aviation. Also explain the influence of at least two weather parameter on landing/takeoff of aircraft.
20. Thermograph
21. Barograph
22. Barometer is used as Meteorological Station Barometer in IMD?
23. SRRG
24. Care/ Precautions to be taken before releasing Radiosonde.
25. Cloud classification

26. Clouds
27. Complete TTBB code and explain
28. Describe different applications of Lightning Location Network (LLN).
29. Explain Buoy Ballot Law and dew point temperature
30. Explain the advantages of GPS based system over non GPS systems in brief.
31. Explain the working of RSGE radio theodolite with the help of block diagram.
32. Explain the calibration of solar radiation sensors and why it is important.
33. Heat Budget
34. How a “Maximum thermometer” record the maximum temperature?
35. Hygrograph
36. Maximum wind level
37. SAMEER radio theodolite system is fully automatic in operation.
38. Optical Theodolite
39. Importance of weather parameters on aviation services.
40. List all important actions required while taking GPS radiosonde ascent.
41. List the parameters observed in radio sounding upper air profile, and explain how the winds are derived in GPS based sounding system.
42. List WMO accuracies for all sensors and GPS used in Radiosonde ascent and also how winds are computed in GPS Radiosonde.
43. Maximum wind level
44. Meteorological Observatory in IMD?
45. Name any two charge generation theories proposed for thunderstorm electrification.
46. Name the different Autographic instruments used at a conventional Meteorological
47. Normal height card
48. observatory and the weather parameters they record?
49. Optical Theodolite
50. Self Recording Raingauge (SRRG)
51. Setting of Maximum and Minimum thermometer
52. Significant wind level
53. Solar radiation spectrum

54. SRRG
55. Sunshine Recorder
56. Thermograph
57. What are exposure conditions for installation of anemometer? Draw Gen block diagram of GPA Radiosonde System and write short notes on the same.
58. What are main constituents of the atmosphere? What are trace gases?
59. What are the different types of Mercury barometers in use and which type of Mercury
60. What are the main charge regions in a typical thundercloud?
61. What are global, diffuse and direct radiations? Explain the relation between them.
62. What is Pyranometer and explain its principle and its application.
63. What is shortwave radiation and longwave radiation. Explain in details its importance and its features.
64. Which is the instrument for measurement of wind speed installed at a Conventional
65. Why GPS Radio sonde is better than a Radio sonde using Pressure sensor and not GPS.
66. Why mercury is used in thermometer.
67. Working principle and Exposure conditions of SRRG
68. Write a short note on Wind Profiler system.
69. Write Block diagram of GPS Radiosonde. Explain functions of each block. Explain why base check is required before releasing Balloon.
70. Write Block diagram of working of GPS Radiosonde and Format for Temp Message TTAA.
71. Write down Buys- Ballot's Law in Northern and Southern hemisphere.
72. Write short notes on Site selection Criteria for installation of Aviation Meteorological Instruments at Runway site. Also exposure conditions and height of Current Weather Sensors & Optics of Transmissometers installed at Airports.
73. Write short notes on Transmissometer and its working principle. How the Transmissometers are calibrated.
74. Write short notes on Wind profiler.
75. Write short notes on working principle of SRRG.

