AVIATION METEOROLOGY

FLIGHT OPS/DISPATCH CLASS: FDS 24

FINAL EXAMINATION

SECTION A

ANSWER QUESTION ONE AND ANY OTHER THREE QUESTIONS

Q1. Decode the following weather reports;

a) METAR HKJK METAR HKJK 170530Z 35007KT 0500 R/06R0150 FG OVC000 FEW///CB 07/07 Q1025 FM0535 TL0615 0100 RMK THUNDER=

(8mks)

TAF HKKI 250230Z 251221 24010KT 9999 SCT025 TEMPO 1218 TSRA FEW 024CB BKN 025 BECMG 1921 SCT 020=
(10mks)

b) Differentiate between a landing forecast and terminal aerodrome forecast.
(4mks)

c) What conditions are required for METAR report to be entered as CAVOK?
(4mks)

d) Define Atmospheric Stability?
(4mks).

Q2. a) List all the groups of clouds you know and the list the different types of clouds in each group.

(14mks)

b) What is included in flight documentation?
(6mks)

Q3. a) Differentiate between Advection and convection of air.
(4mks)

b) Briefly describe the two types of fog and their formation.
(6mks)

c) Briefly describe the following TDCF, veer, backing, standard atmosphere, aircraft turbulence, wind sheer, lapse rate, gusting, wind shift, dew point.
(10mks)

Q4. a) Describe the vertical structure of the atmosphere, briefly discussing all the layers using a clear diagram.
(10mks)

b) Describe the heat transfer processes.
(5mks)

c) Name types of meteorological Instruments in use.
(5mks)

Q5. a) Describe using a diagram what a sea breeze is.
(4mks)

b) List any three hazards related to CB clouds.
(3mks)

c) What is pressure at a point and its units?
(2mks)

d) What is a Jet stream?
(3mks)

e) List the various pressure systems and briefly discuss 2 of them.
(8mks)

SECTION B

ANSWER ALL QUESTIONS

1. Extensive cloud and precipitation is often associated with a non-frontal thermal depression because of:

a) Surface diversion and upper level convergence causing wide spread descent of air in the depression
b) Surface diversion and upper level convergence causing wide spread ascent of air in the depression
c) Surface convergence and upper level divergence causing wide spread ascent of air in the depression

d) Surface convergence and upper level divergence causing wide spread descent of air in the depression

2. The stability in a layer is increasing if:

a) Warm air is advected in the upper part and cold air in the lower part
b) Warm air is advected in the lower part and cold air in the upper part
c) Warm and moist air is advected in the lower part
d) Cold and dry air is advected in the upper part.

3. Which of the following conditions are most favourable to the formation of mountain waves?

a) Unstable air at mountain top altitude and a wind at least 20 knots across the mountain ridge
b) Either stable or unstable air at mountain top and a wind of at least 30knots blowing parallel to the mountain ridge
c) Moist unstable air at mountain top and a wind of less than 5knots blowing across mountain ridge
d) Stable air at mountain top altitude and a wind at least 20knots blowing across mountain ridge

4. The degree of clear air turbulence experienced by an aircraft is proportional to the

a) Intensity of the solar radiation
b) Intensity of vertical and horizontal wind shear
c) Height of the aircraft
d) Stability of the air

5. Under which of the following conditions is the most severe Clear Air Turbulence likely to be experienced

a) A westerly jet stream at low latitudes in the summer
b) A straight jet stream near a low pressure area
c) A curved jet stream near a deep trough
d) A jet stream, with great spacing between the isotherms

6. Convective activity over land in the mid-latitudes is greatest in

a) Summer during the night and early morning

b) Winter in the afternoon

c) Summer in the afternoon

d) Winter during the night and early morning

7. Which of the following is a common cause of ground or surface temperature inversion?

a) Terrestrial radiation on a clear night with no or very light winds
b) Warm air being lifted rapidly aloft, in the vicinity of mountainous terrain.
c) The movement of colder air under warm air, or the movement of warm air over cold air.
d) Heating of the air by subsidence.

8. On a clear sky, continental ground surface, wind calm, the minimum temperature is reached approximately

a) One hour before sunrise
b) Half an hour after sunrise
c) Half an hour before sunrise
d) At the moment the sun rises

9. A gust front is

a) Normally encountered directly below a thunderstorm
b) Characterized by heavy lightning
c) Another name for a cold front
d) Formed by the cold air outflow from a thunderstorm

10. A layer of air cooling at the SALR compared to the DALR would give what kind of cloud?

a) Stratus if saturated
b) Cumulus if saturated
c) No clouds if saturated
d) Convective cloud

11. The most dangerous form of air frame icing is

a) Clear ice
b) Hoar frost
c) Dry ice
d) Rime ice

12. When the temperature and dew point are less than one degree apart the weather conditions are

most likely to be:

a) Clear and cool
b) High scattered clouds
c) Unlimited visibility
d) Fog and cloud

13. Divergence in the upper air results, near the surface, in

a) Falling pressure and likely dissipation of clouds
b) Falling pressure and likely formation of clouds
c) Rising pressure and likely formation of clouds
d) Rising pressure and likely dissipation of clouds

14. Which of the following statements is true of the dew point of an air mass?

a) It can only be equal to, or lower, than the temperature of the air mass.
b) It can be higher than the temperature of the air mass
c) It can be used together with the air pressure to estimate the mass's relative humidity.
d) It can be used to estimate the air mass's relative humidity even if the temperature is unknown.

15. The rate of cooling of ascending saturated air is less than the rate of cooling of ascending unsaturated air because:

a) Water vapour doesn't cool as rapidly as dry air.
b) Water vapour absorbs the incoming heat from the sun
c) Heat is released during the condensation process
d) Moist air is heavier than dry air.

16. What happens to the temperature of a saturated air mass descending?

a) It heats up more than dry because of expansion
b) It heats up less than dry because of evaporation
c) It heats up more than dry because of compression
d) It heats up less than dry because of latent heat released during condensation.

17. The gradient wind is more than Geostrophic wind an Anticyclone because the:

a) Centrifugal force is added to the pressure gradient
b) Centrifugal force opposes the gradient
c) Effect of coriolis is added to friction
d) Coriolis effect opposes the centrifugal force.

18. What causes the geostrophic wind to be stronger than the gradient wind around a low?

a) Centrifugal force adds to the gradient force
b) Centrifugal force opposes the gradient force
c) Coriolis force adds to the gradient force

d) Coriolis force opposes the centrifugal force.

19. Over flat dry land what would cause cloud?

a) Orographic uplift
b) Convective uplift during the day
c) Release of latent heat.
d) Advection.

20). When warm air is advected in the lower part of a cold layer of air:

a) Stability increases in the layer
b) Stability decreases in the layer
c) Stability will remain the same.
d) Stability will be conditional

21. Lack of cloud at low level in a stationary high is due to:

a) Instability
b) Rising air
c) Sinking air
d) Divergence at high level

22. Below a low level inversion visibility is often:

a) Moderate or poor because there is no vertical exchange
b) Very good at night
c) Very good in the early morning
d) Moderate or poor due to heavy snow showers

23. What is a microburst?

a) A small low pressure system where the wind circulates with very high speeds
b) A concentrated downdraft with high speeds and a lower temperature than the surrounding air
c) A concentrated downdraft with high speeds and a higher temperature than the surrounding air
d) An extremely strong wind gust in a tropical revolving storm

24. What are the requirements for the formation of a thunderstorm?

a) A stratocumulus cloud with sufficient moisture
b) A cumulus cloud with sufficient moisture associated with an inversion
c) An adequate supply of moisture, conditional instability and a lifting action
d) Water vapour and high pressure

25. You are flying in an atmosphere which is warmer than ISA, what might you expect?

a) True altitude to be the same as Indicated altitude
b) True altitude to be the lower than Indicated altitude
c) True altitude to be decreasing
d) True altitude to be the higher than Indicated altitude