EAST AFRICAN SCHOOL OF AVIATION
EXAMINATION

FINAL EXAM

IATA/SAFETY SECTION

SUBJECT: METEOROLOGY

Stream: Flight Dispatch No.21 **Duration: 2 Hrs**

DATE: 15/09/2016 **TIME: 8.30 – 10.30 AM**

INSTRUCTIONS TO CANDIDATE:

1. *This paper consists of **SIX (6)** Printed pages.*
2. *This paper has **2** sections*
3. Answer the questions as per the instructions given
4. Examination rules and regulations shall apply

1. What will be the effect on the reading of an altimeter of an aircraft parked on the ground shortly before an active cold front passes
    a) It will be increasing
    b) It will remain unchanged
    c) It will be increasing
    d) It will fluctuate up and down by +/- 50
2. The main factor which contribute to the formation of very low clouds ahead of a warm front is
    a) Saturation of the cold air by rain falling into it and evaporating
    b) Saturation of the warm air by rain falling into it and evaporating
    c) Reduction of outgoing radiation due to clouds
    d) Warm air moving over a cold surface

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

SECTION B

ANSWER QUESTION ONE AND TWO OTHER QUESTIONS

Q1. Decode the following weather reports;

a) (i) METAR HKJK 170530Z 35007KT 0500 R26L/2400FT R08/0400V0800FT FG OVC000 FEW///CB T07/07 Q1025 FM0535 TL0615 0100 RMK THUNDER= (8mks)

(ii) TAF AMD HKJK 130930Z 131212 240010KT 7000 SCT025 FEW030CB BKN070 TEMPO 1220 36023G33KT+TSRA BKN005 BECMG 2224 BKN015 TEMPO0306 2000BCFG BKN003 PROB40 0406 0500 FG 0VC000FM0815 03007KT 9999 SCT020 TX23/12ZTNM01/03Z= (13mks)

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

c) Define advection fog giving conditions of formation, times of occurrence and location (10mks)

d) Define tropopause and its significance. (What it usually marks). (7mks)

e) Briefly describe the following AMDAR, backing, standard atmosphere, aircraft turbulence, wind shear, lapse rate, gusting, and TDCFs. (8mks)

Q2.

a)List the hazards associated with small-scale low pressure areas. What is generally associated with poor visibility? (7mks)

a) Differentiate between Advection and convection of air. (4mks)
b) Name any four Jet streams known to you. (4mks)
c) Distinguish the five lifting mechanisms in formation of precipitation. (5mks)

Q3.

a) Discuss the effect of humidity on density clearly showing their relationship (8mks)
b) List the clouds types referred to as low and middle level (7mks)
c) What is included in flight documentation? (5mks)

Q4.

a). Define turbulence. Give where in jetstreams turbulence is most severe? (6mks)
b) List any three hazards related to CB clouds. (3mks)
c) List the various pressure systems and briefly discuss one of them. (7mks)
d) What conditions are required for METAR report to be entered as CAVOK? (4mks)

Q5.

a) Define relative humidity and radiation fog. (4mks)
b) Discuss the diurnal variation of humidity stating clearly when the maximum and minimumoccurs. (8mks)
c) Define precipitation and give the conditions for it to take place (6mks)
d) Name two types of meteorological instruments (2mks)