Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
(ONLINE)
SEMESTER I
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COURSE NAME	:	INSTRUMENTS
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PROGRAMME CODE	:	BDC
EXAMINATION DATE	:	JANUARY / FEBRUARY 2021
DURATION	:	2 HOURS
INSTRUCTION	:	ANSWERS ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF **ELEVEN (11)** PAGES

Q1 Concerning the pitot and static system, the static pressure error:

A affects the alternate static port only.
B is a direct effect of heating of the static ports.
C is a direct effect of a blockage of the static port.
D is caused by disturbed airflow around the static ports.

(1 marks)

Q2 During its descent through an ash cloud, the pitot probe becomes blocked. The airspeed indicator (ASI):

A over-reads steadily.
B under reads steadily.
C suddenly changes towards zero.
D freezes.

(1 marks)

Q3 Which of the following instruments are connected to the pitot-static system:
(Choose 3 options)

☐ altimeter.
☐ air-operated directional gyro.
☐ vertical speed indicator.
☐ airspeed indicator.

(1 marks)

Q4 If the static source of an altimeter becomes blocked during a climb, the instrument will:

A under-read by an amount equivalent to the reading at the time that the instrument became blocked.
B continue to indicate the reading at which the blockage occurred.
C over-read.
D gradually return to zero.

(1 marks)

Q5 Temperature play a significant part in flight planning, aerodynamics, and aircraft performance. Knowing _____ is important in aviation and can be obtained by applying corrections to the thermometer.

A Static Air Temperature.
B Ram Air Temperature.
C Total Air Temperature.
D Dynamic Air Temperature.

(1 marks)

Q6 Before any flight, to ensure there is enough fuel inside the aircraft tank, we can observe from:

A Fuel Temperature Gauge.
B Fuel Pressure Gauge.
C Fuel Quantity Gauge.
D None of the above.

(1 marks)

Q7 Fuel flow systems are important in any aircraft as to:

A Move fuel from fuel truck into fuel tanks.
B Move fuel from combustion chamber into fuel tanks.
C Move fuel from engine into fuel tanks.
D Move fuel from fuel tanks into combustion chamber.

(1 marks)

Q8 Select the appropriate functions of a fuel vent:
(Choose 4 options)

☐ To maintain atmospheric pressure within the tanks
☐ To prevent air locks
☐ To prevent icing from occurring
☐ To allow fuel overflow
☐ To vent vapor that formed in the system
☐ As an emergency point for fueling

(1 marks)

Q9 Select the systems used to mix air and fuel for ignition in the combustion chamber:
(Choose 2 options)

☐ Gravitational system
☐ Carburetor system
☐ Fuel injection system
☐ Pressure pump system

(1 marks)

Q10 Which of the following are advantages using fuel injection system:
(Choose 3 options)

☐ Correct mixtures can be maintained at all times
☐ Cold start is easier and backfiring is impossible
☐ Reliable & simple construction
☐ Faster and smoother throttle response
☐ Cold start is harder and backfiring is possible

(1 marks)

Q11 The various types of tachometers are:

A Magnetic, capacitance, electronic.
B Electrical, mechanical, density.
C Magnetic, electrical, helical.
D Mechanical, electrical, magnetic

(1 marks)

Q12 The magnetic tachometer sensor is composed of:

A a drag cup rotating in front of an electro-magnet.
B the rotor of a three-phase AC generator.
C the rotor of a single phase AC generator.
D a circular magnet with four poles.

(1 marks)

Q13 An electrical tachometer utilises a generator feeding:

A directly a voltmeter.
B directly a rotating shaft.
C directly a galvanometer.
D a synchronous motor turning a drag cup.

(1 marks)

Q14 Magnetic tachometer consists of:

A a permanent rotating magnet turning inside a non-magnetic drag cup.
B a single-phase generator connected to a asynchronous motor.
C a three phase generator connected to a synchronous motor.
D a single-phase generator connected to a synchronous motor.

(1 marks)

Q15 The Machmeter is subject to the following errors:

A instrument and compressibility only.
B instrument, pressure, and temperature only.
C position, instrument, and manoeuvre induced.
D those of a Machmeter only.

(1 marks)

Q16 The data outputs from the ADC (Air Data Computer) are:
(Choose 4 options)

☐ Altitude.
☐ Mach number.
☐ Total Air Temperature.
☐ True Air Speed.
☐ Static Air Temperature.

(1 marks)

Q17 Air Data Computer (ADC):

A transforms air data measurement into electric impulses driving servo motors in instruments.
B measures position error in the static system and transmits this information to ATC to provide correct altitude reporting.
C converts air data measurements given by ATC from the ground in order to provide correct altitude and speed information.
D is an auxiliary system that provides altitude information in the event that the static source is blocked.

(1 marks)

Q18 The tachometer indicates:
(Choose 2 options)

☐ The speed of the camshaft of a reciprocating engine
☐ The speed of the crankshaft of a reciprocating engine
☐ The speed of the compressor section of gas turbine engine
☐ The speed of the turbine section of gas turbine engine

(1 marks)

Q19 Machmeter works in the same principle as Air Speed Indicator except:

A the speed is relative to the speed of sound
B the speed is related to the static pressure
C the speed is related to the outside air temperature
D the speed is related to the speed of light

(1 marks)

Q20 Pick the correct statement regarding Air Data Computer:

A complicated design, improved displays, and reduced errors.
B central source for other system, clean design, and give out failure warning.
C hard to decode display, permits error correction, and connector for other main systems.
D permits error correction, improved displays, and hard to decode display.

(1 marks)

Q21 Gyro begins to cause precession when:

A a force is applied at 180° or parallel to its rotational axis.
B the speed of the gyro increases.
C the speed of the gyro decreases.
D a force is applied at right angles to its rotational axis.

(1 marks)

Q22 Rate gyro is used in:

A directional gyro indicator.
B turn co-ordinator.
C artificial horizon.
D attitude indicator.

(1 marks)

Q23 If the needle and the ball of a Turn and Slip indicator both show right, what does it indicate:

A turn to right and too much bank.
B turn to left and too much bank.
C turn to right and too little bank.
D turn to left and too little bank.

(1 marks)

Q24 When an aircraft has turned 270° with a constant attitude and bank, the pilot observes the following on a classic (air driven) artificial horizon:

A too much nose up and bank too high.
B too much nose up and bank correct.
C attitude and bank are correct.
D too much nose up and bank too low.

(1 marks)

Q25 Which of the statement is incorrect regarding electrically driven Attitude Indicator?

A Fast spin speed give greater rigidity and less precession
B Constant spin speed at all altitude regardless of air density
C Opened case thus affected by moisture, dust and corrosion
D Runs at constant temperature which improve accuracy

(1 marks)

Q26 The magnetic variation at any point on the Earth's surface is the angle:

A Between the horizontal component of the magnetic field and True North direction.
B Between the compass needle and the local vertical.
C Between the compass needle and the horizon.
D Made by a compass needle during a steady turn.

(1 marks)

Q27 A pilot wishes to turn right on to a northerly heading with 20° bank at a latitude of 40° North. Using a direct reading compass, in order to achieve this he must stop the turn on to an approximate heading of:

A 330°
B 180°
C 030°
D 360°

(1 marks)

Q28 In the northern hemisphere, during deceleration following a landing in a southerly direction, a direct reading magnetic compass indicates:

A an apparent turn to the west.
B an apparent turn to the east.
C no apparent turn only on northern latitudes.
D no apparent turn.

(1 marks)

Q29 When an aircraft on a westerly heading on the northern hemisphere accelerates, the effect of the acceleration error causes the magnetic compass to:

A indicate a turn towards the North.
B to turn faster than the actual turning rate of the aircraft.
C lag behind the turning rate of the aircraft.
D indicate a turn towards the South.

(1 marks)

Q30 Deviation is the relationship between:

A True North (TN) with Magnetic North (MN).
B Compass North (CN) with Magnetic North (MN).
C Compass North (CN) with True North (TN).
D none of the above.

(1 marks)

Q31 Control Display Unit (CDU) are individually, colour coded indicator. Select the correct statement from below.

A Red – indicate trouble of a less urgent.
B Amber – signifies a serious problem requiring immediate crew action.
C Blue or white is usually reserved for lights that are informational.
D Amber – no action required to rectify the problem.

(1 marks)

Q32 Which of these are type of database in Flight Management System?

A Navigation
B Instructional
C Engine
D Computer

(1 marks)

Q33 Information that are related to Performance Database in Flight Management System are as follow, except:

A Fuel weight, Cargo/pax weight.
B Center of gravity.
C Assigned altitude.
D Airports, runways, holding patterns.

(1 marks)

Q34 The main function of a Flight Management Systems (FMS) is:

A To provide consolidated navigation and auto flight control which maximizes aircraft and route efficiency.
B To automatically planned route based departure and destination aerodrome.
C To keep the aircraft capabilities at minimum efficiency.
D To aid pilots on ground when an emergency occurs.

(1 marks)

Q35 Which of the statement is untrue about Multi Function Display (MFD)?

A Gives information on navigation, route, moving map, weather radar.
B Acts as backup for PFD in case where PFD lost power or become unreliable at any stage of flight.
C Acts as primary screen before PFD and will revert to PFD when MFD lost power or become unreliable at any stage of flight.
D Provides ground proximity warning system, traffic collision avoidance system, and airport information all on the same screen.

(1 marks)

Q36 Flight deck instrument display system such as EFIS used electronic display rather than electromechanical. Choose the appropriate technology used inside EFIS.

A Light Emitting Diode (LED)
B Cathode Ray Tube (CRT)
C Organic Light Emitting Diode (OLED)
D Laser Phosphor Display (LPD)

(1 marks)

Q37 Information that are related to Navigation Database in Flight Management System are as follow, except:

A Waypoints
B Airways/ Routes
C Assigned altitude.
D Airports, runways, holding patterns.

(1 marks)

Q38 Automatic Flight Director Systems (AFDS), which includes auto-thrust or known as auto throttle can be operated using system.

A Tactical Operation.
B Independent Operation.
C Planned Operation.
D Navigational Operation.

(1 marks)

Q39 Which of this is the aims of Strategic Operation in Automatic Flight Director Systems?

A Simpler form of automation which used manual input by flight crew.
B Aim to achieve a longer term goal.
C For achieving a specific short term objective.
D Basic inputs (heading, speed, altitude) are entered to achieve the required/selected parameters (pitch attitude, thrust).

(1 marks)

Q40 Auto throttle can be operated by two working modes which are:
(Choose 2 options)

☐ Thrust mode.
☐ Brake mode.
☐ RPM mode.
☐ Speed mode.

(1 marks)

Q41 Main attributes when using Tactical Operation in Automatic Flight Director Systems are

A The aircraft will automatically fly a selected profile and these profiles can be modified by the Flight Crew .
B Aim to achieve a longer term goal.
C For achieving a specific short term objective.
D This operations typically can control all phases of flight (takeoff, en route, approach, landing) with full engine thrust management.

(1 marks)

Q42 Which telecommunication technique is used by FANS?

A HF/ADF
B ADF
C HF
D VHF/SATCOM

(1 marks)

Q43 ICAO has developed the FANS concept to:

A to provide a safe, efficient and cost-effective communication system.
B to effectively monitor information concerning aircraft system status and fuel consumption.
C to automate the distribution of departure slots.
D to allow a safe and efficient use of a given volume of airspace by the maximum possible number of aircraft.

(1 marks)

Q44 Which of these are not a type of communication breakdown?

A Cockpit interference.
B Radio interference.
C Blocked Transmission.
D Call-sign Confusion.

(1 marks)

Q45 Direct emergency communication is communication loop in between:

A flight crew and airport rescue and fire fighting service with ATC in active position.
B ATC, and flight crew.
C ATC and airport rescue and fire fighting service.
D flight crew and airport rescue and fire fighting service while ATC in passive position.

(1 marks)

Q46 Direct emergency communication is advantageous whenever any emergency occurs because of:

A Very easy to revert to the standard communication loop with the controller assuming the mediator role.
B A slower information exchange.
C Reduced situational awareness.
D Increased risk for the passengers during an evacuation.

(1 marks)

Q47 Future Air Navigation System (FANS) provides two types of operation which are: (Choose 2 options)

☐ Positive control
☐ Negative control
☐ Procedural control
☐ Navigational control

(1 marks)

Q48 Procedural Control in FANS have certain description which includes:

A Used in areas which have radar, commonly referred to as radar control.
B Used in areas (oceanic or land) which do not have radar.
C Separation standards are less.
D Used in areas which have military radar.

(1 marks)

Q49 What does the abbreviation TAWS mean?

A Terrain Awareness Warning System
B Terrain Avoidance Warning System
C Terrain and Weather Shun
D Traffic and Weather Shun

(1 marks)

Q50 TAWS Class A are:

A required for all except the smallest commercial air transport aircraft.
B required by larger General Aviation (GA) aircraft and recommended for smaller commercial or GA aircraft.
C required by aerobatic aircraft.
D required for ground movement vehicle.

(1 marks)

Q51 Safety Nets help prevent imminent or actual hazardous situations and can be divided to: (Choose 2 options)

- ☐ Ground based
- ☐ Airborne
- ☐ Oceanic
- ☐ Underground

(1 marks)

Q52 Airborne safety nets provide warning times up to:

A 1 minutes.
B 40 seconds.
C 10 seconds.
D 5 minutes.

(1 marks)

Q53 Ground based safety nets provide warning times up to:

A 10 minutes.
B 40 seconds.
C 10 seconds.
D 2 minutes.

(1 marks)

Q54 Airborne safety nets have few systems incorporated inside the aircraft, includes:

A Short Term Conflict Alert (STCA)
B Area Proximity Warning (APW)
C Terrain Avoidance and Warning System (TAWS)
D Minimum Safe Altitude Warning (MSAW)

(1 marks)

Q55 Stall warning requirements for transport category aircraft must begin at a stall speed which exceeds the stall speed by knots.

A minimum at 5
B not less than 5
C more than 5
D in between 5 to 10

(1 marks)

Q56 Which of these are not types of stall warning systems?

A Post-stall Buffet
B Pre-stall Buffet
C Audible Warning
D Stick Shaker

(1 marks)

Q57 What is the purpose of a Flight Data Recorder (FDR)?

A Recording of cockpit sounds for incident and accident investigations.
B Serving as evidence for insurance issues following personal injury or serious material damage.
C Collection of altitude, heading, speeds etc. for investigation of an accident.
D Monitoring of flight parameters for maintenance purposes.

(1 marks)

Q58 In transport category aircraft, where is the flight data recorder usually located?

A In the wing.
B In the cockpit.
C In the tail.
D In an engine.

(1 marks)

Q59 What is the purpose of a Cockpit Voice Recorder (CVR)?

A Recording of cockpit sounds for incident and accident investigations.
B Serving as evidence for insurance issues following personal injury or serious material damage.
C Collection of altitude, heading, speeds etc. for investigation of an accident.
D Monitoring of flight parameters for maintenance purposes.

(1 marks)

Q60 Sensors for deployment of Automatic Deployable Flight Recorder starts operation at:

A the start of a crash
B 1 minutes before the start of a crash
C 1 minutes after the start of a crash
D 30 seconds after the start of a crash

(1 marks)

- END OF QUESTIONS –