Register Number: ……..

B.E DEGREE EXAMINATIONS: MAY/JUNE 2014

(Regulation 2009)

Second Semester

AERONAUTICAL ENGINEERING

AER101:Elements of Aeronautics

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. As altitude increases above stratosphere _____
   a) Temperature increases, pressure remains constant
   b) Temperature constant, pressure increases
   c) Temperature increases, density increases
   d) Temperature constant, density decreases
2. After _____ angle, the lift co-efficient (C_L) decreases drastically with increase of Angle of Attack
   a) Sideslip
   b) Stall
   c) Dihedral
   d) Climb
3. The main longitudinal load carrying member of an aircraft fuselage is _____
   a) Stringer
   b) former
   c) longeron
   d) truss
4. Span wise placed structural members of the wing are called _____
   a) Ribs
   b) Frames
   c) Trusses
   d) Spars
5. If the propeller pitch is made so large that the blade sections are virtually parallel to the direction of flight, this condition is called
   a) autorotation
   b) fluttering
   c) buffeting
   d) feathering
6. In gas turbine engines the job of compressor on the air is to _____
   a) Increase the air pressure
   b) Decrease the air pressure
   c) Maintain the same pressure
   d) Maintain the same density
7. The velocity required for a space craft to escape earth's gravitational field depends on
   a) Mass of aircraft
   b) Distance between earth and aircraft
   c) Earth rotational speed about axis
   d) Earth orbital speed.

8. What is the radius of perigee for an orbit around the Earth having semi-major axis of 8100 km and eccentricity of 0.168?
   a) 1360.8 km
   b) 6300.5 km
   c) 6739.2 km
   d) 9460.8 km
9. In UAV term RPV is called as _____
   a) Remotely Piloted Aircraft
   b) Remotely Piloted Air-missile
   c) Recoverable Piloted Aircraft
   d) Reusable Piloted Aircraft
10. Long Range UAV's will have weight of _____
    a) >100 Kg
    b) >500 Kg
    c) <500 Kg
    d) < 400 Kg

PART B (10 x 2 = 20 Marks)

11. Mention important basic flight instruments.
12. List out the types of flight vehicles under Non-Power driven category
13. Write important parts of an airplane and its function.
14. Sketch an airfoil and mark all its nomenclature?
15. List out the main advantages and disadvantages of turbo-prop and turbo fan engine.
16. Brief about helicopter flight? & write the important observations between helicopter and fixed wing aircraft flight.
17. State Kepler's first law of planetary motion.
18. Define fuel cells.
19. Give the major application of UAV's
20. What is DARPA? List out its activities.

PART C (5 x 14 = 70 Marks)

21. a) Explain in detail about the structure of the atmosphere and its properties variation with neat sketch.

(OR)

b) Explain the construction and working of an airspeed indicator with neat sketch.

22. a) Write in detail about some of the important metallic, non-metallic materials used in aircraft industry with its applications.

(OR)

	b)	(i)	Brief about geodesic construction with neat sketch.	(8)
		(ii)	List out major advantages and disadvantages of composite materials	(6)
23.	a)		Sketch out the cut section view of a Turbo-jet engine and explain its operation and components in detail.	

(OR)

	b)	(i)	Explain how a propeller produces thrust for aircraft propulsion with appropriate equation.	(7)
		(ii)	Compare the Piston engine and Gas turbine engine for the merits and demerits	(7)
24.	a)	(i)	State and classify rocket engines.	(7)
		(ii)	Explain the solid propellant rocket with a neat sketch.	(7)

(OR)

	b)		With a neat diagram explain the six orbital elements in detail.	
25.	a)	(i)	Draw and explain the UAV classification chart.	(10)
		(ii)	List down the major strength and weakness of UAV's.	(4)

(OR)

	b)	(i)	Draw and explain the historical evolvements of UAV in US warfare.	(10)
		(ii)	Write short notes on UAV safety and operations.	(4)

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