

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY BATHINDA (Pb) - 151001

(State Univ. Estb by Punjab Govt. Act No. 5 (2015) and Approved u/s 2(f) & 12(B) of the UGC Act of 1956)

**Recruitment Test****(Post: Assistant Professor in Aeronautical / Aerospace Engineering-2023)****Answer Key**

QUESTION	ANSWER	QUESTION	ANSWER
1	B	31	B
2	A	32	C
3	C	33	A
4	B	34	C
5	B	35	C
6	A	36	D
7	A	37	A
8	C	38	B
9	D	39	B
10	A	40	A
11	B	41	A
12	B	42	D
13	B	43	C
14	B	44	A
15	B	45	D
16	B	46	B
17	D	47	B
18	D	48	D
19	D	49	C
20	A	50	B
21	C	51	B
22	A	52	B
23	B	53	B
24	A	54	B
25	A	55	B
26	C	56	C
27	D	57	C
28	C	58	B
29	A	59	D
30	B	60	D

Kamini

RECRUITMENT TEST OF POST

Assistant Professor in Aeronautical / Aerospace Engineering-2023



Roll No. _____ Date: _____ Signature of the Candidate: _____

1. The Shear Centre is the point on a cross section to which a
 - a) bending load may be applied without causing torsion in the section
 - b) shear load may be applied without causing torsion in the section
 - c) torsion load may be applied without causing bending in the section
 - d) torsion load may be applied without causing shear in the section

2. The Corner Speed in a V-n diagram represents
 - a) Intersection of the positive limit of the load factor and the line of maximum lift
 - b) Intersection of the negative limit of the load factor and the line of maximum lift
 - c) Intersection of the positive limit of the load factor and the right limit
 - d) Intersection of the negative limit of the load factor and the right limit

3. The x-axis (abscissa) of a V-n diagram is
 - a) Indicated Airspeed
 - b) True Airspeed
 - c) Equivalent Air Speed
 - d) Ground Speed

4. Where is the fuel usually carried in a short haul transport aircraft?
 - a) In the Wing and Fuselage
 - b) In the Wing only
 - c) In the Horizontal Tail only
 - d) In the Horizontal Tail and Fuselage

5. The landing gear layout of a small General Aviation aircraft is usually the
 - a) Nosewheel Type
 - b) Tailwheel Type
 - c) Bicycle Type
 - d) Single Wheel Type

6. If the speed of an aircraft in steady level flight is doubled, what will happen to its Lift Coefficient, keeping other things constant?
 - a) Reduce by four times
 - b) Increase by four times
 - c) Reduce by two times
 - d) Increase by two times

7. A positively cambered aerofoil can achieve zero lift only while flying at
 - a) A negative angle of attack
 - b) A positive angle of attack
 - c) A zero angle of attack
 - d) Any angle of attack

8. What is the purpose of Trailing Edge Flaps in a transport aircraft?

- a) To improve its Take-off performance only
 - b) To improve its Landing performance only
 - c) To improve its Takeoff and Landing performance
 - d) To improve its Take-off, Landing and Cruise performance
9. As the altitude increases from mean sea level to 100 km, what happens to the acceleration due to gravity?
- a) It increases
 - b) It decreases till 50 km, and then increases
 - c) It increases till 50 km, and then decreases
 - d) It decreases
10. What was the main reason of the crash of De Havilland Comet aircraft ?
- a) Stress Concentration in the corners of square windows
 - b) Improper inspection due to remote location of vertical tail
 - c) Wrong heat treatment of the fuselage skin elements
 - d) Explosion of the fumes of fuel due to electric spark from pumps
11. Which of the following statements is TRUE w.r.t. Steady Level Coordinated Turn?
- a) Tangential forces act on the aircraft
 - b) It occurs at a constant altitude
 - c) It is achieved by using rudder deflection only
 - d) Sideslip is permitted during turn
12. What is the preferred cross-section of a wing Spar?
- a) H-section
 - b) I-Section
 - c) C-Section
 - d) T-Section
13. What is the main problem with Forward Swept Wing?
- a) Transverse Buckling
 - b) Torsional Divergence
 - c) Buffeting
 - d) Flutter
14. What is the main type of load that is carried by a wing spar?
- a) Torsional
 - b) Bending
 - c) Compressive
 - d) Shear
15. Which operating condition results in maximum still-air Range of a Glider?
- a) When rate of descent is minimum
 - b) When Lift to Drag ratio is maximum
 - c) When Lift to weight ratio is maximum
 - d) When Lift to Drag ratio is minimum
16. What is the shape of the nozzle used for obtaining supersonic velocities?
- a) Convergent Nozzle
 - b) Convergent-Divergent Nozzle
 - c) Divergent Nozzle

d) Rectangular nozzle

17. What is the main purpose of Chevron nozzles in modern transport aircraft?
 - a) To reduce specific fuel consumption
 - b) To increase the Thrust while take-off
 - c) To improve propulsive efficiency
 - d) To reduce the noise level

18. What is the main purpose of providing a serpentine intake in a military aircraft?
 - a) To reduce specific fuel consumption
 - b) To increase the Thrust while take-off
 - c) To improve propulsive efficiency
 - d) To reduce the radar cross-section

19. An aircraft is in steady inverted level flight. If the wing of this aircraft has a symmetric aerofoil, then
 - a) its lift vector will be pointing downwards
 - b) Its lift vector will slowly rotate towards rearward direction
 - c) Its lift vector will slowly rotate towards forward direction
 - d) its lift vector will be pointing upwards

20. If the bypass ratio of a turbofan engine is increased, then
 - a) Its noise level will decrease and size will increase
 - b) Its noise level will increase and size will decrease
 - c) Its noise level and size will both increase
 - d) Its noise level and size will both decrease

21. Which powerplant type is preferred for a transonic passenger transport aircraft?
 - a) Turbojet with Afterburner
 - b) Turbojet with low bypass ratio
 - c) Turbofan
 - d) Turboprop

22. Which powerplant type is preferred for a Rotary Wing aircraft?
 - a) Turboshaft
 - b) Turbojet with high bypass ratio
 - c) Turbofan
 - d) Turboprop

23. Which of the following is the key advantage of a Tractor engine configuration?
 - a) Improved visibility for Pilot
 - b) Higher Propeller Efficiency
 - c) Lower Fuselage Form Drag
 - d) Lower Noise level in passenger cabin

24. What happens to the Critical Mach Number of an aerofoil as its thickness ratio increases?
 - a) It decreases
 - b) It decreases till $M = 1$, and then increases
 - c) It increases
 - d) It increases till $M = 1$, and then decreases

25. Which component of a transport aircraft supplies power for starting the engine?
 - a) Auxiliary Power Unit

- b) Ducted Fan
 - c) Ram Air Turbine
 - d) Reserve Gas Turbine
26. If an aircraft with positive static longitudinal stability is in steady level flight, then
- a) Aerodynamic Centre is ahead of Centre of Gravity and the Horizontal Tail carries a downward load
 - b) Centre of Gravity is ahead of Aerodynamic Centre and the Horizontal Tail carries an upward load
 - c) Centre of Gravity is ahead of Aerodynamic Centre and the Horizontal Tail carries a downward load
 - d) Centre of Gravity and Aerodynamic Centre coincide and the Horizontal Tail carries no load
27. If the speed of an aircraft in steady level flight is doubled, then, keeping other things constant, the Power required to maintain the flight at the higher speed increases by a factor of
- a) Two
 - b) Three
 - c) Four
 - d) Eight
28. What is the main drawback of providing sweep back on a wing?
- a) Increase in Critical Mach Number
 - b) Increase in Wave Drag
 - c) Increase in wing weight
 - d) Increase in Lift Curve Slope
29. What type of Drag do Winglets reduce?
- a) Induced
 - b) Profile
 - c) Interference
 - d) Skin Friction
30. What type of Drag do Landing Gear Fairings reduce?
- a) Induced
 - b) Pressure
 - c) Interference
 - d) Skin Friction
31. The combustion process in a Turbo shaft engine during ideal operation is
- a) Isentropic
 - b) Isobaric
 - c) Isochoric
 - d) Isothermal
32. Why do space launch vehicles usually have a blunt nose?
- a) To reduce Wave drag
 - b) To result in Oblique shock
 - c) To reduce the thermal stress
 - d) To reduce the weight of the nose
33. If the exit pressure in a rocket exhaust is lower than the atmospheric pressure, then the nozzle is termed as

- a) Overexpanded, and leads to lower plume diameter
 - b) Underexpanded, and leads to lower plume diameter
 - c) Overexpanded, and leads to higher plume diameter
 - d) Underexpanded, and leads to higher plume diameter
34. An aircraft with a turboprop engine produces a Thrust of 500 N and is flying at 100 m/s. If the propeller efficiency is 0.5, calculate the shaft power produced by the engine.
- a) 500 kW
 - b) 250 kW
 - c) 100 kW
 - d) 50 kW
35. Which thermodynamic property of the fluid remains constant in an ideal compression process?
- a) Pressure
 - b) Volume
 - c) Entropy
 - d) Temperature
36. If the length of a simply supported column is halved, then its Euler Buckling load
- a) Is doubled
 - b) Is halved
 - c) remains the same
 - d) Is quadrupled
37. Which of the following requirements for a large transport aircraft are specified by the regulatory authorities?
- a) Second Stage Climb Gradient
 - b) Stalling Speed
 - c) Maximum Speed
 - d) Cruise Mach Number
38. Name the speed during the Take-off of a multi-engined aircraft beyond which take-off is compulsory, even if one engine fails ?
- a) Stalling Speed
 - b) Decision Speed
 - c) Rotation Speed
 - d) Never Exceed Speed
39. If the area moment of inertia of a beam is doubled, then, keeping other things constant, its bending stress will be
- a) doubled
 - b) halved
 - c) tripled
 - d) quadrupled
40. Which of the following powerplants have the lowest specific fuel consumption for a flight Mach Number ranging between 3.0 and 3.5?
- a) Straight Turbojet
 - b) Ramjet
 - c) Scramjet
 - d) Afterburning Turbojet

41. Why are Golf balls provided with dimples?
- To delay flow separation
 - To improve looks
 - To decrease Turbulence
 - For ease in production
42. What is the benefit of Annealing a component after its fabrication
- Improving abrasion resistance
 - Hardening the surface
 - Reducing surface roughness
 - Relieving internal stresses
43. Which kind of tail layout suffers from the problem of Deep Stall
- Twin-Tail
 - X-Tail
 - T-Tail
 - Conventional Tail
44. As the Aspect Ratio of the wing increases from 8 to 10, the lift curve slope will
- increase
 - decrease
 - Remains the same
 - Depends on the wing geometry
45. The operating constraint that affect only the Wing Loading is
- Maximum Mach Number
 - Rate of Climb
 - Take off distance
 - Stalling Speed
46. When the CG of an aircraft coincides with the Neutral Point then the aircraft is
- Highly stable
 - Neutrally stable
 - Highly unstable
 - Dynamically unstable
47. An aircraft is flying vertically upwards, what will be load factor acting on the aircraft?
- 1
 - 0
 - 2
 - More than 2
48. An aircraft is designed to sustain the maximum load factor of 5, if the weight of the aircraft is 10000 N. How much lift it should produce in the steady and level flight?
- 50000 N
 - 2000 N
 - 25000 N
 - 10000 N
49. The parameter that remains constant during the cruise climb flight of a conventional aircraft
- Equivalent airspeed and altitude

- b) Altitude and Lift Coefficient
 - c) Equivalent Airspeed and Lift Coefficient
 - d) Lift Coefficient and Aircraft weight
50. A conventional Altimeter is a
- a) Temperature transducer
 - b) Pressure transducer
 - c) Density transducer
 - d) Velocity transducer
51. Poisson's Ratio is defined as
- a) ratio of transverse contraction strain to longitudinal compression strain in the direction of stretching force
 - b) ratio of transverse contraction strain to longitudinal extension strain in the direction of stretching force
 - c) ratio of transverse contraction strain to longitudinal extension strain in the direction opposite to the stretching force
 - d) ratio of longitudinal extension strain in the direction of stretching force to the transverse contraction strain
52. Winglets are used on the wings to minimize
- a) Skin friction drag
 - b) Induced drag
 - c) Parasite drag
 - d) Wave drag
53. An aircraft is in trimmed condition, it has zero pitching moment at
- a) Its Aerodynamic Centre.
 - b) Its Centre of Gravity
 - c) 25% of its Mean Aerodynamic Chord
 - d) 50% of wing chord
54. Hook's Law is not applicable in case a material exhibits
- a) Elastic Deformation
 - b) Plastic Deformation
 - c) Temporary Deformation
 - d) Ductile deformation
55. As a candidate for a vertical tail, which one of the following aerofoil section is appropriate?
- a) NACA 2412
 - b) NACA 0018
 - c) NACA 23012
 - d) NACA 4412
56. An Euler Bernoulli Beam in bending is assumed to satisfy
- a) Both Plane stress as well as plane strain condition
 - b) Plane strain condition but not plane stress condition
 - c) Plane stress condition but not plane strain condition
 - d) Neither plane stress, nor plane strain condition
57. A statically indeterminate frame structure has
- a) same number of joint degrees of freedom as the number of equilibrium equations

- b) number of joint degrees of freedom is greater than the number of equilibrium equations
 - c) number of joint degrees of freedom is lesser than the number of equilibrium equations
 - d) unknown number of joint degrees of freedom, which cannot be solved using laws of mechanics
58. For a one-dimensional element, the relationship between stiffness coefficient 'k', area of cross-section 'A', length 'L', and Young's modulus 'E' for elastic deformation is
- a) $k = AL/E$
 - b) $k = AE/L$
 - c) $k = L/AE$
 - d) $k = E/AL$
59. The number of natural frequencies in case of a cantilever beam is?
- a) One
 - b) Two
 - c) Three
 - d) Infinite
60. Which one of the following modes of a stable aircraft has non-oscillatory response characteristics?
- a) Phugoid mode
 - b) Short period mode
 - c) Dutch roll mode
 - d) Spiral mode