Week1.2 Assignment

Due on 2021-04-14, 23:59 IST.

As per our records you have not submitted this assignment.

1) Consider two situations where air flows over a wing of 15 deg. In one case Mach number is 3 and makes shock wave angle of 32 deg. In another Mach number is 25 but shock angle is much smaller, say 18 deg. Then, 

M = 3 & Mach has higher shock strength. 

M = 25 & Mach has higher shock strength.

Cannot decide using above information.

As shock angle decreases shock strength always decreases.

No, the answer is incorrect.

Correct Answer: 
M = 25 has higher shock strength.

1 point

2) Which of the following are the characteristics of the hypersonic flow? 

A) High speed 

B) Density term

C) Solution of governing equations becomes independent of the Mach number

D) Boundary layer thickness behind the shock remains unaffected.

E) All of above

F) Only E and F

Solution of governing equations becomes independent of the Mach number

No, the answer is incorrect.

Correct Answer: A, C

2 points

3) At large enough Mach numbers (Ma -> oo) 

A) new equations are nonlinear.

B) new equations are linear as solution is independent of the Mach number.

C) flow can be linearized using small perturbation theory.

D) all of above

E) Only E

F) Only F

No, the answer is incorrect.

Correct Answer: A, C

2 points

4) Which of the following is true for Types I and II. Oblique shock interaction?

A) Both types are same as they occur far away from stagnation point.

B) Type I is a result of interaction of shocks of opposite family and type II is a result of interaction of shocks of same family.

C) Type I is a result of interaction of shocks of opposite family and type II is a result of interaction of shocks of same family.

D) None of above

E) Only E

F) Only F

No, the answer is incorrect.

Correct Answer: C

2 points

5) Which of the following interaction emasculate heat transfer on the surface of the vehicle?

A) Type I

B) Type II

C) Type I and Type IV

D) None of above

No, the answer is incorrect.

Correct Answer: D

2 points

6) Boundary layer thickness increases with increase in Mach number. 

A) True

B) False

C) In some cases of viscous and thermal boundary layer %

D) pressure forces

No, the answer is incorrect.

Correct Answer: D

2 points

7) At stagnation point of boundary layer, which one of the following conditions holds

A) $a = 0$

B) $a > 0$

C) $a < 0$

D) $a > 0$

No, the answer is incorrect.

Correct Answer: A

2 points

8) For compressible boundary layers, which of the following is true? 

A) $a > 0$

B) $a < 0$

C) $a = 0$

D) None of above

No, the answer is incorrect.

Correct Answer: B

2 points

9) Change equation needs to be considered. 

A) Both Mach number is insignificantly small. 

B) Both Mach number is small but not insignificantly.

C) Both Mach number is small and large.

D) None of above

No, the answer is incorrect.

Correct Answer: B

2 points

10) Various dimensions are higher. 

A) $U_H$

B) $U_D$

C) $U_I$

D) All of above

No, the answer is incorrect.

Correct Answer: B

2 points