Assignment 5

The due date for submitting this assignment has passed. Due on 2021-02-24, 23:59 IST.

As per our records you have not submitted this assignment.

1) The dispersion relation of a wave is given by $\omega^2 = a^2 k^2$ where $a$ is a non-zero real constant. The phase and the group velocity of the wave will be: 1 point

- same and independent of $k$
- the phase velocity is $a$ dependent but the group velocity is not
- the phase velocity is independent of $k$ but the group velocity is $k$ dependent
- different and depending on $k$
- No, the answer is incorrect.

- Accepted Answers:
- different and depending on $k$
- No, the answer is incorrect.

2) A polytropic fluid behaves like an incompressible flow when the Mach number tends to: 1 point

- $0$
- $1$
- $\infty$
- No, the answer is incorrect.

- Accepted Answers:
- $0$
- No, the answer is incorrect.

3) The kinetic energy of the second-order disc comes from the: 1 point

- nuclear fusion inside the two dense stars in which the reaction occurs
- the pressure of degeneracy in the compact object to which the mass is somewhat gravitational potential energy which is lost by the less dense star
- the gravitational potential energy of the vacuum
- No, the answer is incorrect.

- Accepted Answers:
- gravitational potential energy which is lost by the less dense star
- No, the answer is incorrect.

4) In the dynamics of accretion discs, the main effect of viscosity is to:

- slow down the ratio of formation of the disk
- increase the nuclear mass from a ring to the shape of a disk
- partially control the latissimally of the disk
- assemble the conversion of angular momentum
- No, the answer is incorrect.

- Accepted Answers:
- partially control the latissimally of the disk
- No, the answer is incorrect.

5) For a fluid system undergoing solid-body rotation with constant angular speed $\Omega$, the linear velocity components are given by $v_x = \Omega y$, $v_y = \Omega x$. The anti-symmetric part of the velocity gradient tensor $\omega_{ij}$ can then be expressed as 1 point

- $\omega_{xy}$
- $\omega_{yx}$
- $2\omega_{xy}$
- No, the answer is incorrect.

- Accepted Answers:
- $2\omega_{xy}$
- No, the answer is incorrect.

6) The pressure in front of the shock ($p_f$) is: 1 point

- greater than the pressure behind the shock ($p_b$)
- less than the pressure behind the shock ($p_b$)
- equal to the pressure behind the shock ($p_b$)
- No, the answer is incorrect.

- Accepted Answers:
- greater than the pressure behind the shock ($p_b$)
- No, the answer is incorrect.

7) The viscous energy loss rate of the less dense star: 1 point

- tends to infinity at the surface of the central accreting star
- remains finite at the surface of the central accreting star
- remains finite and positive at the surface of the central accreting star
- remains finite and negative at the surface of the central accreting star
- No, the answer is incorrect.

- Accepted Answers:
- remains finite and positive at the surface of the central accreting star
- No, the answer is incorrect.

8) A Newtonian fluid:

- is always compressible
- is always inviscid
- corresponds to a non-equilibrium distribution function in the kinetic level
- cannot be biotactic
- No, the answer is incorrect.

- Accepted Answers:
- corresponds to a non-equilibrium distribution function in the kinetic level
- No, the answer is incorrect.

9) Across a shock which one is continuous? 1 point

- the kinetic energy flux
- the momentum flux
- the velocity
- the pressure
- No, the answer is incorrect.

- Accepted Answers:
- the momentum flux
- No, the answer is incorrect.

10) When the Mach number of the medium in front of the shock tends to infinity, then $v_x/c_s$ will be: 1 point

- vanishes but finite
- zero
- infinity
- undefined
- No, the answer is incorrect.

- Accepted Answers:
- vanishes but finite
- No, the answer is incorrect.