Assignment-3

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment. **Due on 2018-09-05, 23:59 IST.**

1) Which of the following is not the major driving force for the fluid flow? **1 point**

- Buoyancy
- Surface tension
- Lorentz force
- Shroud gas flow

No, the answer is incorrect.
Score: 0

Accepted Answers:
Shroud gas flow

2) Lay down the condition for stability of the key hole. **1 point**

- Ablation pressure = Pressure due to fluid flow
- Ablation pressure = Hydostatic pressure + Convection induced pressure
- Ablation pressure = Capillary pressure
- Capillary pressure = shroud gas pressure

No, the answer is incorrect.
Score: 0

Accepted Answers:
Ablation pressure = Capillary pressure

3) Stable diameter of the key hole during key-hole mode welding is determined by the following condition. **1 point**

- Diameter of the key-hole is less than that of heat source
- Diameter of the key-hole is greater than that of heat source by an order of magnitude
4) For solving Navier-Stokes and continuity equations, which of the following is an incorrect initial conditions?

- Pressure is uniform everywhere in the domain
- Temperature is equal to melting point everywhere in the domain
- Velocity is zero everywhere in the domain
- Composition is uniform everywhere in the domain

No, the answer is incorrect.
Score: 0
Accepted Answers:
Temperature is equal to melting point everywhere in the domain

5) For a steady state weld pool with convection within and a moving a heat source without phase change being considered, select all the terms that form the governing equation.

- $\rho C_p \frac{dT}{dt}$
- $\rho C_p (\vec{u} \cdot \nabla) T$
- $\rho C_p V_{torch} \frac{dT}{dy}$
- $-\Delta H_f \frac{df}{dt}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\rho C_p (\vec{u} \cdot \nabla) T$
$\rho C_p V_{torch} \frac{dT}{dy}$

6) Which of the following parameters controls Marangoni convection during laser welding of a pure metal?

- Difference in viscosity
- Difference in solute concentration
- Difference in surface tension
- Difference in heat capacity

No, the answer is incorrect.
Score: 0
Accepted Answers:
Difference in surface tension

7) Which of the following term would drop out if the phase change is not considered as in the case of a Rosenthal’s 3D solution.

- $\rho C_p \frac{dT}{dt}$
- $\nabla \cdot (k \nabla T)$
8) Select one or more limitations for analytical solutions of thermal field during welding.  

☐ Thermal profile at a depth from the surface cannot be obtained.  
☐ Thermal properties are considered to be constant.  
☐ Does not give accurate estimates of gradients and cooling rates.  
☐ Heat loss by convection and radiation from the surface is ignored.  
☐ Limited by geometry and heat source models.  

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
Thermal properties are considered to be constant.  
Heat loss by convection and radiation from the surface is ignored.  
Limited by geometry and heat source models.  

9) To model fluid flow during welding, the incompressible constitutive equations considering Boussinesq assumption are valid if ______  

☐ relative difference in density < 5%  
☐ heat capacity difference < 15%  
☐ latent heat is negligible  
☐ Relative difference in density > 50%  

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
relative difference in density < 5%  

10) During which one or more of the following welding processes is key-hole mode welding possible?  

☐ EBW  
☐ PAW  
☐ GMAW  
☐ GTAW  
☐ SAW  
☐ LBW  

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
EBW  
PAW  
LBW
11) Gaussian heat source during spot and moving heat source has the same form except for the change in following term.

- Radius of the heat source.
- Depth from the top surface.
- Radial distance away from the centre of the heat source.
- Pre-exponent of Gaussian heat source.

No, the answer is incorrect.
Score: 0
Accepted Answers:
- Radial distance away from the centre of the heat source.

12) During which type of the following welding processes does solutal buoyancy play an important role?

- Heterogeneous welding
- Only homogeneous welding
- Autogenous welding
- Both homogeneous and heterogeneous welding

No, the answer is incorrect.
Score: 0
Accepted Answers:
- Heterogeneous welding

13) Which of the following is a correct observation with respect to welding of steel with high sulphur content?

- Monotonously decreasing surface tension away from the centre of the weld pool
- Monotonously increasing surface tension away from the centre of the weld pool
- Narrow and shallow geometry of weld pool
- Deep and narrow geometry of weld pool

No, the answer is incorrect.
Score: 0
Accepted Answers:
- Deep and narrow geometry of weld pool

14) How does the surface tension of pure metal change on the surface of a weld pool during arc welding?

- Increases with distance away from centre of weld pool
- Decreases with distance away from centre of weld pool
- First increases and then decreases with distance away from centre of weld pool
- First decreases and then increases with distance away from centre of weld pool

No, the answer is incorrect.
Score: 0
Accepted Answers:
- Increases with distance away from centre of weld pool

15) Which of the following assumptions is taken commonly by the use of Navier-Stokes equation during modelling of fluid flow in a weld pool?

- Fusion zone consists of non-Newtonian fluid
16. Fluid flow in the fusion zone is laminar.

17. Using the data of thermal field of a weldmelt, temperature plot along a horizontal line across weld pool through its center gives _______.

18. Which of the following component can be neglected from the governing equation in case of steady state for fluid flow modelling?

19. Which of the below methods can be used to render a welding problem a single domain one while modeling fluid flow?
No, the answer is incorrect.
Score: 0
Accepted Answers:
- Enthalpy-porosity method
- Effective viscosity method

20. During welding the ablation pressure __________ with increasing size of vapor column.  

- increases
- decreases
- first increases then decreases
- first decreases then increases

No, the answer is incorrect.
Score: 0
Accepted Answers:
- first increases then decreases