Assignment 9

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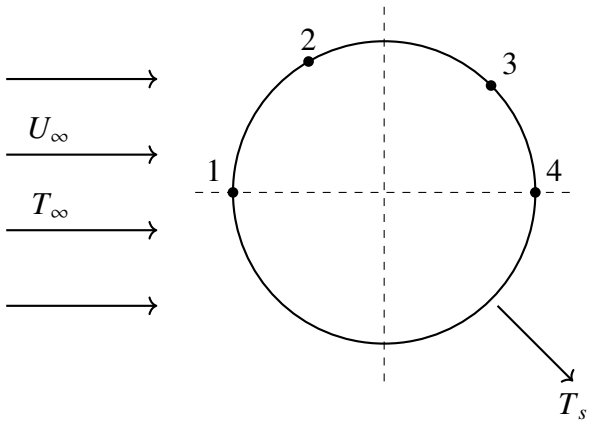
GATE-2014:ME

1) Consider a two-dimensional laminar flow over a long cylinder as shown in figure below.



The free stream velocity is U_∞ and the free stream temperature T_∞ is lower than the cylinder surface temperature T_s. The local heat transfer coefficient is minimum at a point

(ME:2014)

a) 1 b) 2 c) 3 d) 4

2) For a completely submerged body with centre of gravity G and centre of buoyancy B, the condition of stability will be:

(ME:2014)

a) G is located below B
b) G is located above B
c) G and B are coincident
d) Independent of the locations of G and B

3) In a power plant, water (density = $1000\,kg/m^3$) is pumped from $80\,kPa$ to $3\,MPa$. The pump has an isentropic efficiency of 0.85. Assuming that the temperature of the water remains the same, the specific work (in kJ/kg) supplied to the pump is:

(ME:2014)

a) 0.34 b) 2.48 c) 2.92 d) 3.43

4) Which one of the following is a CFC refrigerant?

(ME:2014)

a) $R744$ b) $R290$ c) $R502$ d) $R718$

5) The jobs arrive at a facility, for service, in a random manner. The probability distribution of the number of arrivals of jobs in a fixed time interval is: (ME:2014)

a) Normal b) Poisson c) Erlang d) Beta

6) In exponential smoothing method, which one of the following is true? (ME:2014)
a) $0 \leq \alpha \leq 1$ and high value of α is used for stable demand
b) $0 \leq \alpha \leq 1$ and high value of α is used for unstable demand
c) $\alpha \geq 1$ and high value of α is used for stable demand
d) $\alpha \leq 0$ and high value of α is used for unstable demand

7) For machining a rectangular island represented by coordinates $P(0,0)$, $Q(100,0)$, $R(100,50)$, and $S(0,50)$ on a casting using CNC milling machine, an end mill with a diameter of $16\,mm$ is used. The trajectory of the cutter center to machine the island $PQRS$ is: (ME:2014)

a) $(-8,-8),(108,-8),(108,58),(-8,58),(-8,-8)$
b) $(8,8),(94,8),(94,44),(8,44),(8,8)$
c) $(-8,8),(94,0),(94,44),(8,44),(-8,8)$
d) $(0,0),(100,0),(100,50),(50,0),(0,0)$

8) Which one of the following instruments is widely used to check and calibrate geometric features of machine tools during their assembly? (ME:2014)

a) Ultrasonic probe
b) Coordinate Measuring Machine (CMM)
c) Laser interferometer
d) Vernier calipers

9) The major difficulty during welding of aluminium is due to its: (ME:2014)

a) High tendency of oxidation
b) High thermal conductivity
c) Low melting point
d) Low density

10) The main cutting force acting on a tool during the turning (orthogonal cutting) operation of a metal is $400\,N$. The turning was performed using $2\,mm$ depth of cut and $0.1\,mm/rev$ feed rate. The specific cutting pressure (in N/mm^2) is: (ME:2014)

a) 1000 b) 2000 c) 3000 d) 4000

11) The process of reheating the martensitic steel to reduce its brittleness without any significant loss in its hardness is: (ME:2014)

a) Normalising b) Annealing c) Quenching d) Tempering

12) In solid-state welding, the contamination layers between the surfaces to be welded are removed by: (ME:2014)

a) Alcohol b) Plastic deformation c) Water jet d) Sand blasting

13) The integral $\oint_C (y\,dx - x\,dy)$ is evaluated along the circle $x^2 + y^2 = \frac{1}{4}$ traversed in counterclockwise direction. The integral is equal to:

(ME:2014)

a) 0 b) $-\frac{\pi}{4}$ c) $\frac{\pi}{4}$ d) $-\frac{\pi}{2}$