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Uttar Pradesh Rajya Vidyut Utpadan Nigam Ltd.

Subject : Assisstant Engineer Trainee Mechanical
Test Center Name : Lucknow Institute Of Technology
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Q.1

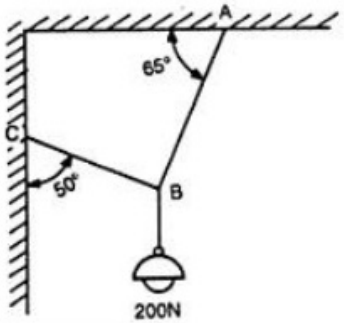
Which of the following is used in vapour compression refrigeration system?

1) Throttle valve
2) Both throttle valve and expansion cylinder
3) Expansion cylinder
4) Pump

Chosen Option: 3

Q.2

An electric light fixture weighing 200 N is supported (as shown in figure). Determine tensile force in wire BC.



1) 158.6 N
2) 120 N
3) 87.5 N
4) 20 N

Chosen Option: 3

Q.3

A steel bar is elongated by the application of axial compressive load of 200 kN. Determine the elongation if the cross section of bar (A) is 40 mm x 40 mm, length of bar (L) is 2m and modulus of elasticity E = 200 GPa.

1) 1.25mm
2) 4.05mm
3) 5.40mm
4) 2.70mm

Chosen Option: 1

Q.4

A closed thermodynamic system manifests when:

1) matter is not allowed to cross the boundary, but energy transfer does occur across the boundary
2) there is absolutely no interaction of the system with surroundings across its boundaries
3) there is only transfer of mass, but no heat and work energy are transferred
4) there is transfer of both mass and energy across the system boundaries

Chosen Option: 2

Q.5

The thickness of oil film at the surface of slip gauges is of the order of:

1) 10 micron
2) 0.005 micron
3) 0.1 micron
4) 1 micron

Chosen Option: 2

Q.6

A helical spring of wire diameter 6 mm and spring index 6 is acted by an initial load of 750 N. After compressing it further by 12 mm the stress in the wire is 500 MPa. Find the number of active coils. (given : G = 84000 MPa).

1) 24

2) 10

3) 30

4) 18

Chosen Option: --

Q.7

Match the following and select the correct answer from the options given below the lists:

Column A	Column B
P: Compressible flow	**U:** Reynolds number
Q: Free surface flow	**V:** Nusselt number
R: Boundary layer flow	**W:** Weber number
S: Pipe flow	**X:** Froude number
T: Heat convection	**Y:** Mach number
	Z: Skin friction coefficient

1) P - Y; Q - W; R - Z; S - U; T - V

2) P - U; Q - X; R - V; S - Z; T - W

3) P - W; Q - X; R - Z; S - U; T - V

4) P - Y; Q - W; R - Z; S - U; T - X

Chosen Option: 2

Q.8

What type of materials are ceramics?

1) Conductors

2) Superconductors

3) Insulators

4) Semiconductors

Chosen Option: 4

Q.9

Among the following, identify the one which is not a component of a control system.

1) A comparison of actual results with the standard

2) A means of measuring accomplishment

3) A standard

4) A flow of authority to enforce the standards

Chosen Option: 3

Q.10

A dummy activity is:

1) Imaginary and alternative to existing pattern

2) Alternative to existing pattern

3) True

4) Imaginary

Chosen Option: 4

Q.11

Which one of the following statements is not related to the first law of thermodynamics?

1) Every process occurring in nature proceeds in the sense in which the sum of the entropies of all bodies taking part in the process is increased.

2) Energy can neither be created nor destroyed

3) The sum total of all energy remains constant

4) Whenever energy is transformed from one form to another, energy is always conserved

Chosen Option: 1

Q.12

For two points A and B located on a planar rigid body, the relative velocity between the two points:

1) should always be along AB

2) should always be perpendicular to AB when the body undergoes pure translation

3) should always be perpendicular to AB

4) can be oriented along any direction

Chosen Option: 4

Q.13

For which of the given conditions heat transfer from the insulated tip can be considered the case of fin of finite length?
(where m is slope of differential equation and L is length of fin).

1) m = 0.75 , L = 3

2) m = 3 , L = 0.72

3) m = 1 , L = 3

4) m = 2 , L = 1.2

Chosen Option: --

Q.14

Which of the following statements is correct for heat and work?

1) Both are point functions
2) Both are intensive properties
3) Both are path functions
4) Both are extensive properties

Chosen Option: 1

Q.15

A condenser of a refrigeration system rejects heat at rate of 150 kW, while its compressor consumes 60 kW power. What would be the coefficient of performance of the system?

1) 2
2) 2.5
3) 1.5
4) 1

Chosen Option: 2

Q.16

Which of the following is a single point cutting tool?

1) Hacksaw blade
2) Grinding wheel
3) Parting tool
4) Milling cutter

Chosen Option: 1

Q.17

Consider the information given below:
A smooth pipe of diameter 200 mm carries water. The pressure in the pipe at section S_1 (elevation: 10 m) is 50 kPa. At section S_2 (elevation: 12 m), the pressure is 20 kPa and the velocity is 2 m/s^2. Density of water is 1000 kg/m^3 and acceleration due to gravity is 9.8 m/s^2.
Which of the following is true?

1) Flow is from S_2 to S_1 and head loss is 1.06 m
2) Flow is from S_1 to S_2 and head loss is 0.53 m
3) Flow is from S_2 to S_1 and head loss is 0.53 m
4) Flow is from S_1 to S_2 and head loss is 1.06 m

Chosen Option: --

Q.18

Which of the following material has the lowest resistivity?

1) Manganin
2) Constantan
3) Nichrome
4) Silver

Chosen Option: 4

Q.19

Which of the following is true if environmentally sound products are made through efficient processes?

1) It is unprofitable, as long as recyclable materials prices are soft.
2) It is easier for repetitive processes than for product-focused processes.
3) It is known as lean manufacturing.
4) It can still be profitable.

Chosen Option: 3

Q.20

If the free-stream fluid velocity (V) is 20 m/s and the pipe diameter (D) is 1 m, calculate the Reynolds number (R), if the dynamic density (ρ) is given by 0.150 kg/m^3 and the fluid viscosity is 0.0000122.

1) 245902
2) 224201
3) 242602
4) 232502

Chosen Option: --

Q.21

A liquid compressed in a cylinder has initially a volume of 20 m^3 at a pressure of 100 Pa. If the new volume is 40 m^3 at a pressure of 50 Pa, the bulk modulus of elasticity would be:

1) -50 Pa
2) -20 Pa
3) 50 Pa
4) 20 Pa

Chosen Option: 3

Q.22

A Transportation firm has 4 exit (Supply) points and 5 entry (Demand) points. The total number of entries is greater than exits. So the number of iterations excluding degeneracy would be:

1) 3
2) 9
3) 0
4) 6

Chosen Option: --

Q.23

Customers arrive at a reception counter at an average interval rate of 10 minutes and receptionist takes an average of 6 minutes for one customer. Determine average queue length.

1) 7/10
2) 3/10
3) 9/10
4) 11/10

Chosen Option: 1

Q.24

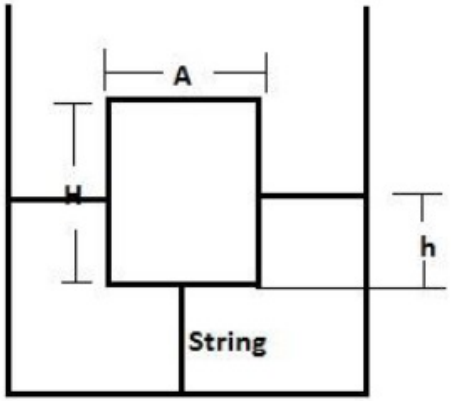
A square surface 3m x 3m lies in a vertical line in water with its upper edge at water surface. The hydrostatic force on square surface is:

1) 17,000 kg
2) 21,350 kg
3) 13,500 kg
4) 28,000 kg

Chosen Option: --

Q.25

A cylindrical body having cross-sectional area **"A"**, height **"H"** and density **"ρ_s"** is immersed to a depth **"h"** in a liquid of density **"ρ"** and is tightened by a string to the bottom. Find the tension in the string. (where g is acceleration due to gravity)



1) ρghA

2) $(\rho - \rho_s)\, ghA$

3) $(\rho_s - \rho)\, ghA$

4) $(\rho h - \rho_s H)gA$

Chosen Option: 4