

# 2010-ME-'14-26'

AI24BTECH11006 - Bugada Roopansha

- 14) A phenomenon is modeled using dimensional variables with  $k$  primary dimensions. The number of non-dimensional variables is:
  - a)  $k$
  - b)  $n$
  - c)  $n - k$
  - d)  $n + k$
- 15) A turbo-charged four-stroke direct injection diesel engine has a displacement volume of  $0.0259 \text{ m}^3$  (25.9 litres). The engine has an output of 950 kW at 2200 rpm. The mean effective pressure (*in MPa*) is closest to:
  - a) 2
  - b) 1
  - c) 0.2
  - d) 0.1
- 16) One kilogram of water at room temperature is brought into contact with a high-temperature thermal reservoir. The entropy change of the universe is:
  - a) equal to entropy change of the reservoir
  - b) equal to entropy change of water
  - c) equal to zero
  - d) always positive
- 17) A hydraulic turbine develops 1000 kW power for a head of 40 m. If the head is reduced to 20 m, the power developed (*in kW*) is:
  - a) 177
  - b) 354
  - c) 500
  - d) 707
- 18) The material property which depends only on the basic crystal structure is:
  - a) fatigue strength
  - b) work hardening
  - c) fracture strength
  - d) elastic constant
- 19) In a gating system, the ratio 1 : 2 : 4 represents:
  - a) sprue base area: runner area :ingate area
  - b) pouring basin area: ingate area: runner area
  - c) sprue base area: ingate area: casting area
  - d) runner area: ingate area: casting area
- 20) A shaft has a dimension,  $35 - 40 \pm 35$ . The respective values of fundamental deviation and tolerance are:
  - a)  $-0.025, \pm 0.008$
  - b)  $-0.025, 0.016$
  - c)  $-0.009, \pm 0.008$
  - d)  $-0.009, 0.016$
- 21) In a CNC program block, `N002 G02 G91 X40 Z40...`, `G02` and `G91` refer to:
  - a) circular interpolation in counterclockwise direction and incremental dimension
  - b) circular interpolation in counterclockwise direction and absolute dimension
  - c) circular interpolation in clockwise direction and incremental dimension
  - d) circular interpolation in clockwise direction and absolute dimension
- 22) The demand and forecast for February are 12000 and 10275, respectively. Using single exponential smoothing method (*smoothing coefficient* = 0.25), the forecast for the month of March is:
  - a) 431
  - b) 9587
  - c) 10706
  - d) 11000
- 23) Little's law is a relationship between:
  - a) stock level and lead time in an inventory system
  - b) waiting time and length of the queue in a queuing system
  - c) number of machines and job due dates in a scheduling problem
  - d) uncertainty in the activity time and project completion time
- 24) Vehicle manufacturing assembly line is an example of:
  - a) product layout
  - b) process layout

- c) manual layout
- d) fixed layout

25) Simplex method of solving linear programming problems uses:

- a) all the points in the feasible region
- b) only the corner points of the feasible region
- c) intermediate points within the infeasible region
- d) only the interior points in the feasible region

26) Torque exerted on a flywheel over a cycle is listed in the table. Flywheel energy (*in J per unit cycle*) using Simpson's rule is:

Angle ( <i>degree</i> )	Torque ( <i>Nm</i> )
0	0
60	1066
120	-323
180	0
240	323
300	-355
360	0

- a) 542
- b) 993
- c) 1444
- d) 1986