

310/c

Selection for the post of CTI, TTC

Candidates are required to answer **ALL TWENTYFIVE** questions from Section A and **any FIVE** from section B. Each question in section A carries 2 marks each and questions in section B carries 10 marks each.

Total Marks 100

Time 3 hours

Section A

1. The accuracy of micrometers, callipers, dial indicators can be checked by a
 - A. feeler gauge
 - B. slip gauge
 - C. ring gauge
 - D. plug gauge

2. Strain energy is the
 - A. energy stored in a body when strained within elastic limits
 - B. energy stored in a body when strained upto the breaking of a specimen
 - C. maximum strain energy which can be stored in a body
 - D. proof resilience per unit volume of a material

3. In arc welding, the electric arc is produced between the work and the electrode by
 - A. voltage
 - B. flow of current
 - C. contact resistance
 - D. all of these

- 4.0 The draft or taper allowance on casting is generally
 - A. 1 to 2 mm/m
 - B. 2 to 5 mm/m
 - C. 5 to 10 mm/m
 - D. 10 to 15 mm/m

- 5.0 Which of the following welding process uses non-consumable electrodes?
 - A. TIG welding
 - B. MIG welding
 - C. Manual arc welding
 - D. Submerged arc welding

- 6.0 Galvanising is a
 - A. zinc diffusion process
 - B. process of coating zinc by hot dipping
 - C. process used for making thin phosphate coating on steel
 - D. none of the above

7. A man standing at a point P is watching the top of a tower, which makes an angle of elevation of 30° with the man's eye. The man walks some distance towards the tower to watch its top and the angle of the elevation becomes 60° . What is the distance between the base of the tower and the point P?

- A. 43 units
- B. 8 units
- C. 12 units
- D. Data inadequate
- E. None of these

8. In back-hand welding, the angle between the welding torch and the work is kept as

- A. $30^\circ-40^\circ$
- B. $40^\circ-50^\circ$
- C. $50^\circ-60^\circ$
- D. $60^\circ-70^\circ$

9. Notching is the operation of

- A. cutting a sheet of metal in a straight line along the length
- B. removal of metal to the desired shape from the edge of a plate
- C. cutting a sheet of metal through part of its length and then bending the cut portion
- D. bending a sheet of metal along a curved axis

10. Aluminium is the best material for making patterns because it is

- A. light in weight
- B. easy to work
- C. corrosion resistant
- D. all of these

11. Lancing is the operation of

- A. cutting a sheet of metal in a straight line along the length
- B. removal of metal to the desired shape from the edge of a plate
- C. cutting a sheet of metal through part of its length and then bending the cut portion
- D. bending a sheet of metal along a curved axis

12. Rotary swaging

- A. is extensively used for making bolts and rivets
- B. is used for reducing the diameters of round bars and tubes by rotating dies which open and close rapidly on the work
- C. is used to improve fatigue resistance of the metal by setting up compressive stresses in its surface
- D. consists of pressing the metal inside a chamber to force it out by high pressure through an orifice which is shaped to provide the desired form of the finished part

13. Lap joints are employed on plates having thickness

- A. less than 3 mm
- B. 5 to 10 mm
- C. 12.5 mm
- D. above 25 mm

14. In permanent mould casting method

molten metal is poured in a metallic mould, retained in the mould long enough for the
A. outer skin to solidify and finally mould is turned over to remove molten metal still in molten condition

B. molten metal is poured and allowed to solidify while the mould is revolving

C. molten metal is forced into mould under high pressure

D. none of the above

15. The instrument used to measure external and internal diameter of shafts, thickness of parts and depth of holes, is

A. outside micrometer

B. inside micrometer

C. depth gauge micrometer

D. vernier calliper

16. For gas welding, the pressure desired at the welding torch for oxygen is

A. 7 to 103 kN/m²

B. 70 to 280 kN/m²

C. 280 to 560 kN/m²

D. 560 to 840 kN/m²

17. Two balls of equal mass and of perfectly elastic material are lying on the floor. One of the ball with velocity v is made to struck the second ball. Both the balls after impact will move with a velocity

A. v

B. $v/2$

C. $v/4$

D. $v/8$

18. The velocity ratio in case of an inclined plane inclined at angle θ to the horizontal and weight being pulled up the inclined plane by vertical effort is

A. $\sin \theta$

B. $\cos \theta$

C. $\tan \theta$

D. $\operatorname{cosec} \theta$

19. A body of weight W is required to move up on rough inclined plane whose angle of inclination with the horizontal is α . The effort applied parallel to the plane is given by (where $\mu = \tan \phi =$ Coefficient of friction between the plane and the body.)

A. $P = W \tan \alpha$

B. $P = W \tan(\alpha + \phi)$

C. $P = W (\sin \alpha + \mu \cos \alpha)$

D. $P = W (\cos \alpha + \mu \sin \alpha)$

20. What is the total surface area of a right circular cone of height 14 cm and base radius 7 cm?

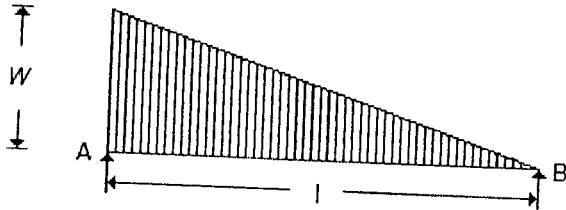
A. 344.35 cm²

B. 462 cm²

C. 498.35 cm²

D. None of these

21 The maximum bending moment for the beam shown in the below figure, lies at a distance of _____ from the end B.



- A. $l/2$
 - B. $l/3$
 - C. $\frac{l}{\sqrt{2}}$
 - D. $\frac{l}{\sqrt{3}}$
- 22 A certain Wheatstone bridge has the following resistor values: $R_1 = 10 \text{ k}\Omega$, $R_2 = 720 \Omega$, and $R_4 = 2.4 \text{ k}\Omega$. The unknown resistance is
- A. 24Ω
 - B. 2.4Ω
 - C. 300Ω
 - D. $3,000 \Omega$
- 23 A certain series circuit consists of a $1/8 \text{ W}$ resistor, a $1/4 \text{ W}$ resistor, and a $1/2 \text{ W}$ resistor. The total resistance is 1200Ω . If each resistor is operating in the circuit at its maximum power dissipation, total current flow is
- A. 27 mA
 - B. 2.7 mA
 - C. 19 mA
 - D. 190 mA

24. Metals are good conductors of electricity because

- A. they contain free electrons
- B. the atoms are lightly packed
- C. they have high melting point
- D. All of the above

25. Which of the following statement is wrong?

- A. The heat transfer in liquid and gases takes place according to convection.
- B. The amount of heat flow through a body is dependent upon the material of the body.
- C. The thermal conductivity of solid metals increases with rise in temperature,
- D. Logarithmic mean temperature difference is not equal to the arithmetic mean temperature difference.

Section B

1.
 - i) Describe the heat treatment process for spring manufacturing in ICF.
 - ii) What are the tests done on the spring after manufacture?
2.
 - i) What is lean manufacturing?
 - ii) Define cutting speed, feed, depth of cut and machining timing for a Milling machine?
3. What are various welding processes deployed in ICF? Discuss the advantage and disadvantage of each system.
4. Write notes on following:
 - a) Welding defects
 - b) Vernier calliper
 - c) Batch order
 - d) Non-stock procurement
 - e) Poisson's ratio
5. Write notes on following:
 - a) Factory Layout
 - b) Isometric view
 - c) Modulus of Elasticity
 - d) IMS
 - e) Least count
- 6) Write notes on following;
 - a) Incentive scheme deployed in ICF
 - b) Factory act
 - c) WCA
 - d) ERP
 - e) Official Language act
