# NATIONAL INSTITUTE OF TECHNICAL TEACHERS TRAINING AND RESEARCH
### (DEEMED TO BE UNIVERSITY UNDER DISTINCT CATEGORY)
## CHANDIGARH

### Ph.D. Entrance Examination - December 2025 Session

| Subject / Branch / Department | : | Mechanical Engineering |
|---|---|---|
| Roll No. | : | |
| Candidate Name | : | |
| Date of Examination | : | 29-August-2025 |

### Maximum Marks: 25 (There is no negative marking)

**Notes:** (a) Only one option to be tick-marked out of the four options given as answer

(b) The Candidate must put his/her signature with date at the bottom of each page

(c) For any rough work, please use ONLY back-sides of pages which are left blank

| | |
|---|---|
| **Q1.** | The dendrite structure is observed while solidification for: |
| **(a)** | Low cooling rate |
| **(b)** | Very high cooling rate |
| **(c)** | High cooling rate |
| **(d)** | Both a and b |
| **Q2.** | What is the range of carbon content in steel? |
| **(a)** | 0-0.8% |
| **(b)** | 0-2% |
| **(c)** | 0-4.4% |
| **(d)** | 0-6.67% |
| **Q3.** | T.T.T diagram indicates time and temperatures transformation of: |
| **(a)** | austenite |
| **(b)** | ferrite |
| **(c)** | pearlite |
| **(d)** | cementite |
| **Q4.** | Resilience of material is important when it is subjected to: |
| **(a)** | Combined loading |
| **(b)** | Fatigue |
| **(c)** | Thermal Stresses |
| **(d)** | Shock loading |

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| Q5. | Composites can be classified based on _____ |
|---|---|
| (a) | Matrix type |
| (b) | Reinforcement constituent |
| (c) | Matrix type and Reinforcement constituent |
| (d) | Neither on matrix type nor on reinforcement constituent |
| Q6. | In the process normalizing of steel, the steel is heated above its upper critical temperature in the range of: |
| (a) | 200-150°C |
| (b) | 30-50°C |
| (c) | 80-100°C |
| (d) | 110-200°C |
| Q7. | During normalizing process of steel, the specimen is heated_____ |
| (a) | above the upper critical temperature and cooled in still air |
| (b) | below the upper critical temperature and cooled in still air |
| (c) | below the lower critical temperature and cooled in still air |
| (d) | above the upper critical temperature and cooled in in the furnace |
| Q8. | Which of the following has a greater impact on the longitudinal strength of reinforced composites? |
| (a) | Fiber orientation |
| (b) | Fiber strength |
| (c) | Fiber length |
| (d) | Fiber diameter |
| Q9. | Heat treatment is often done to: |
| (a) | Join plates |
| (b) | Non-destructive testing of plates |
| (c) | Stress relieving of cold worked materials |
| (d) | Remove cracks in welds |
| Q10. | Which kind of corrosion is difficult to monitor and is very dangerous for metal? |
| (a) | Stress corrosion |
| (b) | Galvanic corrosion |
| (c) | Crevice corrosion |
| (d) | Pitting corrosion |

Q11. Part-programming mistakes can be avoided in:

| | |
|---|---|
| (a) | NC |
| (b) | CNC |
| (c) | Both CNC and NC |
| (d) | None of the above |

Q12. Which of the following is the full form of CIPMS?

| | |
|---|---|
| (a) | Computer-integrated production management system |
| (b) | Computer-induced planning for the management system |
| (c) | Computer-integrated process for machining science |
| (d) | None of the above |

Q13. Numerical control _____

| | |
|---|---|
| (a) | applies only to milling machines |
| (b) | is a method for controlling through a set of instructions |
| (c) | is a method for producing the exact number of parts per hour |
| (d) | none of the mentioned |

Q14. Which of the following is not the advantage of CNC machines?

| | |
|---|---|
| (a) | Improved quality |
| (b) | Reduced scrap rate |
| (c) | Higher flexibility |
| (d) | Improved strength of the components |

Q15. The function of interpolator in a CNC machine controller is to:

| | |
|---|---|
| (a) | Control spindle speed |
| (b) | Control tool rapid approach speed |
| (c) | Generate a reference signal prescribing the shape of the part to be machined |
| (d) | Perform miscellaneous (M) functions (tool change, coolent control etc) |

Q16. CAD/CAM is the relationship between:

| | |
|---|---|
| (a) | Science and engineering |
| (b) | Design and manufacturing |
| (c) | Design and marketing |
| (d) | Manufacturing and marketing |

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| Q17. | The basic geometric building blocks provided in a CAD/CAM package are |
|------|------------------------------------------------------------------------|
| (a) | points |
| (b) | lines |
| (c) | circles |
| (d) | All of the mentioned |

| Q18. | The integration of CAD and CAM is called |
|------|--------------------------------------------|
| (a) | Computer-integrated manufacturing |
| (b) | CAE/CAM |
| (c) | Computer-aided Engineering |
| (d) | Computer-aided design |

| Q19. | Dwell in CNC programme is defined by |
|------|---------------------------------------|
| (a) | G01 |
| (b) | G02 |
| (c) | G04 |
| (d) | G03 |

| Q20. | The model, which is created by using basic entities of two dimensions, is called: |
|------|------------------------------------------------------------------------------------|
| (a) | Surface model |
| (b) | Wire frame model |
| (c) | Solid model |
| (d) | Isometric model |

| Q21. | In which of the following processes thereisno tool wear? |
|------|-----------------------------------------------------------|
| (a) | EDM |
| (b) | ECM |
| (c) | USM |
| (d) | All of them |

| Q22. | In USM material removal increases with: |
|------|------------------------------------------|
| (a) | Increase in frequency and amplitude of vibration |
| (b) | Increase in frequency and decrease in amplitude of vibration |
| (c) | Decrease in frequency and decrease in amplitude of vibration |
| (d) | Decrease in frequency and increase in amplitude of vibration |

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| | |
|---|---|
| **Q23.** | In ECM, material removal is due to: |
| **(a)** | Corrosion |
| **(b)** | Erosion |
| **(c)** | Ion displacement |
| **(d)** | Fusion |
| **Q24.** | Which of the following materials cannot be machined by EDM? |
| **(a)** | Ti |
| **(b)** | CI |
| **(c)** | Steel |
| **(d)** | Glass |
| **Q25.** | In electrochemical machining, the gap between the tool and work is kept usually as |
| **(a)** | 0.1mm |
| **(b)** | 0.75mm |
| **(c)** | 0.4mm |
| **(d)** | 0.25mm |

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## ANSWER KEY - Ph.D. Entrance Examination - December 2025 Session

| Subject / Branch / Department | : | MECHANICAL ENGINEERING |
|---|---|---|
| Date of Examination | : | 29-AUGUST-2025 |

Answers:

| | | | | | |
|---|---|---|---|---|---|
| 1. | c | 11 | c | 21 | b |
| 2. | b | 12 | a | 22 | a |
| 3. | a | 13 | b | 23 | c |
| 4. | d | 14 | d | 24 | d |
| 5. | c | 15 | c | 25 | b |
| 6. | b | 16 | b | | |
| 7. | a | 17 | d | | |
| 8. | b | 18 | a | | |
| 9. | c | 19 | c | | |
| 10. | d | 20 | b | | |