

(Common Question Paper model for All Trades)

Limited Departmental Competitive Examination - 2007
For the Post of Chageman (Tech/Non-Tech)

QUESTION PAPER

Subject: **General Engg. & Metallurgical Engg.**

Code: **1.73 / 264**

Sr. No.:

Roll No.:

.....

Signature of the Invigilator

Date: 20.04.2007

Duration: 2 Hours

Time: 09:00 Hrs. to 11:00 Hrs.

Max. Marks: 70

Instructions: Please read the following instructions carefully before writing your answers:

- 1) All Questions are compulsory.
- 2) Each Questions carries 1 mark.
- 3) There are four alternatives - (A), (B), (C), (D) given against each question out of which only one is the most appropriate answer. If (A) is correct, round on the correct alternative like (A) .
- 4) **The discarded answer if any, must be crossed properly and supported by initial of the candidate.**
- 5) If a question is answered wrongly or more than one answers are marked, 0.25 marks will be deducted for each such question.
- 6) **Use only blue or black ball pen only. Use of Pencil is not allowed.**
- 7) No sheet from the Question Paper / Answer Book should be detached.
- 8) **You may do rough work, if required, on the blank sheets.**
- 9) Please DO NOT repeat DO NOT write your name anywhere on the Question Paper.

Q.1. Angstrom is a unit of:

- (A) Length (B) Sound level (C) Force (D) Power

Q.2. Find the value of $1400 \div 200 \times (150 \div 50)$:

- (A) 200 (B) 400 (C) 600 (D) 800

Q.3. What is the voltage source for a circuit carrying 2 A of current through a 36 ohms resistor?

- (A) 1.8 V (B) 18 V (C) 7.2 V (D) 72 V

Q.4. Subtract $12xy + 5yz + 9zx$ from $15xy + 6yz + 7zx$:

- (A) $27xy + 11yz + 2zx$ (B) $27xy + 11yz + 2zx$ (C) $3xy + 11yz + 16zx$ (D) $27xy + 11yz + 16zx$

Q.5. Copper, lead and zinc mostly occur in the form of:

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(A) Oxides (B) Carbonates (C) Silicates (D) Sulphides

Q.6. The value of $\cos 60^\circ$ is:

(A) 0.5 (B) 0.866 (C) 1 (D) ?

Q.7. Aluminium and its alloys are given excellent protection against corrosion by:

(A) anodising (B) Galvanising (C) Lead coating (D) None of these

Q.8. Aluminium has low:

(A) Tensile strength (B) Specific gravity (C) Both 'A' & 'B' (D) Neither 'A' nor 'B'

Q.9. Ageing of aluminium alloys causes increase in its:

(A) Strength (B) Hardness (C) Both 'A' & 'B' (D) Neither 'A' nor 'B'

Q.10. How many primary volts must be applied to a transformer with a turns ratio of 0.1 to obtain a secondary voltage of 9 V?

(A) 9 V (B) 90 V (C) 900 V (D) 0.9 V

Q.11. Which of the following facilities is not required in an integrated steel plant having cent percent facilities for continuous casting of steel ?

(A) Hot rolling mill (B) Cold rolling mill (C) Slabbing mill (D) None of these

Q.12. Forging of plain carbon steel is carried out at _____ deg C:

(A) 900 (B) 1100 (C) 1300 (D) 1500

Q.13. Radiation thermometer cannot measure the temperature:

(A) inside a pressure vessel

(B) of an object without coming in physical contact with it

(C) of liquid oxygen

(D) of moving objects at high temperature

Q.14. During induction hardening, the depth of hardening is controlled by:

(A) Current (B) Voltage (C) Frequency (D) Phase angle

Q.15. The process of heating iron base alloys to approximately 40°C above the critical temperature range followed by cooling to below that range in still air at ordinary temperature is known as:

(A) Normalizing (B) Annealing (C) Tempering (D) Spheroidizing

Q.16. Forces are called co-planer when all of them acting on a body lie in:

(A) One point (B) One plane (C) Different planes (D) Perpendicular planes

Q.17. Unit of work or energy in SI unit is:

(A) newton (B) pascal (C) kilogram-metre (D) joule

Q.18. In actual machines:

(A) Mechanical advantage is equal to velocity ratio

(B) Mechanical advantage is greater than velocity ratio

(C) Mechanical advantage is less than velocity ratio

(D) Mechanical advantage is unity

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- Q.19. The intensity of stress which causes unit strain is called:
(A) Unit stress (B) Modulus of rigidity (C) Bulk modulus (D) Modulus of elasticity
- Q.20. Velocity is:
(A) Same as speed
(B) Velocity has sense and is a vector quantity
(C) Velocity has sense and is a scalar quantity
(D) None of these
- Q.21. Brinell's & Vicker's hardness values are almost identical upto a hardness of:
(A) 60 (B) 130 (C) 235 (D) 300
- Q.22. The minimum percentage of nickel or chromium in austenitic stainless steel is:
(A) 3 (B) 6 (C) 8 (D) 12
- Q.23. An alloy of aluminium and _____ is called Hindalium:
(A) Magnesium (B) Silver (C) Manganese (D) Nickel
- Q.24. An example of shaft furnace is:
- Q.25. If fuel and air are mixed ahead of the burner, it is called a _____ burner:
(A) Premix (B) Outside mixing type (C) Rotary (D) Diffusion
- Q.26. Reheating furnace (pusher type) is used for heating steel:
(A) Ingots (B) Slabs (C) Coils (D) Sheets
- Q.27. Maximum thermal efficiency of boiler may be about _____ percent:
(A) 10 (B) 25 (C) 65 (D) 90
- Q.28. Carbon is present in the uncombined (graphitic) form in case of:
(A) Cast iron (B) Steel (C) Ferroalloy (D) None of these
- Q.29. Which is the best moulding process for production of large intricate castings weighing more than 100 tons ?
(A) Pit moulding (B) Ceramic moulding (C) Green sand moulding (D) Cement moulding
- Q.30. _____ is a thermo mechanical treatment of metal:
(A) Annealing (B) Martempering (C) Ausforming (D) Austempering
- Q.31. Paralite is a mixture of _____ and cementite:
(A) γ - iron (B) δ - iron (C) ϵ - iron (D) ledeburite
- Q.32. How can the defect be corrected, if a steel part develops insufficient hardening after quenching ?
(A) By reheating the part in oxidising atmosphere followed by quenching
(B) By annealing or normalizing followed by hardening
(C) By removing the scale from the surface of the part
(D) Either 'A', 'B' or 'C'
- Q.33. Red or reddish black-iron ore contains mainly:
(A) Hematite (B) Magnetite (C) Limonite (D) Carbonate

Q.34. Vacuum degassing of steel is done to:

- (A) Remove hydrogen from steel to avoid prolonged annealing treatment particularly in forging quality steels
- (B) Improve cleanliness by removing the oxygen in the form of CO gas
- (C) Produce very low carbon steel ($< 0.03\%$) by transferring part of the refining from the furnace to the degassing unit
- (D) All of these

Q.35. High hydrogen content in steel:

- (A) causes hair line cracking in high alloy steel
- (B) reduces its ductility
- (C) both 'A' & 'B'
- (D) Neither 'A' nor 'B'

Q.36. During steel ingot casting, shrinkage cavity can be minimised by using:

- (A) High teeming temperature
- (B) Hot tops
- (C) Exothermic powders
- (D) Both 'B' & 'C'

Q.37. Vacuum refining of liquid steel aims at reducing _____ in it:

- (A) Carbon content
- (B) Dissolved gases
- (C) Non-metallic inclusions & dissolved gases
- (D) Both 'A' & 'B'

Q.38. In electric arc process of steel making, the slag duration oxidation period has:

- (A) Low basicity
- (B) Low FeO content
- (C) Low basicity & high FeO content
- (D) High basicity & low FeO content

Q.39. With increase in temperature, the electrical conductivity of steel slag:

- (A) Increase
- (B) Decrease
- (C) Remains unaffected
- (D) May increase or decrease, depending on slag composition

Q.40. Induction furnaces work on the principle of:

- (A) combination of induced current and skin effect
- (B) induction and resistance
- (C) current flow between the coil & the work
- (D) current flow through a heating element

Q.41. In Electro-slag re-melting process:

- (A) the mould is made of stainless steel & acts as an electrode
- (B) the mould is made of stainless steel & the cast come out of bottom
- (C) the mould is made of silicon steel & has a water jacket
- (D) the mould holds slag and the bottom plate with solidified cast acts as one of the electrodes

Q.42. In electro-slag re-melting:

- (A) very high frequency is used
- (B) very low frequency is used
- (C) high current & voltage is used
- (D) medium frequency is used

Q.43. Galvanising of steel sheet is done for improving its:

- (A) corrosion resistance
- (B) lustre
- (C) high temperature strength
- (D) tensile stress

Q.44. Corrosion of some metals can be prevented by its:

- (A) purification
- (B) alloying
- (C) painting
- (D) all of these

Q.45. The most popular method of NDT used in tube inspection:
(A) X - ray (B) Dye penetrant (C) Eddy current (D) None of these

Q.46. _____ is not a non-destructive test for a material:
(A) Radiography test (B) Magna flux method (C) Ultrasonic test (D) Wohler fatigue test

Q.47. Steel balls for ball bearings are generally made of carbon chrome steel and they are hardened to a hardness value of about _____ VPN.
(A) 100? 150 (B) 250? 300 (C) 400? 500 (D) 700? 800

Q.48. _____ of a material is designated by its Izod value:
(A) Impact resistance (B) Tensile strength (C) Creep strength (D) Hardness

Q.49. Which of the following is present in the micro-structure of black heart malleable iron ?
(A) Graphite flakes in ferrite matrix
(B) Graphite flakes in pearlite matrix
(C) Graphite modules in ferrite and pearlite matrix
(D) None of these

Q.50. Steel before pouring into moulds (during casting of steel) must be thoroughly:
(A) oxidised (B) de-oxidised (C) normalised (D) None of these

Q.51. A _____ machine is used to give uniform sand hardness throughout the mould:
(A) Squeezing (B) Diaphragm moulding (C) Jolt (D) Stripper plate

Q.52. Which rolling mill cannot reduce a slab directly to strip in one pass through the mill ?
(A) Cogging mill (B) Planetary mill (C) Three high mill (D) None of these

Q.53. Current is measured in?
(A) watts (B) volts (C) henries (D) amperes

Q.54. Separation of particles of various sizes, shapes & densities by allowing them to settle in a fluid is called:
(A) Classification (B) Forth floatation (C) Thickness (D) None of these

Q.55. Molten metal after solidifying in a mould possess different _____ properties:
(A) Metallurgical (B) Mechanical (C) Both 'A' & 'B' (D) Neither 'A' nor 'B'

Q.56. Flange wrinkling is the defect found in:
(A) Rolling (B) Forging (C) Bending (D) Deep drawing

Q.57. Deformation and volume changes of the part during its heat treatment can be minimised by:
(A) using surface hardening process wherever possible
(B) slow cooling of the part in martensitic range
(C) using alloy steels least prone to such changes
(D) Either 'A', 'B' or 'C'

Q.58. The main/maximum use of lead is in:
(A) Storage batteries manufacture (B) Lining of chemical equipment (C) Bearing material manufacture (D) Paint manufacture

Q.59. Percentage of copper in high grade copper is about:

- (A) 20 (B) 40 (C) 60 (D) 80

Q.60. Dome temperature of blast furnace stove is most accurately measured by:

- (A) Radiation pyrometer (B) Platinum-platinum / rhodium thermocouple (C) Iron-constantan thermocouple (D) Platinum resistance thermocouple

Q.61. Thermocouples can be used to measure temperature of:

- (A) Gas (B) Powdered metal (C) Molten metal (D) Solid metal

Q.62. A sample of steel shows excessive hardness after tempering due to:

- (A) high temperature during tempering
(B) Insufficient holding time during tempering
(C) Change in volume during cooling
(D) None of these

Q.63. Fill a suitable number in the box in the following so that the four numbers form a proportion: 12, 21, 8, ____ ?

- (A) 15 (B) 17 (C) 27 (D) 14

Q.64. Iron alloy having carbon more 2% is known as:

- (A) Cast iron (B) High Carbon Steel (C) Mild Steel (D) None of these

Q.65. Steel with carbon below 0.8% is known as:

- (A) Eutectoid Steel (B) Hyper-tectoid Steel (C) Hypo-tectoid Steel (D) Austenite Steel

Q.66. Ratio of copper to zinc in utensil grade brass is about:

- (A) 1 : 1 (B) 2 : 1 (C) 3 : 1 (D) 4 : 1

Q.67. Thermistors are used in _____ devices:

- (A) Voltage measuring (B) Temperature measuring (C) Temperature & voltage measuring
(D) Voltage & current measuring

Q.68. Very high sulphur in pig iron makes:

- (A) it hard (B) it soft & machinable (C) it brittle & malleable (D) its casting unsound

Q.69. Spheroidising of a material is a/an _____ process:

- (A) Normalising (B) Annealing (C) Tempering (D) Hardening

Q.70. As compared to ball bearing, a needle roller bearing has:

- (A) less friction (B) less area requirement (C) large load capacity to size ratio (D) All of these