CET(PG)-2015

Sr. No. : 191064

Question Booklet Series : A

Important : Please consult your Admit Card / Roll No. Slip before filling your Roll Number on the Test Booklet and Answer Sheet.

Roll No. *In Figures* *In Words*

O.M.R. Answer Sheet Serial No.

Signature of the Candidate :

Subject : M.E. (Mechanical Engineering)

Time : 90 minutes **Number of Questions : 75** **Maximum Marks : 75**

DO NOT OPEN THE SEAL ON THE BOOKLET UNTIL ASKED TO DO SO

INSTRUCTIONS

1. Write your Roll No. on the Question Booklet and also on the OMR Answer Sheet in the space provided and nowhere else.
2. Enter the Subject and Series Code of Question Booklet on the OMR Answer Sheet. Darken the corresponding bubbles with **Black Ball Point / Black Gel pen.**
3. Do not make any identification mark on the Answer Sheet or Question Booklet.
4. To open the Question Booklet remove the paper seal gently when asked to do so.
5. Please check that this Question Booklet contains **75** questions. In case of any discrepancy, inform the Assistant Superintendent within 10 minutes of the start of test.
6. Each question has four alternative answers (A, B, C, D) of which only one is correct. For each question, darken only one bubble (A or B or C or D), whichever you think is the correct answer, on the Answer Sheet with **Black Ball Point / Black Gel pen.**
7. If you do not want to answer a question, leave all the bubbles corresponding to that question blank in the Answer Sheet. No marks will be deducted in such cases.
8. Darken the bubbles in the OMR Answer Sheet according to the Serial No. of the questions given in the Question Booklet.
9. Negative marking will be adopted for evaluation i.e., 1/4th of the marks of the question will be deducted for each wrong answer. A wrong answer means incorrect answer or wrong filling of bubble.
10. For calculations, use of simple log tables is permitted. Borrowing of log tables and any other material is not allowed.
11. For rough work only the sheets marked "Rough Work" at the end of the Question Booklet be used.
12. The Answer Sheet is designed for **computer evaluation**. Therefore, if you do not follow the instructions given on the Answer Sheet, it may make evaluation by the computer difficult. **Any resultant loss to the candidate on the above account, i.e., not following the instructions completely, shall be of the candidate only.**
13. After the test, hand over the Question Booklet and the Answer Sheet to the Assistant Superintendent on duty.
14. In no case the Answer Sheet, the Question Booklet, or its part or any material copied/noted from this Booklet is to be taken out of the examination hall. Any candidate found doing so, would be expelled from the examination.
15. A candidate who creates disturbance of any kind or changes his/her seat or is found in possession of any paper possibly of any assistance or found giving or receiving assistance or found using any other unfair means during the examination will be expelled from the examination by the Centre Superintendent/Observer whose decision shall be final.
16. **Telecommunication equipment such as pager, cellular phone, wireless, scanner, etc., is not permitted inside the examination hall. Use of calculator is not allowed.**

SEAL

1. **The minimum resultant of two forces of magnitudes 10 N and 7 N will be :**

   (A) 17 N (B) 10 N

   (C) 7 N (D) 3 N

2. **The maximum frictional force that comes into play, when a body just tends to move over another body, is called :**

   (A) Rolling friction (B) Sliding friction

   (C) Limiting friction (D) Dynamic friction

3. **Fulcrum always lies between load and effort in :**

   (A) Class I lever (B) Class III Lever

   (C) Class II Lever (D) Cranked lever

4. **If the diameter of a shaft (subjected to torque alone) is doubled, then the maximum horse power which can be transmitted by the shaft gets increased by :**

   (A) Two times (B) Four times

   (C) Six Times (D) Eight times

5. **Which of the following statements is true ?**

   (A) When transverse strain increases, axial strain also increases

   (B) When transverse strain decreases, axial strain also decreases

   (C) When transverse strain increases, axial strain decreases

   (D) There is no relationship between transverse strain and axial strain

6. **A turbo machine becomes prone to cavitation, if :**

   (A) Temperature exceeds critical value (B) Temperature falls below a critical value

   (C) Pressure falls below a vapour pressure (D) Velocity exceeds a critical value

7. **The Froude number is the ratio of :**

   (A) Inertia force to pressure force (B) Inertia force to surface tension force

   (C) Inertia force to gravity force (D) Inertia force to viscous force

8. **Priming is required in :**

   (A) Reciprocating pump (B) Centrifugal pump

   (C) Axial flow pump (D) Rotary pump

9. **An ideal fluid has :**

(A) Zero density
(B) Zero surface tension
(C) Zero specific gravity
(D) Zero viscosity

10. **Hegen-Poiseuille equation is valid for :**

(A) Turbulent flow
(B) Laminar flow
(C) Rotational flow
(D) Uniform flow

11. **Which of the following relationships is wrong ?**

(A) $TdS = dU + pdV$
(B) $TdS = dH + Vdp$
(C) $Q = \Delta E + W$
(D) $TdS = dH - Vdp$

12. **Triple point condition refers to a state, when degree of freedom equals to :**

(A) 3
(B) 2
(C) 1
(D) 0

13. **For the same compression ratio and same heat rejection, what is the order of efficiency of Otto, Diesel and Dual cycle?**

(A) Otto > Diesel > Dual
(B) Otto > Dual > Diesel
(C) Diesel > Otto > Dual
(D) Diesel > Dual > Otto

14. **Select a turning pair from the following kinematic pairs :**

(A) Nut and bolt
(B) Roller bearing
(C) Cross-heads and guides of reciprocating engine
(D) Crankshaft moving in a journal bearing

15. **The standard value of addendum is :**

(A) 2 module
(B) 1 module
(C) 1.157 module
(D) 3 module

16. **Which of the following is an imaginary circle ?**

(A) Mohr's circle
(B) Addendum circle
(C) Dedendum circle
(D) Pitch circle

17. **During tensile testing of a specimen using UTM, the parameters actually measured include :**

(A) True stress and true strain
(B) Engineering stress and engineering strain
(C) Poisson's ratio and Young's modulus
(D) Load and elongation

SEAL

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18. **Interchangeability can be achieved by :**

(A) Better process planning
(B) Better product planning
(C) Standardization
(D) Simplification

19. **The most suitable theory of failure for brittle materials is :**

(A) Maximum normal stress theory
(B) Maximum shear stress theory
(C) Maximum distortion energy theory
(D) Maximum strain energy theory

20. **For resistance spot welding of 1.5 mm thick steel sheets, the current required is about :**

(A) 10,000 amp
(B) 100 amp
(C) 15 amp
(D) 5 amp

21. **The bolts in a rigid flanged coupling connecting two shafts transmitting power are subjected to :**

(A) Shear force and bending moment
(B) Axial force
(C) Torsion
(D) Torsion and bending

22. **Which statement is wrong in respect of lever of class two ?**

(A) Mechanical advantage is always greater than one
(B) Load point is in between the fulcrum and effort point
(C) Effort arm is always smaller than the load arm
(D) Leverage is equal to the ratio of effort arm to load arm

23. **Removal of metal particles from the raceway of a rolling contact bearing is a kind of failure of bearing known as :**

(A) Pitting
(B) Wearing
(C) Spalling
(D) Scuffing

24. **The gear train usually employed in clocks is :**

(A) Reverted gear train
(B) Simple gear train
(C) Sun and planet gear
(D) Differential gear

25. **While manufacturing gears, a certain minimum number of teeth are kept on a gear wheel :**

(A) So that the gear is of a good size
(B) For better durability
(C) To avoid interference
(D) For better strength

26. **In a fillet welded joint, the weakest area of weld is :**

(A) Toe
(B) Root
(C) Throat
(D) Face

27. **A cubic crystal system has the following number of space lattices :**

(A) 3 (B) 7

(C) 14 (D) 15

28. **Which of the following metals has the highest bond energy?**

(A) Silver (B) Magnesium

(C) Iron (D) Tungsten

29. **Rockwell hardness test uses :**

(A) Depth of penetration of indenter (B) Surface area of indentation

(C) Projected area of indentation (D) Height of rebound

30. **Super plastic behavior is observed in :**

(A) Steel (B) Aluminium

(C) Glass (D) Cement and bricks

31. **How is white cast iron formed ?**

(A) By rapid heating of gray cast iron (B) By rapid cooling of gray cast iron

(C) By rapid heating of ductile cast iron (D) By rapid cooling of ductile cast iron

32. **Which of the following compounds is very soft and ductile?**

(A) Ferrite (B) Cementite

(C) Austenite (D) Pearlite

33. **Gas carburizing uses :**

(A) Sodium cyanide (B) Hydrocarbons

(C) Charcoal (D) Calcium carbide

34. **The blade of a power saw is made of :**

(A) High carbon steel (B) Medium carbon steel

(C) Low carbon steel (D) High speed steel

35. **Atomic packing factor for copper crystal is :**

(A) 0.52 (B) 0.68

(C) 0.74 (D) 1.633

36. **Gun metal contains :**

(A) Copper, Tin and Zinc (B) Aluminium, Tin and Zinc

(C) Lead, Tin and Zinc (D) Copper, Tin and Manganese

37. **Coated HSS contains a thin layer of :**

(A) Cobalt carbide (B) Copper carbide

(C) Titanium nitride (D) Vanadium nitride

38. **Which of the following materials require minimum compaction pressure?**

(A) Brass (B) Iron

(C) Bronze (D) Aluminium

39. **Upper part of a moulding flask is called :**

(A) Cope (B) Drag

(C) Sprue (D) Cheek

40. **A cupola furnace can produce a maximum temperature of around :**

(A) 500 degree Celsius (B) 1000 degree Celsius

(C) 1600 degree Celsius (D) 3200 degree Celsius

41. **Tool signature consists of :**

(A) Five elements (B) Six elements

(C) Seven elements (D) Eight elements

42. **Fusion process is very similar to :**

(A) Spinning (B) Forging

(C) Casting (D) Rolling

43. **Which of the following welding processes finds extensive applications in automobile industry?**

(A) TIG welding (B) MIG welding

(C) SAW (D) Resistance welding

44. **Heat affected zone is minimum in :**

(A) Gas welding (B) Laser welding

(C) Arc welding (D) Thermit welding

45. **Presence of Sulphur in welded joints increases its :**

(A) Brittleness (B) Ductility

(C) Toughness (D) Strength

46. **LASER stands for :**

(A) Light Amplification by Simulated Emission of radiation

(B) Light Amplitude by Simulated Emission of radiation

(C) Light Amplitude by Stimulated Emission of radiation

(D) Light Amplification by Stimulated Emission of radiation

47. **Thin Aluminium sheets can be welded by :**

(A) MIG welding

(B) TIG welding

(C) Resistance welding

(D) Submerged arc welding

48. **Carburizing flame contains excess of :**

(A) Ethylene

(B) Propylene

(C) Methylene

(D) Acetylene

49. **Which of the following materials require lubricant when hot extruded?**

(A) Steel

(B) Zinc

(C) Tin

(D) Magnesium

50. **Twin electrode carbon arc welding uses :**

(A) Straight polarity DC

(B) Reverse polarity DC

(C) AC

(D) Pulsed AC

51. **Turning produces :**

(A) Square shapes

(B) Triangular shapes

(C) Rectangular shapes

(D) Cylindrical shapes

52. **In reaming process :**

(A) High metal removal rate is obtained

(B) High surface finish is obtained

(C) High dimensional accuracy is obtained

(D) High form accuracy is obtained

53. **The design of a riser is based on :**

(A) Bernoulli's theorem

(B) Continuity equation

(C) Chvorinov's rule

(D) Viscosity law

54. **The included angle of V-block is :**

(A) 45 degree

(B) 60 degree

(C) 90 degree

(D) 120 degree

55. **The Metal Removal Rate (MRR) in drilling is :**

(A) Directly proportional to the drill diameter

(B) Directly proportional to the square of the drill diameter

(C) Inversely proportional to the drill diameter

(D) Inversely proportional to the square of the drill diameter

56. **A moving mandrel is used in :**

(A) Tube drawing (B) Wire drawing

(C) Forging (D) Metal cutting

57. **PLC stands for :**

(A) Proportionate Logic Control (B) Programmable Logic Control

(C) Proportionate Level Control (D) Programmable Level Control

58. **The specific speed of a hydraulic pump is the speed of geometrically similar pump working against a unit head and :**

(A) Delivering unit quantity of water (B) Consuming unit power

(C) Having unit velocity of flow (D) Having unit radial velocity

59. **The tolerance of grade 6 is obtained by :**

(A) Die casting (B) Turning on capstan and turret lathes

(C) Grinding (D) Sand casting

60. **The reliability factor for using 50% reliability in design is :**

(A) 1 (B) 0.868

(C) 0.5 (D) 0.814

61. **Wet bulb temperature is :**

(A) Indication of moisture content in air (B) Same as saturation temperature

(C) Indication of performance of A.C. system (D) Indication of performance of heat pump

62. **Which of the following processes results in the best accuracy of the hole made?**

(A) Drilling (B) Reaming

(C) Broaching (D) Boring

63. **In water jet machining, typical value of stand-off distance is :**

(A) 25.0 mm (B) 10.5 mm

(C) 15.5 mm (D) 3.2 mm

64. **The stroke of an I.C. engine is usually :**

(A) Equal to crank radius

(B) One-half of crank radius

(C) Twice the crank radius

(D) Thrice the crank radius

65. **The highest useful compression ratio of Benzene is :**

(A) 5

(B) 14.6

(C) 8.20

(D) 10.96

66. **The inside diameter of cylinder of an engine is called :**

(A) Nominal diameter

(B) Pitch diameter

(C) Bore

(D) Effective diameter

67. **Maximum delivery pressure in reciprocating compressors can be :**

(A) 50 bar

(B) 100 bar

(C) 500 bar

(D) 1000 bar

68. **One ton of refrigeration is equal to :**

(A) 100 kW

(B) 2.5 kW

(C) 3.5 kW

(D) 4.5 kW

69. **Comfort condition for human body is :**

(A) 24 degree Celsius DBT and 70% RH

(B) 30 degree Celsius DBT and 30% RH

(C) 24 degree Celsius DBT and 60% RH

(D) 16 degree Celsius DBT and 80% RH

70. **Lancashire boiler usually consists of :**

(A) One flue tube

(B) Two flue tubes

(C) Three flue tubes

(D) Four flue tubes

71. **What is the function of differential in automobiles ?**

(A) It allows rear wheel movement

(B) It permits two rear wheels to run independently

(C) It reduces speed of propeller shaft to suit the requirement of wheel axes

(D) It permits two rear wheels to have flexibility of relative speed, whenever it is required

72. **In a tractor, the springs provided for the rear wheels are :**

(A) Helical springs

(B) Leaf springs

(C) Torsional springs

(D) No springs are provided

73. **Which gears are not used in the final drive gearing system?**

(A) Spur
(B) Straight bevel
(C) Hypoid
(D) Spiral

74. **Fluidics is related to :**

(A) Fluid flow through large pipes
(B) Control technology
(C) Fluid storage in cylindrical vessels
(D) Analysis of fluid properties

75. **A company has an annual demand of 1000 units, ordering cost of Rs. 100 per order and carrying cost of Rs. 100 per unit year. If the stock-out costs are estimated to be nearly Rs. 400 each time the company runs out of stock, the safety stock justified by the carrying cost will be :**

(A) 4
(B) 20
(C) 40
(D) 100