Total No. of Printed Pages : 21

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A

SET-Y

Ph.D./URS-EE-Jan-2022

SUBJECT : Mechanical Engineering

10017

Sr. No. .....

Time : **1¼ Hours** Max. Marks : **100** Total Questions : **100**

Roll No. (in figures)_____ (in words) _____

Name _____ Father's Name_____

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SEAL

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1. Annealing of white cast iron results in production of :

(1) Malleable iron
(2) Nodular iron
(3) Spheroidal iron
(4) Grey iron

2. Which of the following statement is wrong ?

(1) Steel with 0.8% carbon is wholly pearlite
(2) The amount of cementite increases with the increase in percentage of carbon in iron
(3) A mechanical mixture of 87% cementite and 13% ferrite is called pearlite
(4) The cementite is identified as round particles in the structure

3. White cast iron has :

(1) Carbon in the form of carbide
(2) Low tensile strength
(3) High compressive strength
(4) All of these

4. A cycle consisting of one constant pressure, one constant volume and two isentropic processes is known as :

(1) Carnot cycle
(2) Stirling cycle
(3) Otto cycle
(4) Diesel cycle

5. Nickel in steel :

(1) Improves wear resistance, cutting ability and toughness
(2) Refines grain size and produces less tendency to carburisation, improves corrosion and heat resistant properties
(3) Improves cutting ability and reduces hardenability
(4) Gives ductility, toughness, tensile strength and anti-corrosion properties

6. Cemented carbide tools are ***not*** found to be suitable for cutting :

(1) Brass (2) Cast iron

(3) Aluminium (4) Steel

7. A coarse grained steel :

(1) Is less tough and has a greater tendency to distort during heat treatment

(2) Is more ductile and has a less tendency to distort during heat treatment

(3) Is less tough and has a less tendency to distort during heat treatment

(4) Is more ductile and has a greater tendency to distort during heat treatment

8. Normalizing of steel is done to :

(1) Refine the grain structure

(2) Remove strains caused by cold working

(3) Remove dislocations caused in the internal structure due to hot working

(4) All of the above

9. If the permissible crushing stress for the material of a key is double the permissible shear stress, then the sunk key will be equally strong in shearing and crushing if the key is a :

(1) rectangular key with width equal to half the thickness

(2) rectangular key with width equal to twice the thickness

(3) square key

(4) rectangular key with width equal to one-fourth the thickness

10. Which of the following element results in presence of free graphite in C. I. ?

(1) Carbon (2) Sulphur

(3) Silicon (4) Manganese

11. Which is false statement about annealing ? Annealing is done to :

(1) Relieve stresses

(2) Harden steel slightly

(3) Improve machining characteristic

(4) Soften material

12. The main alloying elements high speed steel in order of increasing proportion are :

(1) Vanadium, chromium, tungsten

(2) Tungsten, titanium, vanadium

(3) Chromium, titanium, vanadium

(4) Tungsten, chromium, titanium

13. Which is false statement about normalizing ? Normalizing is done to :

(1) Refine grain structure

(2) Reduce segregation in casting

(3) Improve mechanical properties

(4) Induce stresses

14. Vanadium in high speed steels :

(1) Promotes decarburisation

(2) Provides high hot hardness

(3) Forms very hard carbides and thus increases wear resistance

(4) Promotes retention of austenite

15. White cast iron contains carbon in the form of :

(1) Free carbon (2) Graphite

(3) Cementite (4) White carbon

16. Which of the following constituents of steels is softest and least strong ?

(1) Austenite
(2) Pearlite
(3) Ferrite
(4) Cementite

17. In nodular iron, graphite is in the form of :

(1) Cementite
(2) Free carbon
(3) Flakes
(4) Spheroids

18. Austenite is a combination of :

(1) Ferrite and cementite
(2) Cementite and gamma iron
(3) Ferrite and austenite
(4) Ferrite and iron graphite

19. When a shaft is subjected to a twisting moment, every cross-section of the shaft will be under :

(1) Tensile stress
(2) Compressive stress
(3) Shear stress
(4) Bending stress

20. The stress induced in a body due to suddenly applied load compared to when it is applied gradually is :

(1) Same
(2) Half
(3) Two times
(4) Four times

21. Percentage reduction of area in performing tensile test on cast iron may be of the order of :

(1) 50%
(2) 25%
(3) 0%
(4) 15%

22. The property of material to absorb large amount of energy before fracture is known as :

(1) Ductility
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23. Longitudinal stress in a thin cylinder is :

(1) Equal to the hoop stress
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24. If the section modulus of a beam is increased, the bending stress in the beam will :

(1) Not change
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26. What type of fusion welding process is used for welding sheet metals of all engineering metals (except Cu, Ag) in automobile and air craft industries, pipe and tubing production ?

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28. The main purpose of spheroidising treatment is to improve :

(1) Hardenability of low carbon steels

(2) Machinability of low carbon steels

(3) Hardenability of high carbon steels

(4) Machinability of high carbon steels

29. The mechanism of material removal in EDM process is :

(1) Melting and Evaporation

(2) Melting and Corrosion

(3) Erosion and Cavitations

(4) Cavitations and Evaporation

30. In ECM, the material removal is due to :

(1) Corrosion

(2) Erosion

(3) Fusion

(4) Ion displacement

31. Allowance in limits and fits refers to :

(1) Maximum clearance between shaft and hole

(2) Minimum clearance between shaft and hole

(3) Difference between maximum and minimum sizes of hole

(4) Difference between maximum and minimum sizes of shaft

32. An expendable pattern is used in :

(1) Slush casting

(2) Squeeze casting

(3) Centrifugal casting

(4) Investment casting

33. Misrun is a casting defect which occurs due to ?
(1) Very high pouring temperature of the metal
(2) Insufficient fluidity of the molten metal
(3) Absorption of gases by the liquid metal
(4) Improper alignment of the mould flasks

34. Shrinkage allowance on pattern is provided to compensate for shrinkage when :
(1) The temperature of liquid metal drops from pouring to freezing temperature
(2) The metal changes from liquid to solid state at freezing temperature
(3) The temperature of solid phase drops from freezing to room temperature
(4) The temperature of metal drops from pouring to room temperature

35. Which of the following statement is wrong about ultrasonic machining ?
(1) It is best suited for machining hard and brittle materials
(2) It cuts materials at very slow speeds
(3) It removes large amount of material
(4) It produces good surface finish

36. In electro-discharge machining, dielectric is used to :
(1) Help in the movement of the sparks
(2) Control the spark discharges
(3) Act as coolant
(4) All of these

37. A fine grained grinding wheel is used to grind :
(1) Hard and brittle materials
(2) Soft and ductile materials
(3) Hard and ductile materials
(4) Soft and brittle materials

38. In order to grind soft material :

(1) Coarse grained grinding wheel is used

(2) Fine grained grinding wheel is used

(3) Medium grained grinding wheel is used

(4) Anyone of these

39. Carbide tipped tools usually have :

(1) Negative rake angle

(2) Positive rake angle

(3) Any rake angle

(4) No rake angle

40. The operation of machining several surfaces of a workpiece simultaneously is called :

(1) Profile milling

(2) Gang milling

(3) Saw milling

(4) Helical milling

41. The material which on machining produces chips with built up edge is :

(1) Brittle material (2) Ductile material

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(1) Essentially an isentropic process
(2) Non-heat transfer process
(3) Reversible process
(4) Constant temperature process

51. Resilience of a material is important, when it is subjected to :

(1) Combined loading
(2) Fatigue
(3) Thermal stresses
(4) Shock loading

52. The power transmitted by the belt drive can be increased by :

(1) Increasing the initial tension in the belt
(2) Dressing the belt to increase the coefficient of friction
(3) Increasing wrap angle by using idler pulley
(4) All of the above methods

53. Which ***one*** of the following is a positive drive ?

(1) V-belt drive
(2) Rope drive
(3) Crossed flat belt drive
(4) Chain drive

54. Shear stress theory is applicable for :

(1) Ductile materials
(2) Brittle materials
(3) Elastic materials
(4) All of the above

55. If two identical springs are in parallel then their overall stiffness will be :

(1) Half
(2) Same
(3) Double
(4) None of the above

56. In a gear, having Involute teeth, the normal to the Involute is a tangent to the :

(1) Base circle
(2) Pitch circle
(3) Addendum circle
(4) Dedendum circle

57. The cam and follower is an example of :

(1) Sliding pair
(2) Rolling pair
(3) Lower pair
(4) Higher pair

58. According to Kennedy'S theorem, if three bodies have plane motions, their instantaneous centers lie on :

(1) A triangle
(2) A point
(3) Two lines
(4) A straight line

59. The Coriolis component of acceleration acts :

(1) Along the sliding surface

(2) Perpendicular to the sliding surface

(3) At 45° to the sliding surface

(4) Parallel to the sliding surface

60. Euler's dimensionless number relates the following :

(1) Inertial force and gravity

(2) Viscous force and inertial force

(3) Viscous force and buoyancy force

(4) Pressure force and inertial force

61. In a forced vortex, the velocity of flow everywhere within the fluid is :

(1) Maximum

(2) Minimum

(3) Zero

(4) Nonzero finite

62. The continuity equation is connected with :

(1) Open channel/pipe flow

(2) Compressibility of fluids

(3) Conservation of mass

(4) Steady/unsteady flow

63. The absolute pressure is equal to :

(1) Gauge pressure + atmospheric pressure

(2) Gauge pressure – atmospheric pressure

(3) Atmospheric pressure – gauge pressure

(4) Gauge pressure – vacuum pressure

64. Cavitation is caused by :

(1) High velocity
(2) High pressure
(3) Weak material
(4) Low pressure

65. A body floats in stable equilibrium :

(1) When its meta centric height is zero
(2) When the metacentre is above CG
(3) When its e.g. is below its center of buoyancy
(4) Metacentre has nothing to do with position of CG for determining stability

66. A large Reynold number is indication of :

(1) Smooth and streamline flow
(2) Laminar flow
(3) Steady flow
(4) Highly turbulent flow

67. Which of the following is dimensionless ?

(1) Specific weight
(2) Specific volume
(3) Specific speed
(4) Specific gravity

68. Service time in queuing theory is usually assumed to follow :

(1) Normal distribution
(2) Poisson's distribution
(3) Erlang distribution
(4) Exponential distribution

69. Simplex method is the method used for :

(1) Value analysis

(2) Network analysis

(3) Linear programming

(4) Queuing theory

70. Which of the following layouts is suited to flow production system ?

(1) Process layout

(2) Product layout

(3) Fixed position layout

(4) Plant layout

71. The production scheduling is simpler and high volume of output and high labour efficiency are achieved in the case of :

(1) Product layout

(2) Process layout

(3) Fixed position layout

(4) A combination of line and process layout

72. A-B-C analysis is used in :

(1) CPM

(2) PERT

(3) Inventory control

(4) All of these

73. A critical activity has :

(1) Maximum slack

(2) Minimum slack

(3) Zero slack

(4) Average slack

74. The probabilistic time is given by (where to = Optimistic time, tp = Pessimistic time, and tn = Most likely time) :

(1) (to + tp + tn)/3

(2) (to + 2tp + tn)/4

(3) (to + 4tp + tn)/5

(4) (to + tp + 4tn)/6

75. Two alternatives can produce a product. First have a fixed cost of Rs. 2000 and a variable cost of Rs. 20 per piece. The second method has a fixed cost of Rs. 1500 and a variable cost of Rs. 30. The break even quantity between the two alternatives is :

(1) 25

(2) 50

(3) 75

(4) 100

76. Scheduling :

(1) Prescribes the sequence of operations to be followed

(2) Determines the programme for the operations

(3) Is concerned with starting of processes

(4) Regulates the progress of job through various processes

77. In the continuous review inventory control, the material is ordered when it reaches :

(1) Reorder point

(2) Optimum order quantity

(3) Average inventory

(4) Zero

78. Which modes of transportation suit high quantity shipments ?

(1) Air transportation

(2) Water transportation

(3) Rail transportation

(4) Intermodal transportation

79. With regard to safety inventory required for a required service level, which of following is correct under Aggregation in Supply chain :

(1) It decreases

(2) It increases

(3) It remains fixed

(4) It is doubled

80. Lean production involves :

(1) Improvement of resource utilization

(2) Reduction of waiting time

(3) Elimination of all types of waste

(4) Elimination of rework

81. A growing number of firms now outsource some or all of their inventory storage and transport to intermediaries. These are called :

(1) Competitors

(2) Third-party logistics providers

(3) Channel members

(4) Cross-functional teams

82. The Delphi method :

(1) Uses a panel of experts who give their opinion on what is likely to happen

(2) Consists of projections based on external indicators that relate to the demand for a company's products

(3) Uses economic indicators, such as housing starts and gasoline consumption, to forecast demand

(4) Uses historical data to forecast demand

83. Which of the following techniques are projections based on judgment, intuition and informed opinions ?

(1) Extrinsic forecasting

(2) Quantitative forecasting

(3) Intrinsic forecasting

(4) Qualitative forecasting

84. Which of the following aggregate planning strategies is likely to have the least impact on quality ?

(1) Subcontracting

(2) Changing inventory level

(3) Using part-time workers

(4) Varying production rates through overtime or idle time

85. Which statement is characteristic of a mixed strategy for aggregate planning ?

(1) Mixed plans typically yield a worse strategy than a pure plan

(2) Mixed plans seek a minimum cost via a combination of planning options

(3) Mixed plans are less complex to develop than a level plan

(4) Mixed plans are less complex to develop than a chase plan

86. Which of these pieces of information is ***not*** contained in a bill of material ?

(1) Lead times

(2) Physical dimensions

(3) Raw materials to be used

(4) Quantities of components

87. JIT is a philosophy of :

(1) Push production

(2) Waste reduction

(3) Re-engineering for breakthrough

(4) Variability increase

88. What is an advantage of holding inventory ?

(1) Improved quality

(2) Reduced obsolescence

(3) Greater availability

(4) Reduced material handling

89. Investment casting is used for :

(1) Shapes which are made by difficulty using complex patterns in sand casting

(2) Mass production

(3) Shapes which are very complex and intricate and can't be cast by any other method

(4) Stainless steel

90. The vacuum obtainable in a condenser is dependent upon :

(1) Capacity of ejector

(2) Quantity of steam to be handled

(3) Any of the two is possible

(4) Temperature of cooling water

91. Zeroth law of thermodynamics :

(1) Deals with conversion of mass and energy

(2) Deals with reversibility and irreversibility of process

(3) Deals with thermal equilibrium

(4) Deals with heat engines

92. In vapour compression refrigeration cycle, the condition of refrigerant is saturated liquid :

(1) Before entering the expansion valve

(2) Before entering the compressor

(3) After passing through the condenser

(4) Before passing through the condenser

93. Absorption system normally uses following refrigerant :

(1) CO_2

(2) SO_2

(3) Freon-II

(4) Ammonia

94. Shock effect in a nozzle is felt in :

(1) Divergent portion

(2) Straight portion

(3) Convergent portion

(4) Throat

95. Which type of electrode is used in submerged arc welding ?

(1) Bare rods
(2) Coated electrodes
(3) Core wires
(4) Copper electrodes

96. The main advantage of shell moulding is that :

(1) Metallic pattern is used
(2) The moulds are stronger
(3) Thin section can be easily obtained
(4) Highly complex sections can be easily obtained

97. Blind risers :

(1) Assist in feeding the metal into casting proper
(2) Help to trap slag or other lighter particles
(3) Supply the liquid metal when pouring is completed
(4) None of the above

98. Cylinder-Piston assembly constitute which type of kinematic pair :

(1) Lower pair
(2) Higher pair
(3) Open pair
(4) Close pair

99. Thermal efficiency of a closed cycle gas turbine plant increases by :

(1) Reheating
(2) Intercooling
(3) Regenerator
(4) All of the above

100. For a machine to be self-locking, its efficiency should be :

(1) 100%
(2) Less than 67%
(3) Less than 50%
(4) More than 50%

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   (3) Hard material
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(3) Otto cycle (4) Diesel cycle

25. Nickel in steel :

(1) Improves wear resistance, cutting ability and toughness

(2) Refines grain size and produces less tendency to carburisation, improves corrosion and heat resistant properties

(3) Improves cutting ability and reduces hardenability

(4) Gives ductility, toughness, tensile strength and anti-corrosion properties

26. Cemented carbide tools are ***not*** found to be suitable for cutting :

(1) Brass (2) Cast iron

(3) Aluminium (4) Steel

27. A coarse grained steel :

(1) Is less tough and has a greater tendency to distort during heat treatment

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28. Normalizing of steel is done to :

(1) Refine the grain structure

(2) Remove strains caused by cold working

(3) Remove dislocations caused in the internal structure due to hot working

(4) All of the above

29. If the permissible crushing stress for the material of a key is double the permissible shear stress, then the sunk key will be equally strong in shearing and crushing if the key is a :

(1) rectangular key with width equal to half the thickness

(2) rectangular key with width equal to twice the thickness

(3) square key

(4) rectangular key with width equal to one-fourth the thickness

30. Which of the following element results in presence of free graphite in C. I. ?

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(1) Maximum
(2) Minimum
(3) Zero
(4) Nonzero finite

42. The continuity equation is connected with :

(1) Open channel/pipe flow
(2) Compressibility of fluids
(3) Conservation of mass
(4) Steady/unsteady flow

43. The absolute pressure is equal to :

(1) Gauge pressure + atmospheric pressure
(2) Gauge pressure – atmospheric pressure
(3) Atmospheric pressure – gauge pressure
(4) Gauge pressure – vacuum pressure

44. Cavitation is caused by :

(1) High velocity
(2) High pressure
(3) Weak material
(4) Low pressure

45. A body floats in stable equilibrium :

(1) When its meta centric height is zero

(2) When the metacentre is above CG

(3) When its e.g. is below its center of buoyancy

(4) Metacentre has nothing to do with position of CG for determining stability

46. A large Reynold number is indication of :

(1) Smooth and streamline flow

(2) Laminar flow

(3) Steady flow

(4) Highly turbulent flow

47. Which of the following is dimensionless ?

(1) Specific weight

(2) Specific volume

(3) Specific speed

(4) Specific gravity

48. Service time in queuing theory is usually assumed to follow :

(1) Normal distribution

(2) Poisson's distribution

(3) Erlang distribution

(4) Exponential distribution

49. Simplex method is the method used for :

(1) Value analysis

(2) Network analysis

(3) Linear programming

(4) Queuing theory

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(2) Product layout

(3) Fixed position layout

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(2) Reduction of waiting time

(3) Elimination of all types of waste

(4) Elimination of rework

71. A growing number of firms now outsource some or all of their inventory storage and transport to intermediaries. These are called :

(1) Competitors

(2) Third-party logistics providers

(3) Channel members

(4) Cross-functional teams

72. The Delphi method :

(1) Uses a panel of experts who give their opinion on what is likely to happen

(2) Consists of projections based on external indicators that relate to the demand for a company's products

(3) Uses economic indicators, such as housing starts and gasoline consumption, to forecast demand

(4) Uses historical data to forecast demand

73. Which of the following techniques are projections based on judgment, intuition and informed opinions ?

(1) Extrinsic forecasting

(2) Quantitative forecasting

(3) Intrinsic forecasting

(4) Qualitative forecasting

74. Which of the following aggregate planning strategies is likely to have the least impact on quality ?

(1) Subcontracting

(2) Changing inventory level

(3) Using part-time workers

(4) Varying production rates through overtime or idle time

75. Which statement is characteristic of a mixed strategy for aggregate planning ?

(1) Mixed plans typically yield a worse strategy than a pure plan

(2) Mixed plans seek a minimum cost via a combination of planning options

(3) Mixed plans are less complex to develop than a level plan

(4) Mixed plans are less complex to develop than a chase plan

76. Which of these pieces of information is ***not*** contained in a bill of material ?

(1) Lead times

(2) Physical dimensions

(3) Raw materials to be used

(4) Quantities of components

77. JIT is a philosophy of :

(1) Push production

(2) Waste reduction

(3) Re-engineering for breakthrough

(4) Variability increase

78. What is an advantage of holding inventory ?

(1) Improved quality

(2) Reduced obsolescence

(3) Greater availability

(4) Reduced material handling

79. Investment casting is used for :

(1) Shapes which are made by difficulty using complex patterns in sand casting

(2) Mass production

(3) Shapes which are very complex and intricate and can't be cast by any other method

(4) Stainless steel

80. The vacuum obtainable in a condenser is dependent upon :

(1) Capacity of ejector

(2) Quantity of steam to be handled

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(4) Temperature of cooling water

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C

SET-Y

Ph.D./URS-EE-Jan-2022

SUBJECT : Mechanical Engineering 10019

Sr. No. .....

Time : **1¼ Hours** Max. Marks : **100** Total Questions : **100**

Roll No. (in figures)_____ (in words) _____

Name _____ Father's Name_____

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(Signature of the Candidate) (Signature of the Invigilator)

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2. The candidates ***must return*** the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
4. Question Booklet along with answer key of all the A, B, C & D code will be got uploaded on the University website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examination in writing/through E.Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.
5. The candidate ***must not*** do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers ***must not*** be ticked in the question booklet.
6. ***There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.***
7. Use only **Black** or **Blue Ball Point Pen** of good quality in the OMR Answer-Sheet.
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(2) 25%
(3) 0%
(4) 15%

52. The property of material to absorb large amount of energy before fracture is known as :

(1) Ductility
(2) Toughness
(3) Resilience
(4) Shock proof

53. Longitudinal stress in a thin cylinder is :

(1) Equal to the hoop stress
(2) Twice the hoop stress
(3) Half of the hoop stress
(4) One fourth of hoop stress

54. If the section modulus of a beam is increased, the bending stress in the beam will :

(1) Not change
(2) Increase
(3) Decrease
(4) None of these

55. When a closely-coiled helical spring is subjected to an axial load, it is said to be under :

(1) Bending
(2) Shear
(3) Torsion
(4) Crushing

56. What type of fusion welding process is used for welding sheet metals of all engineering metals (except Cu, Ag) in automobile and air craft industries, pipe and tubing production ?

(1) Thermit welding
(2) Electroslag welding
(3) Resistance welding
(4) Electron beam welding

57. The object of caulking in a riveted joint is to make the joint :

(1) Free from corrosion
(2) Stronger in tension
(3) Free from stresses
(4) Leak-proof

58. The main purpose of spheroidising treatment is to improve :

(1) Hardenability of low carbon steels
(2) Machinability of low carbon steels
(3) Hardenability of high carbon steels
(4) Machinability of high carbon steels

59. The mechanism of material removal in EDM process is :

(1) Melting and Evaporation
(2) Melting and Corrosion
(3) Erosion and Cavitations
(4) Cavitations and Evaporation

60. In ECM, the material removal is due to :

(1) Corrosion
(2) Erosion
(3) Fusion
(4) Ion displacement

61. The material which on machining produces chips with built up edge is :

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63. The high cutting speed and large rake angle of the tool will result in the formation of which of the following ?

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64. The capacity of induced draft fan compared to forced draft fan in a boiler is :

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(2) The amount of water evaporated or steam produced in kg per kg of fuel burnt

(3) The amount of water evaporated from and at 100°C into dry and saturated steam

(4) The evaporation of 15.653 kg of water per hour from and at 100°C

66. Steam engine operates on :

(1) Carnot cycle

(2) Joule cycle

(3) Stirling cycle

(4) Brayton cycle

67. In a throttling process :

(1) Steam temperature remains constant

(2) Steam pressure remains constant

(3) Steam enthalpy remains constant

(4) Steam entropy remains constant

68. Which of the following is *not* a boiler mounting ?

(1) Blow off cock

(2) Feed check valve

(3) Economiser

(4) Fusible plug

69. The increase in pressure :

(1) Lowers the boiling point of a liquid

(2) Raises the boiling point of a liquid

(3) Does not affects the boiling point of a liquid

(4) Reduces its volume

70. Adiabatic process is :

(1) Essentially an isentropic process

(2) Non-heat transfer process

(3) Reversible process

(4) Constant temperature process

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Total No. of Printed Pages : 21

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D

SET-Y

Ph.D./URS-EE-Jan-2022

SUBJECT : Mechanical Engineering

10024

Sr. No. .....

Time : **1¼ Hours** Max. Marks : **100** Total Questions : **100**

Roll No. (in figures)_____ (in words) _____

Name _____ Father's Name_____

Mother's Name_____ Date of Examination_____

(Signature of the Candidate) (Signature of the Invigilator)

CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

1. ***All questions are compulsory.***
2. The candidates ***must return*** the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
4. Question Booklet along with answer key of all the A, B, C & D code will be got uploaded on the University website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examination in writing/through E.Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.
5. The candidate ***must not*** do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers ***must not*** be ticked in the question booklet.
6. ***There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.***
7. Use only **Black** or **Blue Ball Point Pen** of good quality in the OMR Answer-Sheet.
8. *Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained* **30** *minutes after starting of the examination.*

SEAL

1. The production scheduling is simpler and high volume of output and high labour efficiency are achieved in the case of :

   (1) Product layout

   (2) Process layout

   (3) Fixed position layout

   (4) A combination of line and process layout

2. A-B-C analysis is used in :

   (1) CPM

   (2) PERT

   (3) Inventory control

   (4) All of these

3. A critical activity has :

   (1) Maximum slack (2) Minimum slack

   (3) Zero slack (4) Average slack

4. The probabilistic time is given by (where to = Optimistic time, tp = Pessimistic time, and tn = Most likely time) :

   (1) (to + tp + tn)/3 (2) (to + 2tp + tn)/4

   (3) (to + 4tp + tn)/5 (4) (to + tp + 4tn)/6

5. Two alternatives can produce a product. First have a fixed cost of Rs. 2000 and a variable cost of Rs. 20 per piece. The second method has a fixed cost of Rs. 1500 and a variable cost of Rs. 30. The break even quantity between the two alternatives is :

   (1) 25 (2) 50

   (3) 75 (4) 100

6. Scheduling :

(1) Prescribes the sequence of operations to be followed

(2) Determines the programme for the operations

(3) Is concerned with starting of processes

(4) Regulates the progress of job through various processes

7. In the continuous review inventory control, the material is ordered when it reaches :

(1) Reorder point

(2) Optimum order quantity

(3) Average inventory

(4) Zero

8. Which modes of transportation suit high quantity shipments ?

(1) Air transportation

(2) Water transportation

(3) Rail transportation

(4) Intermodal transportation

9. With regard to safety inventory required for a required service level, which of following is correct under Aggregation in Supply chain :

(1) It decreases

(2) It increases

(3) It remains fixed

(4) It is doubled

10. Lean production involves :

(1) Improvement of resource utilization

(2) Reduction of waiting time

(3) Elimination of all types of waste

(4) Elimination of rework

11. Resilience of a material is important, when it is subjected to :

(1) Combined loading

(2) Fatigue

(3) Thermal stresses

(4) Shock loading

12. The power transmitted by the belt drive can be increased by :

(1) Increasing the initial tension in the belt

(2) Dressing the belt to increase the coefficient of friction

(3) Increasing wrap angle by using idler pulley

(4) All of the above methods

13. Which ***one*** of the following is a positive drive ?

(1) V-belt drive (2) Rope drive

(3) Crossed flat belt drive (4) Chain drive

14. Shear stress theory is applicable for :

(1) Ductile materials

(2) Brittle materials

(3) Elastic materials

(4) All of the above

15. If two identical springs are in parallel then their overall stiffness will be :

(1) Half
(2) Same
(3) Double
(4) None of the above

16. In a gear, having Involute teeth, the normal to the Involute is a tangent to the :

(1) Base circle
(2) Pitch circle
(3) Addendum circle
(4) Dedendum circle

17. The cam and follower is an example of :

(1) Sliding pair
(2) Rolling pair
(3) Lower pair
(4) Higher pair

18. According to Kennedy'S theorem, if three bodies have plane motions, their instantaneous centers lie on :

(1) A triangle
(2) A point
(3) Two lines
(4) A straight line

19. The Coriolis component of acceleration acts :

(1) Along the sliding surface
(2) Perpendicular to the sliding surface
(3) At 45° to the sliding surface
(4) Parallel to the sliding surface

20. Euler's dimensionless number relates the following :

(1) Inertial force and gravity
(2) Viscous force and inertial force
(3) Viscous force and buoyancy force
(4) Pressure force and inertial force

21. Allowance in limits and fits refers to :
(1) Maximum clearance between shaft and hole
(2) Minimum clearance between shaft and hole
(3) Difference between maximum and minimum sizes of hole
(4) Difference between maximum and minimum sizes of shaft

22. An expendable pattern is used in :
(1) Slush casting
(2) Squeeze casting
(3) Centrifugal casting
(4) Investment casting

23. Misrun is a casting defect which occurs due to ?
(1) Very high pouring temperature of the metal
(2) Insufficient fluidity of the molten metal
(3) Absorption of gases by the liquid metal
(4) Improper alignment of the mould flasks

24. Shrinkage allowance on pattern is provided to compensate for shrinkage when :
(1) The temperature of liquid metal drops from pouring to freezing temperature
(2) The metal changes from liquid to solid state at freezing temperature
(3) The temperature of solid phase drops from freezing to room temperature
(4) The temperature of metal drops from pouring to room temperature

25. Which of the following statement is wrong about ultrasonic machining ?
(1) It is best suited for machining hard and brittle materials
(2) It cuts materials at very slow speeds
(3) It removes large amount of material
(4) It produces good surface finish

26. In electro-discharge machining, dielectric is used to :
(1) Help in the movement of the sparks
(2) Control the spark discharges
(3) Act as coolant
(4) All of these

27. A fine grained grinding wheel is used to grind :
(1) Hard and brittle materials
(2) Soft and ductile materials
(3) Hard and ductile materials
(4) Soft and brittle materials

28. In order to grind soft material :
(1) Coarse grained grinding wheel is used
(2) Fine grained grinding wheel is used
(3) Medium grained grinding wheel is used
(4) Anyone of these

29. Carbide tipped tools usually have :
(1) Negative rake angle
(2) Positive rake angle
(3) Any rake angle
(4) No rake angle

30. The operation of machining several surfaces of a workpiece simultaneously is called :
(1) Profile milling
(2) Gang milling
(3) Saw milling
(4) Helical milling

31. Which is false statement about annealing ? Annealing is done to :

(1) Relieve stresses

(2) Harden steel slightly

(3) Improve machining characteristic

(4) Soften material

32. The main alloying elements high speed steel in order of increasing proportion are :

(1) Vanadium, chromium, tungsten

(2) Tungsten, titanium, vanadium

(3) Chromium, titanium, vanadium

(4) Tungsten, chromium, titanium

33. Which is false statement about normalizing ? Normalizing is done to :

(1) Refine grain structure

(2) Reduce segregation in casting

(3) Improve mechanical properties

(4) Induce stresses

34. Vanadium in high speed steels :

(1) Promotes decarburisation

(2) Provides high hot hardness

(3) Forms very hard carbides and thus increases wear resistance

(4) Promotes retention of austenite

35. White cast iron contains carbon in the form of :

(1) Free carbon (2) Graphite

(3) Cementite (4) White carbon

36. Which of the following constituents of steels is softest and least strong ?

(1) Austenite
(2) Pearlite
(3) Ferrite
(4) Cementite

37. In nodular iron, graphite is in the form of :

(1) Cementite
(2) Free carbon
(3) Flakes
(4) Spheroids

38. Austenite is a combination of :

(1) Ferrite and cementite
(2) Cementite and gamma iron
(3) Ferrite and austenite
(4) Ferrite and iron graphite

39. When a shaft is subjected to a twisting moment, every cross-section of the shaft will be under :

(1) Tensile stress
(2) Compressive stress
(3) Shear stress
(4) Bending stress

40. The stress induced in a body due to suddenly applied load compared to when it is applied gradually is :

(1) Same
(2) Half
(3) Two times
(4) Four times

41. Zeroth law of thermodynamics :

(1) Deals with conversion of mass and energy
(2) Deals with reversibility and irreversibility of process
(3) Deals with thermal equilibrium
(4) Deals with heat engines

42. In vapour compression refrigeration cycle, the condition of refrigerant is saturated liquid :

(1) Before entering the expansion valve

(2) Before entering the compressor

(3) After passing through the condenser

(4) Before passing through the condenser

43. Absorption system normally uses following refrigerant :

(1) CO_2 (2) SO_2

(3) Freon-II (4) Ammonia

44. Shock effect in a nozzle is felt in :

(1) Divergent portion (2) Straight portion

(3) Convergent portion (4) Throat

45. Which type of electrode is used in submerged arc welding ?

(1) Bare rods (2) Coated electrodes

(3) Core wires (4) Copper electrodes

46. The main advantage of shell moulding is that :

(1) Metallic pattern is used

(2) The moulds are stronger

(3) Thin section can be easily obtained

(4) Highly complex sections can be easily obtained

47. Blind risers :

(1) Assist in feeding the metal into casting proper

(2) Help to trap slag or other lighter particles

(3) Supply the liquid metal when pouring is completed

(4) None of the above

48. Cylinder-Piston assembly constitute which type of kinematic pair :

(1) Lower pair (2) Higher pair

(3) Open pair (4) Close pair

49. Thermal efficiency of a closed cycle gas turbine plant increases by :

(1) Reheating (2) Intercooling

(3) Regenerator (4) All of the above

50. For a machine to be self-locking, its efficiency should be :

(1) 100% (2) Less than 67%

(3) Less than 50% (4) More than 50%

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(1) 50%
(2) 25%
(3) 0%
(4) 15%

82. The property of material to absorb large amount of energy before fracture is known as :

(1) Ductility
(2) Toughness
(3) Resilience
(4) Shock proof

83. Longitudinal stress in a thin cylinder is :

(1) Equal to the hoop stress
(2) Twice the hoop stress
(3) Half of the hoop stress
(4) One fourth of hoop stress

84. If the section modulus of a beam is increased, the bending stress in the beam will :

(1) Not change
(2) Increase
(3) Decrease
(4) None of these

85. When a closely-coiled helical spring is subjected to an axial load, it is said to be under :

(1) Bending
(2) Shear
(3) Torsion
(4) Crushing

86. What type of fusion welding process is used for welding sheet metals of all engineering metals (except Cu, Ag) in automobile and air craft industries, pipe and tubing production ?

(1) Thermit welding

(2) Electroslag welding

(3) Resistance welding

(4) Electron beam welding

87. The object of caulking in a riveted joint is to make the joint :

(1) Free from corrosion

(2) Stronger in tension

(3) Free from stresses

(4) Leak-proof

88. The main purpose of spheroidising treatment is to improve :

(1) Hardenability of low carbon steels

(2) Machinability of low carbon steels

(3) Hardenability of high carbon steels

(4) Machinability of high carbon steels

89. The mechanism of material removal in EDM process is :

(1) Melting and Evaporation

(2) Melting and Corrosion

(3) Erosion and Cavitations

(4) Cavitations and Evaporation

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(2) Erosion

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95. The equivalent evaporation is defined as :

(1) The ratio of heat actually used in producing the steam to the heat liberated in the furnace
(2) The amount of water evaporated or steam produced in kg per kg of fuel burnt
(3) The amount of water evaporated from and at 100°C into dry and saturated steam
(4) The evaporation of 15.653 kg of water per hour from and at 100°C

96. Steam engine operates on :

(1) Carnot cycle
(2) Joule cycle
(3) Stirling cycle
(4) Brayton cycle

97. In a throttling process :

(1) Steam temperature remains constant
(2) Steam pressure remains constant
(3) Steam enthalpy remains constant
(4) Steam entropy remains constant

98. Which of the following is ***not*** a boiler mounting ?

(1) Blow off cock
(2) Feed check valve
(3) Economiser
(4) Fusible plug

99. The increase in pressure :

(1) Lowers the boiling point of a liquid
(2) Raises the boiling point of a liquid
(3) Does not affects the boiling point of a liquid
(4) Reduces its volume

100. Adiabatic process is :

(1) Essentially an isentropic process
(2) Non-heat transfer process
(3) Reversible process
(4) Constant temperature process

Answerkey of Entrance Test of PHD/URS Machnical Enineering 2021-22

Q. No.	A	B	C	D
1	1	2	2	1
2	3	2	1	3
3	4	1	4	3
4	4	2	3	4
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6	4	2	3	2
7	1	3	4	1
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45	3	2	3	1
46	2	4	4	3
47	3	4	1	3
48	3	4	1	1
49	2	3	1	4

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96	3	1	1	2
97	3	4	2	3
98	1	4	3	3
99	4	2	3	2
100	3	4	4	2