

139/2017

Question Booklet
Alpha Code

A

Question Booklet
Serial Number

101741

Total No. of questions : 100

Time : 75 Minutes

Maximum : 100 Marks

INSTRUCTIONS TO CANDIDATES

1. The question paper will be given in the form of a Question Booklet. There will be four versions of question booklets with question booklet alpha code viz. A, B, C & D.
2. The Question Booklet Alpha Code will be printed on the top left margin of the facing sheet of the question booklet.
3. The Question Booklet Alpha Code allotted to you will be noted in your seating position in the Examination Hall.
4. If you get a question booklet where the alpha code does not match to the allotted alpha code in the seating position, please draw the attention of the Invigilator IMMEDIATELY.
5. The Question Booklet Serial Number is printed on the top right margin of the facing sheet. If your question booklet is un-numbered, please get it replaced by new question booklet with same alpha code.
6. The question booklet will be sealed at the middle of the right margin. Candidate should not open the question booklet, until the indication is given to start answering.
7. Immediately after the commencement of the examination, the candidate should check that the question booklet supplied to him contains all the 100 questions in serial order. The question booklet does not have unprinted or torn or missing pages and if so he/she should bring it to the notice of the Invigilator and get it replaced by a complete booklet with same alpha code. This is most important.
8. A blank sheet of paper is attached to the question booklet. This may be used for rough work.
9. **Please read carefully all the instructions on the reverse of the Answer Sheet before marking your answers.**
10. Each question is provided with four choices (A), (B), (C) and (D) having one correct answer. Choose the correct answer and darken the bubble corresponding to the question number using Blue or Black Ball-Point Pen in the OMR answer sheet.
11. **Each correct answer carries 1 mark and for each wrong answer 1/3 mark will be deducted. No negative mark for unattended questions.**
12. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the Register Number Coding Sheet and that the Invigilator has affixed his/her signature in the space provided.
13. Strict compliance of instructions is essential. Any malpractice or attempt to commit any kind of malpractice in the Examination will result in the disqualification of the candidate.

SEAL

139/2017

Maximum : 100 marks

Time : 1 hour and 15 minutes

1. What is the name of the Line of Control between India and Pakistan?
(A) Mc Mohan Line (B) Radcliffe Line
(C) Palk Line (D) Siachin Line
2. Cite an example for cold desert in India.
(A) Himachal Pradesh (B) Gujarat
(C) Haryana (D) Rajasthan
3. What was the name of the Ship used by Vasco-da-Gama for his voyage?
(A) HMS Beagle (B) Savo Gabriel
(C) Voyager (D) Savo Plow
4. Who described the 'Directive Principles' as the 'Novel Features of the Indian Constitution'?
(A) Dr. Rajendra Prasad (B) Jawaharlal Nehru
(C) Sardar Vallabhai Patel (D) Dr. B.R. Ambedkar
5. What is the name of the Indian River which carries large volume of water?
(A) Sindu (B) Ganga 2005
(C) Brahmaputra (D) Yamuna
6. Who is considered as the 'Political Father' of the Ezhavas?
(A) Kumaran Asan (B) Dr. Palpu
(C) Sree Narayana Guru (D) S. Shankar
7. The height of Mount Anamudi :
(A) 2695 metres (B) 2965 metres
(C) 2756 metres (D) 2654 metres
8. Who was the first President of Kerala Sahitya Academy?
(A) Sardar K.B. Panicker (B) Sardar K.N. Panicker
(C) Sardar K. M. Panicker (D) Kumaranasan
9. Which day is celebrated as 'Coconut Day'?
(A) November 01 (B) August 02
(C) January 28 (D) September 02

A

10. In which year Vakkom Abdul Khader Moulavi started his Newspaper 'Swadeshabhimani'?
- (A) 1904 (B) 1903
(C) 1906 (D) 1905
11. What was the name of the Newspaper started by Sahodaran Ayyappan?
- (A) Velakkaran (B) Bhojanam
(C) Sangabhodam (D) Yachana
12. Who was the author of 'Paalazhimadhanam'?
- (A) Sree Narayana Guru (B) Ayyankali
(C) Kunchan Nambyar (D) Ezhuthachan
13. Who wrote the work 'Jathikummi'?
- (A) Kumaranasan (B) Chavara Achan
(C) Poikayil Yohannan (D) Pandit Karuppan
14. Who was the first Malayalam novelist who won the *Jnanpith*?
- (A) G. Sankarakkuruppu (B) S.K. Pottakkad
(C) M.T. Vasudevān Nair (D) Valsala
15. Who authored the pamphlet 'Thiruvithamkoor for Tiruvithamkoorian'?
- (A) T.K. Madhavan (B) G.P. Pillai
(C) P. Ranga Rao (D) N. Raman Pillai
16. Who led the 'Pattini Jatha' from Kannur to Madras in 1936?
- (A) E.M.S. Namboothirippad (B) K. Kelappan
(C) A.K. Gopalan (D) C. Kesavan
17. In which country in the world Green Revolution started for the first time?
- (A) Mexico (B) India
(C) Pakistan (D) China
18. Who was known as the 'Jhansi Rani of Travancore'?
- (A) Anna Chandi (B) Arya Pallam
(C) A.V. Kuttimalu Amma (D) Akkamma Cheriyan
19. Who is CEO of NITI AYOGE?
- (A) Aravind Panagariya (B) Rajiv Kumar
(C) Amitab Kant (D) M. Ahaluwaliya

20. What is the name of the mission which aims to achieve full immunisation coverage for all children in the country by 2020?
- (A) Mission Indradhanush (B) Make India
(C) Bal Swachata Mission (D) AYUSH Mission
21. Which of the following is not a scalar quantity?
- (A) Energy (B) Kinematic Viscosity
(C) Power (D) None of the above
22. Ratio of dynamic friction to static friction is :
- (A) Always greater than 1 (B) Always less than 1
(C) Always constant (D) None of the above
23. If the moment of inertia of a rectangular section is to be doubled for the same width, its height h has to be increased to
- (A) $2h$ (B) $0.5h$
(C) $1.26h$ (D) $1.414h$
24. A particle starts from rest and moves along a straight line with constant acceleration a . If it acquires a velocity of 3 m/s after having travelled a distance of 7.5 m, the acceleration and the time taken to travel this distance are :
- (A) $0.6 \text{ m/s}^2, 5 \text{ s}$ (B) $5 \text{ m/s}^2, 0.6 \text{ s}$
(C) $6 \text{ m/s}^2, 0.5 \text{ s}$ (D) $0.5 \text{ m/s}^2, 6 \text{ s}$
25. If the speed of a particle along a curved path is constant, which of the following is true?
- (A) Tangential acceleration is zero, normal acceleration is non zero
(B) Normal acceleration is zero, tangential acceleration is non-zero
(C) Both tangential and normal accelerations are zero
(D) None of the above
26. Starting from rest a particle moving along a circular path of radius r so that the distance travelled is given by the expression $s = ct^2$ where c is a constant. The tangential and normal accelerations of the particle are :
- (A) $2c, 4c^2t^2/r$ (B) $4c, c^2t^2/r$
(C) $c, 0.5c^2t^2/r$ (D) $0.5c, 2c^2t^2/r$
27. If the linear momentum of a particle is increased by 50%, its Kinetic energy will increase by :
- (A) 50% (B) 225%
(C) 2.25% (D) 125%

28. In method of sections for analysis of plane truss, the maximum number of unknown forces that can be found with a given section is :
- (A) 1 (B) 2
(C) 3 (D) 4
29. The depth of centre of pressure in a rectangular lamina of height h with one side in the liquid surface is at :
- (A) $2h/3$ (B) h
(C) $h/3$ (D) $h/2$
30. If 44.5 N tension produces an elongation of 25 mm in a given spring, find the frequency of vibration of a 4.45 N weight suspended from the end of the spring :
- (A) 9.9 Hz (B) 0.99 Hz
(C) 19.9 Hz (D) 91.09 Hz
31. The alloy in duralumin with largest content is :
- (A) Magnesium (B) Manganese
(C) Copper (D) None of the above
32. The crystal structure of all the following material is FCC except :
- (A) Aluminium (B) Magnesium
(C) Nickel (D) Copper
33. Which of the following is a mechanical property?
- (A) Modulus of elasticity (B) Thermal conductivity
(C) Cohesive force (D) Stiffness
34. Hardness is the resistance to :
- (A) Bending (B) Deformation
(C) Scratching (D) Sliding
35. The reaction that causes a liquid and solid phase of fixed proportions mix to yield a second solid phase is :
- (A) Eutectic (B) Eutectoid
(C) Peritectic (D) Peritectoid
36. The most desirable method of increasing the yield strength of mild steel is :
- (A) Precipitation hardening (B) Cold working
(C) Solute addition (D) Grain refinement

37. Recrystallisation rate increases with :
- (A) Increasing amount of cold work (B) Higher annealing temperature
(C) Decreasing initial grain size (D) All the above
38. Bainite has :
- (A) Same morphology as austenite
(B) A non-lamellar morphology of ferrite and cementite
(C) The coarsest morphology among all the products from austenite
(D) None of the above
39. Free energy decrease during recrystallization comes mainly from :
- (A) Lower energy of the new crystal structure
(B) Excess point defects
(C) Grain boundaries
(D) Excess dislocations
40. The maximum hardenability of any steel depends on :
- (A) Presence of alloying elements (B) Grain size
(C) Carbon content (D) All the above
41. When a circular rod of diameter d welded to a rigid plate by a circular fillet weld of size t is subjected to a twisting moment T , the shear stress induced in the weld is given by :
- (A) $2.83 T/\pi d^3$ (B) $4.24 T/\pi d^2$
(C) $5.66 T/\pi d^2$ (D) $1.414 T/\pi d^2$
42. Parallel fillet welded joints are designed for :
- (A) Tensile strength (B) Compressive strength
(C) Bending strength (D) Shear strength
43. A bolt is specified by its :
- (A) Nominal diameter and pitch (B) Major diameter and pitch
(C) Minor diameter and pitch (D) None of the above
44. In a knuckle joint, the pin is subjected to :
- (A) Double shear (B) Double shear and bending
(C) Crushing and double shear (D) None of the above
45. A beam is said to be of uniform strength if _____ is same throughout the beam.
- (A) Bending moment (B) Shear stress
(C) Deflection (D) Bending stress

46. If both the mean coil diameter and wire diameter of a helical compression spring are doubled, the deflection of the spring will be :
 (A) doubled (B) halved
 (C) increased 4 times (D) reduced to one fourth
47. The tensile (hoop) stress in a flywheel rim due to the centrifugal force acting on the rim will be _____ if the linear velocity is increased by 10%.
 (A) Increased by 21% (B) Increased by 121%
 (C) Increased by 100% (D) Increased by 10%
48. If a spring is cut into three equal springs, the stiffness will be :
 (A) reduced to approximately one third (B) same
 (C) increased to approximately 3 times (D) unpredictable
49. For high speed reduction _____ gear is used.
 (A) Worm (B) Spur
 (C) Bevel (D) Herringbone
50. If the thickness of a thin cylinder subjected to internal pressure is doubled and diameter is reduced to half, the stress will be :
 (A) Reduced to one fourth (B) Reduced to one half
 (C) Remains constant (D) Reduced to one eighth
51. Which of the following is true?
 (A) Bulk modulus is the ratio of spherical stress to volumetric strain
 (B) Bulk modulus is infinity for a material of 0.5 Poisson ratio
 (C) (A) and (B)
 (D) None of the above
52. Pressure in bar at a depth of 10 m in oil of relative density 0.750 is :
 (A) 7355.75 (B) 0.075
 (C) 73.575 (D) 9.3575
53. In a steady flow of fluid the acceleration of any fluid particle is :
 (A) Constant (B) Variable
 (C) Zero (D) Zero under limiting condition
54. The velocity of a horizontal jet through an orifice provided at the bottom of a tank with water at a level of 4 m is 4 m/s. What will be the jet velocity when the level drops to 1 m?
 (A) 1 m/s (B) 2 m/s
 (C) 1.414 m/s (D) 4 m/s

55. In a free vortex motion, the tangential component of the water particle is proportional to
(A) Distance from the centre (R) (B) R^2
(C) $1/R$ (D) R^3
56. Which of the following statements is false?
(A) Pitting due to cavitation occurs at high pressure
(B) Specific speed of a turbine with higher head is lower
(C) Centrifugal pump is started with delivery valve fully closed and axial flow pump with delivery valve fully open
(D) None of the above
57. The limiting pressure head at starting and end of the suction and delivery strokes of a reciprocating pump are _____ of water.
(A) 2.6 m (B) 10 m
(C) 1.6 m (D) 16 m
58. Air vessels in a reciprocating pump :
(A) Maintain uniform flow rate (B) Reduce friction head
(C) Both (A) and (B) (D) None of the above
59. For a completely submerged rectangular vertical plate in a liquid, the ratio of distance of centre of pressure from the liquid surface to the centre of gravity is :
(A) Always greater than 1 (B) Less than 1
(C) Greater than or equal to 1 (D) Less than or equal to 1
60. The Darcy friction factor is .
(A) A constant
(B) Not a constant
(C) Sometimes known as Blasius friction factor
(D) (B) and (C)
61. With increase in pressure the enthalpy of dry saturated gas :
(A) Increases
(B) Decreases
(C) Remains constant
(D) Increases up to the critical point and then decreases
62. Latent heat of a liquid vapour mixture _____ with increase in pressure.
(A) does not change (B) decreases
(C) increases (D) increases till critical point is reached

63. The type of compression that would consume less work is :
(A) Adiabatic (B) Polytropic
(C) Isenthalpic (D) Isothermal
64. For an incompressible fluid which of the following is true :
(A) Specific heats at constant pressure and constant volume are same
(B) Specific heat at constant pressure is greater than that at constant volume
(C) Specific heat at constant volume is greater than that at constant pressure
(D) None of the above
65. Joule's law states that the specific internal energy of a gas :
(A) Depends on temperature of the gas (B) Depends on pressure of the gas
(C) Independent of pressure of the gas (D) (A) and (C)
66. In an ideal gas the partial pressure of a component is :
(A) Inversely proportional to square of mole fraction
(B) Directly proportional to mole fraction
(C) Directly proportional to square of mole fraction
(D) Equal to mole fraction
67. Inversion curves are the curves of
(A) Constant entropy
(B) Constant internal energy
(C) Constant enthalpy
(D) Constant derivative of pressure with respect to enthalpy
68. Throttling calorimeter is used for measuring :
(A) Very low dryness fraction (B) Very high dryness fraction
(C) Calorific values of liquids (D) Calorific values of gases
69. A perfect gas at 27°C is heated at constant pressure till its volume is doubled. The final temperature is :
(A) 54°C (B) 327°C
(C) 108°C (D) 654°C
70. If a certain amount of dry ice is mixed with same amount of water at 80°C , the final temperature of the mixture will be :
(A) 80°C (B) 40°C
(C) 20°C (D) 0°C

71. A casting with a _____ volume to surface ratio will cool and solidify _____.
- (A) higher, fast (B) higher, slowly
(C) lower, slowly (D) lower, fast
72. Which is an expendable mould casting process?
- (A) Shell moulding (B) Investment casting
(C) Vacuum moulding (D) All the above
73. Impression die forging is also known as :
- (A) Open die forging (B) Flashless die forging
(C) Indirect forging (D) None of the above
74. The extrusion pressure in direct extrusion in comparison to indirect extrusion is :
- (A) Higher at beginning but almost the same at the end
(B) Lower at beginning but almost the same at the end
(C) Same at beginning but increases at the end
(D) Same at beginning but decreases at the end
75. _____ provides a clearance between the trailing edge of the tool and the newly generated work surface.
- (A) Side rake angle (B) End cutting edge angle
(C) Back rake angle (D) All the above
76. In water jet cutting stand-off distance is the separation between :
- (A) Work surface and the operator (B) Nozzle and the operator
(C) Nozzle and work surface (D) None of the above
77. Ultrasonic machining is used to machine :
- (A) Non-metallic materials (B) Hard and brittle materials
(C) Tough and malleable materials (D) Soft and ductile materials
78. _____ machining process(es) require(s) a vacuum chamber.
- (A) Laser Beam Machining (B) Electron Beam Machining
(C) Ultrasonic Machining (D) Both (A) and (B)
79. Tungsten is usually used as an electrode in :
- (A) Gas tungsten arc welding (B) Submerged arc welding
(C) Plasma arc welding (D) Both (A) and (C)

80. The code G33 is used for :
 (A) Absolute programming (B) Thread cutting
 (C) Increment programming (D) Tool length compensation
81. The following is (are) the limitations of Economic Order Quantity assumption(s) :
 (A) Demand may vary throughout year
 (B) It assumes that storage space is unlimited
 (C) Prices of materials change throughout year
 (D) All the above
82. Work study examines :
 (A) Method (B) Work duration
 (C) Feasibility of a product (D) (A) and (B)
83. In process charts the symbols used for storage and inspection are _____ respectively.
 (A) Square and Triangle (B) Triangle and Square
 (C) Circle and Triangle (D) Square and Circle
84. Which charts are used for keeping a control on the central tendency and dispersion?
 (A) P-chart, C-chart (B) P-chart, R-chart
 (C) X-chart, R-chart (D) C-chart and X-chart
85. If there are more than one optimum solution for the decision variable, the solution is :
 (A) Alternative (B) Infeasible
 (C) Unbounded (D) None of the above
86. Which method is an iterative procedure for solving LPP in a finite number of steps?
 (A) Slack variable (B) M-method
 (C) Duplex method (D) Simplex method

87. Activities G, P and R are the immediate predecessors for activity W. If the earliest finish time for the three are 12, 15 and 10, then the earliest start time for W is :
- (A) 10 (B) 12
(C) 15 (D) None of the above
88. _____ layout is preferred for low volume production of non-standard products.
- (A) Fixed position layout (B) Product layout
(C) Process layout (D) Combination layout
89. Image building objectives are related to _____ type of market structure.
- (A) Competition (B) Oligopoly
(C) Monopoly (D) Monopsony
90. Which of the following is (are) the limitations of break-even analysis?
- (A) Static concept (B) Non-linear behaviour of costs
(C) Presence of perfect competition (D) All the above
91. When a bar of cross-sectional area A is subjected to axial loading P , which of the following is true?
- (A) Stress is given by P/A at every sections except at ends
(B) Bending will occur if P is not acting through the centroid of the cross-section
(C) Both (A) and (B)
(D) None of the above
92. The value of Poisson's ratio for cork and concrete are :
- (A) 0.1 and 0 (B) 0 and 0.5
(C) 0 and 0.1 (D) 0.5 and 0
93. A statically indeterminate structure is one which has :
- (A) more constraints that are necessary
(B) less constraints that are necessary
(C) exactly the same constraints that are necessary
(D) infinite constraints

94. If theory of pure bending is used for calculating the normal stresses in the case of non-uniform bending of beams, the values will be :
- (A) Almost correct
 - (B) Incorrect
 - (C) Correct or incorrect depending on the magnitude of bending moment
 - (D) None of the above
95. In case of bending of beams of rectangular cross-section, the maximum shear stress is _____ larger than the average shear stress.
- (A) 50%
 - (B) 150%
 - (C) 250%
 - (D) 350%
96. A sudden jump on the bending moment diagram is caused by :
- (A) A concentrated load at that point
 - (B) A uniformly varying load
 - (C) A support at that point
 - (D) A couple acting at that point
97. In a cantilever beam carrying uniformly varying load starting from zero at the free end, the bending moment diagram is a
- (A) Horizontal line
 - (B) Inclined line
 - (C) Parabola
 - (D) Cubic
98. If a bar is loaded in simple tension, the failure of material may be due to :
- (A) Normal stresses
 - (B) Shear stresses
 - (C) (A) or (B)
 - (D) None of the above
99. The bending moment at mid-span of a uniform beam of height h subjected to a point load P is _____ compared to a beam of same length, width but of height $2h$ carrying the same load.
- (A) same
 - (B) twice
 - (C) half
 - (D) none of the above
100. A simply supported beam subjected to a couple at mid-span has :
- (A) Same bending moment and zero shear stress throughout the length
 - (B) Same shear stress and zero bending moment throughout the length
 - (C) Zero bending moment at ends and maximum at the centre
 - (D) None of the above