

049/2016

Maximum : 100 marks

Time : 1 hour and 15 minutes

1. The co-ordination number of FCC crystal structure is :
(A) 4 (B) 6
(C) 8 (D) 12
2. According to Gibb's phase rule, the number of degrees of freedom of a two component, three phase system is :
(A) 3 (B) 2
(C) 1 (D) 0
3. Which one of the following is correct for Berger's vector in screw dislocation?
(A) perpendicular to the dislocation line (B) parallel to the dislocation line
(C) inclined to the dislocation line (D) opposite to the dislocation line
4. In high speed steels, the alloying element with maximum percentage is :
(A) Vanadium (B) Nickel
(C) Tungsten (D) Silicon
5. In electric arc welding, arc is created by :
(A) current (B) voltage
(C) frequency (D) contact resistance
6. Tool life is affected mainly with :
(A) depth of cut (B) feed
(C) cutting speed (D) coolant
7. The surface roughness on a drawing is represented by :
(A) circles (B) triangles
(C) squares (D) zig-zag line
8. Among the conventional machining processes, the maximum specific energy is consumed in :
(A) turning (B) drilling
(C) grinding (D) facing

9. The optimum value of the helix angle of a drill is :
- (A) 10° (B) 20°
(C) 30° (D) 50°
10. Auto-collimator is used for measuring :
- (A) roughness (B) flatness
(C) automobile balancing (D) angle
11. Density of a fluid is sensitive to change in pressure. Such fluid is known as :
- (A) ideal fluid (B) real fluid
(C) compressible fluid (D) perfect fluid
12. The density of one litre of petrol of specific gravity 0.7 is :
- (A) 600 kg/m^3 (B) 600 N/m^3
(C) 700 kg/m^3 (D) 700 N/m^3
13. Whirl pool in a river is an example for :
- (A) forced vortex flow (B) free vortex flow
(C) irrotational flow (D) viscous flow
14. A steady irrotational flow of an incompressible fluid is known as :
- (A) laminar flow (B) creeping flow
(C) potential flow (D) shear flow
15. Bernoulli's equation is :
- (A) momentum equation (B) energy equation
(C) force equation (D) mass equation
16. The equations of motion for a viscous fluid is known as :
- (A) Euler's equation (B) Bernoulli's equation
(C) Reynold's equation (D) Navier-Stoke's equation
17. Darcy's friction factor in a pipe flow corresponds to a Reynold's number of 2000 is :
- (A) 0.016 (B) 0.032
(C) 0.32 (D) 0.16

18. Pitot tube is used for measuring :
(A) discharge (B) velocity
(C) viscosity (D) pressure
19. The slip in a reciprocating pump is :
(A) positive (B) negative
(C) zero (D) positive or negative
20. Modern Francis turbine is essentially a :
(A) Tangential flow turbine (B) Mixed flow turbine
(C) Axial flow turbine (D) Radial flow turbine
21. The ratio of pressure force to inertia force is known as :
(A) Reynold's number (B) Froude's number
(C) Weber number (D) Euler's number
22. Series operation of a centrifugal pump results in :
(A) high head (B) high discharge
(C) high speed (D) reduced power consumption
23. Hydraulic ram works on the principle of :
(A) positive displacement action
(B) centrifugal action
(C) reciprocating action
(D) inertia force of water in the supply line
24. Hydraulic intensifier is used for :
(A) storing energy of a fluid in the form of pressure energy
(B) increasing the pressure intensity of a liquid
(C) transfer and lift heavy loads
(D) augment the supply of water
25. The capacity of a hydraulic accumulator is defined as :
(A) maximum amount of energy it can store
(B) maximum discharge which can deliver
(C) the volume of liquid which can store
(D) the maximum height to which it is capable of lifting the liquid

26. The pump to be used for pumping highly viscous fluids belongs to :
- (A) screw pump (B) turbine pump
(C) centrifugal pump (D) plunger pump
27. Cavitation in centrifugal pump can be reduced by :
- (A) reducing the discharge (B) reducing the suction head
(C) throttling the discharge (D) increasing the fluid velocity.
28. A direction control valve designated by DC 3/2 implies :
- (A) 3 position and 2 port (B) 3 port and 2 positions
(C) 3 supply port and 2 exhaust port (D) 3 exhaust port and 2 supply ports
29. The function of check valve is :
- (A) to allow the flow of fluid in one direction only
(B) to allow the flow of fluid on both directions
(C) to regulate the flow
(D) to check the flow
30. Sequence valves are also called as :
- (A) counter balance valve (B) shuttle valve
(C) throttle valve (D) diverting valves
31. A simply supported beam of span 10 m carrying a concentrated load of 1000 N at the mid span will have the maximum bending moment of :
- (A) 10000 Nm (B) 5000 Nm
(C) 2500 Nm (D) 500 Nm
32. The ratio of maximum shear stress to average shear stress for a beam with circular section is :
- (A) 3:1 (B) 2:1
(C) 3:2 (D) 4:3
33. The maximum shear stress developed on the surface of a solid circular shaft under pure torsion is 320 MPa. If the shaft diameter is doubled, then the maximum shear stress developed corresponds to the same torque will be :
- (A) 160 Mpa (B) 80 MPa
(C) 40 MPa (D) 30 MPa

34. When a close coiled spring is subjected to axial load, its axial deflection is directly proportional to :
- (A) Diameter of the wire
 (B) Modulus of rigidity of the spring material
 (C) Modulus of elasticity of the spring material
 (D) Mean radius of the coil of the spring
35. A universal joint is an example of :
- (A) higher pair
 (B) lower pair
 (C) rolling pair
 (D) sliding pair
36. Coriolis component of acceleration is always :
- (A) parallel to the link
 (B) perpendicular to the link
 (C) radially outward along the link
 (D) coincide with the axis of link
37. Axial thrust is minimum in case of :
- (A) helical gear
 (B) bevel gear
 (C) double helical gear
 (D) miter gear
38. Whenever the follower moves with simple harmonic motion, the velocity diagram is :
- (A) parabolic
 (B) sinusoidal
 (C) hyperbolic
 (D) cosine curve
39. In case of multi-disk clutch, if there are 3 disks on the driving shaft and 2 disk on the driven shaft, then the total number of pairs of contacting surfaces is equal to :
- (A) 5
 (B) 6
 (C) 4
 (D) 1
40. A key connecting to a flange coupling to a shaft likely to fail in :
- (A) tension
 (B) shear
 (C) torsion
 (D) bending
41. Second law of thermodynamics defines a property known as :
- (A) internal energy
 (B) entropy
 (C) temperature
 (D) enthalpy

42. The entropy change in a reversible adiabatic process is :
- (A) zero (B) <0
(C) >0 (D) ≤ 0
43. The efficiency of a Carnot cycle operating between the temperature limits of 327° and 27° is :
- (A) 92% (B) 60%
(C) 50% (D) 70%
44. One ton of refrigeration is equal to :
- (A) 3.5 kW (B) 3.8 kW
(C) 4 kW (D) 3 kW
45. Which of the following processes is not associated with Diesel cycle?
- (A) constant volume (B) constant pressure
(C) adiabatic (D) isothermal
46. Morse test is conducted only on :
- (A) variable speed engine (B) low power engine
(C) multi-cylinder engine (D) water cooled engine
47. The ignition quality of a petrol engine fuel is expressed as :
- (A) Cetane number (B) Octane number
(C) SAE rating (D) API gravity
48. The brake lining is usually made of :
- (A) leather (B) fabric
(C) cork (D) asbestos
49. The throttling process in a refrigeration cycle is :
- (A) isentropic (B) isobaric
(C) isochoric (D) isenthalpic
50. For the same temperature limits, the COP of a refrigerator is 4, then the COP of a heat pump equals :
- (A) 5 (B) 4
(C) 3 (D) 2

51. Which among the following is a Primary supporting member?
- (A) Bracket floors (B) Deep Transverse
(C) Deck Beam (D) Hold frame
52. What is a Gun Whale?
- (A) Area joining keel to Garboard strake
(B) Area joining bilge plate to bottom plate
(C) Area joining sheer strake to stringer plate
(D) Area joining bulkhead to deck
53. What is the standard size of a TEU container?
- (A) 20' × 6' × 6' (B) 20' × 8' × 8'
(C) 25' × 8' × 8' (D) 40' × 6' × 6'
54. Why do you sub divide the hull into compartments?
- (A) To make the ship afloat when one compartment is flooded
(B) To increase speed
(C) To get directional stability
(D) To increase stability
55. Which compartment standard is given for passenger vessels with respect to flooding?
- (A) One compartment standard (B) Two compartment standard
(C) Three compartment standard (D) No compartment standard
56. What is the stability criteria for Trim and Stability booklet?
- (A) ILO Criteria (B) ILLC Criteria
(C) SOLAS criteria (D) IMO Criteria
57. How do you reduce free surface effect?
- (A) By carrying liquid of less density
(B) By giving rectangular tanks
(C) By giving partition bulkheads in tanks
(D) By giving cylindrical tanks
58. What is the advantage of variable pitch propellers?
- (A) Can function for varying loads (B) Can increase speed
(C) Economical in operation (D) Can use lesser diameter propeller

59. Which rule is applicable for the design of light and sound signals?
- (A) MARPOL (B) SOLAS
(C) COLREG (D) ILLC
60. Which among the following is an item in FFA?
- (A) Lifebuoy (B) Bilge and fire pump
(C) Embarkation ladder (D) Catwalk
61. In an alternator, the regulator controls output voltage by :
- (A) Sine wave voltage regulation (B) Speed regulation
(C) Output current regulation (D) Field current regulation
62. The number of windings in the stator of an alternator is :
- (A) 4 (B) 3
(C) 6 (D) 2
63. The torque developed at the motor armature, when the battery current is switched on, is called :
- (A) Engine resisting torque (B) Breakaway torque
(C) Motor locked torque (D) Starting torque
64. Continuity test of motor field windings can be done with a :
- (A) Rheostat (B) Multimeter
(C) Voltmeter (D) Wattmeter
65. The light used to indicate the direction in which vehicle turning is :
- (A) Park lamps (B) Reverse lamp
(C) Tail lamp (D) Traficators
66. The device that give an indication whether certain electric units have turned on or not, is called :
- (A) Tell-tale relay (B) Limit relay
(C) Solenoid relay (D) Neutral switch
67. The frequency of a 2 pole alternator running at 3000 rpm is _____ Hz.
- (A) 60 (B) 120
(C) 50 (D) 150