Date of Examination: 08.03.2020 **Time: 2 Hrs**

Name of the Candidate:											
Application No:											

Candidate's Signature *Invigilator's Signature*

Instructions to Candidates:

1. **Use of Calculators, cell phones and other electronic devices IS NOT permitted inside Examination Hall.**
2. **Candidate should carefully read the instructions on Question paper and mark correct answer(s) in the Square bracket provided against each question**
3. **There are a total of 80 questions. The questions are divided into Part A and Part B. Part A consists of 60 questions carrying one mark each. Part B consists of 20 questions carrying two marks each.**
4. **Clarifications on questions are not permitted.**
5. **Rough work can be done in any blank space provided in the Question booklet only. Rough work should not be done anywhere except at the space provided at end of the question paper.**
6. **No candidate is allowed to leave the examination hall till the examination is over.**

Part – A (60 x 1 = 60 Marks)

1.	Orthographic Projection is A. Projectors are parallel to the plane of projection. B. Observer is at an infinite distance from the Reference plane C. Reference plane is at infinite distance from the object D. Projectors are perpendicular to the plane of projection	[D]
2.	Reference planes are assumed to be A. Transparent and finite size B. Transparent and infinite size C. Opaque and finite size D. Opaque and infinite size	[B]
3.	In aligned system of dimensioning, the dimensions may be read from A. Bottom or right hand edges B. Bottom or left hand edges C. Only from bottom D. Only from left side	[A]
4.	Which of the following statement is correct with respect to the first angle projection method? A. Left side view is on the left of the Front View B. Right side view is on the right of the front view C. Front view is below the reference line *xy* and Top view is above the Reference line *xy*. D. Front view is above the reference line *xy* and Top view is below the Reference line *xy*.	[D]
5.	The sectional views of an assembly are required to A. Reduce the size of the objects. B. To observe the internal details of the object. C. To remove the parts from the housing and observe the details. D. None of the above	[B]
6.	A material with identical properties in all directions is said to be A. homogeneous B. isotropic C. elastic D. orthotropic	[B]
7.	The stress level, below which a material has a high probability of not failing under reversal of stress, is known as A. elastic limit B. endurance limit C. proportional limit D. tolerance limit	[D]

8.	A Mohr's circle reduces to a point when the body is subjected to A. Pure shear B. Uniaxial stress only C. Equal and opposite axial stresses on two mutually perpendicular planes, the planes D. Equal axial stresses on two mutually perpendicular planes, the planes being free of shear.	[B]
9.	The material is subjected to a static load, the stress concentration is more important to be considered when a material is A. Ductile B. Isotropic C. Brittle D. Anisotropic	[C]
10.	In bending, perfectly plastic behavior assumes the normal stress distribution is _____ over the cross-section of the beam. A. Linearly increasing B. Linearly decreasing C. Exponentially increasing D. Constant	[C]
11.	The element representing the maximum in-plane shear stress with the associated average normal stresses is oriented ____ from the element representing the principal stresses. A. 45° B. 90° C. 180° D. 30°	[A]
12.	A pin-connected column will buckle about the principal axis of the cross-section having the _____ moment of inertia A. High B. Least C. Medium D. none	[B]
13.	Newton's law of viscosity depends on the A. Stress and Strain in the fluid B. Shear stress, pressure and velocity C. Shear stress and rate of strain D. Viscosity and shear stress	[C]
14.	When can a piezometer be not used for pressure measurement in pipes? A. The pressure difference is low B. The velocity is high C. The fluid in the pipe is a gas D. The fluid in the pipe is highly viscous	[C]
15.	_____ is one of the important parameter by which the problem of cavitations in the draft tube can be avoided A. height of the draft tube B. *size of the pump* C. material of the draft tube	[A]

	D. diameter of the draft tube	
16.	If the distance between the two streamlines for an incompressible flow is reducing then the magnitude of velocity _____ A. increases B. decreases C. slowly becomes zero D. none of the above	[A]
17.	If the distance between the two streamlines for an incompressible flow is reducing then the magnitude of velocity _____ A. increases B. decreases C. slowly becomes zero D. none of the above	[A]
18.	The purpose of gate is to A. feed the casting at a rate consistent with the rate of solidification B. act as reservoir for molten metal C. help feed the casting until all solidification takes place D. feed molten metal from the pouring basin to the gate	[A]
19.	The purpose of the riser is to A. deliver molten metal into the mould cavity B. act as a reservoir for the molten metal C. feed the molten metal to the casting in order to compensate for the shrinkage D. deliver the molten metal from pouring basin to gate.	[B]
20.	The casting method adopted for ornaments/toys of nonferrous alloys is A. slush casting B. die casting C. investment casting D. centrifugal casting	[A]
21.	Bottom gating system is sometimes preferred in casting because A. it enables rapid filling of mould cavity B. it is easier to provide in the mould C. it provides cleaner metal D. it reduces splashing and turbulence	[D]
22.	Which one of the following processes produce a casting when pressure forces the molten metal into the mould cavity? A. sand casting B. investment casting C. die casting D. continuous casting	[C]
23.	The centrifugal casting method is used for casting articles of A. symmetrical shape about vertical axis B. symmetrical shape about horizontal axis C. irregular shape	[B]

	D. non-ferrous metals only	
24.	Core prints are used in the casting A. to strengthen the core B. to fabricate the core C. to support and hold the core in plane D. all of the above	[C]
25.	Which one of the following welding techniques uses a non-consumable electrode? A. MIG welding B. TIG welding C. Submerged arc welding D. Thermite welding	[B]
26.	Preheating of workpiece is essential in welding A. High Speed Steel B. Stainless Steel C. Cast Iron D. Aluminum	[C]
27.	Following gases are used in TIG welding A. CO_2 and H_2 B. Argon and Neon C. Argon and Helium D. Helium and Neon	[C]
28.	In arc welding process, the intense heat is developed between the work and the electrode largely due to A. Current B. Voltage C. Electrical Energy D. Contact Resistance	[D]
29.	Pinch effect in welding is the result of A. expansion of gases in the arc B. electro magnetic forces C. electric force D. surface tension of the molten metal	[B]
30.	Oxyacetylene flame having more amount of C_2H_2 is called A. Oxidizing flame B. Carburizing flame C. Neutral flame D. Red flame	[B]
31.	Maximum flame temperature in case of gas welding occurs at A. outer cone B. inner cone C. intermediate cone D. None of these	[B]
32.	In the forging operation, fullering is done to A. draw out the material B. bend the material C. upset the material D. extrude the material	[A]
33.	Which one of the following metal forming processes is not a high energy forming process? A. Electro-magnetic forming B. Roll forming C. Explosive forming D. Electrohydraulic forming	[B]
34.	A strip is to be rolled from a thickness of 30 mm to 15 mm using a two high mill having rolls of diameter 300 mm. The coefficient of friction for unaided bite should A. 0.316 B. 0.512 C. 0.254 D. 0.072	[A]

35.	Cold shut is a forging defect caused by which of the following reason? A. improper cleaning of the stock B. improper design of die C. misalignment of the two die halves D. improper cooling of the large forging	[B]
36.	In drawing operation if D_i = Initial diameter and D_o = outgoing diameter, then the degree of drawing is equal to A. $\frac{D_i - D_o}{D_i}$ B. $\frac{D_o - D_i}{D_o}$ C. $\frac{D_i^2 - D_o^2}{D_i^2}$ D. $\sqrt{\frac{D_i^2 - D_o^2}{D_i^2}}$	[C]
37.	A gating ratio of 1 : 2 : 4 is used to design the gating system for magnesium alloy casting, which refers to the cross section areas of the various gating elements as given below: 1. Down sprue 2. Runner bar 3. Ingates The correct sequence of the above elements in the ratio 1 : 2: 4 is A. 1, 2 and 3 B. 1, 3 and 2 C. 2, 3 and 1 D. 3, 1 and 2	[A]
38.	According to Chvorinov's equation the solidification time of a casting is proportional to ____, where V is the volume of the casting. A. V^2 B. V C. $\frac{1}{V^2}$ D. $\frac{1}{V}$	[A]
39.	Casting chills are used to A. Decrease possibility of blowholes B. Increase directional solidification C. Improve surface finish D. Decreases the freezing time of casting	[B]
40.	Weld cracking happens because of A. Stress due to shrinkage B. Welding speed is high C. Gas Shielding is improper D. High wavelength	[A]
41.	Cutting tool material 18-4-1 HSS has which one of the following composition A. 18% W, 4% Cr, 1% V B. 18% Cr, 4% W, 1% V C. 18% W, 4% V, 1% Cr D. 4)18% Cr, 4% V, 1% W	[A]
42.	Tool life is generally better when A. Grain size of work material is large B. Grain size of work material is small C. Hard constituents are present in the microstructure of the tool material D. High compressive strength for work material	[A]
43.	Which among the following is the slowest speed operation performed on Lathe? A. Turning B. Thread cutting C. Knurling D. Taper turning	[B]
44.	Which one of the following materials cannot be machined with Diamond?	[A]

	A. Cast Iron B. Aluminum C. Brass D. Ceramics	
45.	Friction between chip and tool can be reduced by A. Increasing rake angle B. Increasing flank angle C. Increasing depth of cut D. Increasing cutting speed	[D]
46.	The process in which the material removal is governed by Faraday law is A. Electro Chemical Machining B. Electro Discharge Machining C. Abrasive Jet Machining D. Laser Beam Machining	[A]
47.	3-2-1 principle of location arrests how many degrees of freedom? A. 3 translations B. 3 rotations C. 3 translations and 3 rotations D. 3 translations and 6 rotations	[D]
48.	Jigs are used A. Drilling processes B. Welding processes C. Grinding processes D. Milling processes	[A]
49.	Soft materials cannot be economically ground due to A. The higher temperatures involved in grinding B. Frequent wheel clogging C. Rapid wheel wear D. Low work-piece stiffness	[B]
50.	What is meant by hard wheel in Grinding? A. Abrasives are hard B. Hardness of grinding wheel is high C. Bonding strength between the abrasives is high D. All of the above	[C]
51.	Which one of the following processes does not cause tool wear? A. USM Machining B. ECM C. EDM D. Anode Mechanical	[B]
52.	Dry and compressed air is used as cutting fluid for machining A. Steel B. cast iron C. aluminum D. brass	[B]
53.	A good cutting fluid should have A. Low thermal conductivity B. High viscosity C. High specific heat D. High density	[B]
54.	Machining soft materials will result in A. High shear angle B. Low shear angle C. High cutting forces D. High rake angle	[A]

55.	A High chip thickness ratio (uncut chip thickness/chip thickness) results in A. Higher friction angle B. Low shear angle C. Low coefficient of friction D. 4) Higher machinability	[B]
56.	Which one of the following operations performed on lathe is an example of orthogonal machining? A. Thread cutting B. Parting C. Turning D. Knurling	[B]
57.	A square steel bar of 50 mm side and 5 m long is subjected to a load where upon, it absorbs a strain energy of 100 J. What is its modulus of resilience? A. 8×10^{-3} N/mm^2 B. 125 mm^2/N C. 0.01 N/mm^2 D. 100 mm^2/N	[A]
58.	For the following hole and shaft sizes of mated parts according to basic hole system Hole: 37.50 mm to 37.52 mm Shaft: 37.47 mm to 37.45 mm What is the value of allowance? A. 0.02 mm B. 0.03 mm C. 0.05 mm D. 0.07 mm	[B]
59.	A single point cutting tool with a nose radius of 0.4 mm was used to turn a component in a lathe employing a feed rate of 0.3 mm/rev. If the feed rate is doubled, the ideal surface roughness produced on the component will increase by a factor of A. 2 B. 4 C. 8 D. 16	[B]
60.	A grinding wheel is specified as 49 A 36 M 7 V 24 The number 36 stands for A. Structure B. grade C. grit size D. bond	[C]

Part – B (20 questions each carry 2 marks)

61.	A Mild steel bar of 150 mm long, 60 mm diameter is turned to 145 mm long 50 mm diameter. Assume the workpiece rotates at 440 rpm, feed is 0.3 mm/rev and maximum depth of cut is 1 mm. consider approach and over travel distance as 5 mm for turning operation, Assume that facing operation is also performed for the finished job and estimate the total machining time? A. 1.136 min B. 1.316 min C. 5.68 min D. 5.86 min	[D]
62.	In a turning operation, the approach angle is 30^0 and the back rake is 8^0. Calculate the side rake so that the cutting can be considered as orthogonal. A. 10.24^0 B. 13.67^0 C. 15.12^0 D. 16.42^0	[B]
63.	Match the following: (a) Slush casting (1) Turbine blades (b) Investment casting (2) Cylinder head (c) Pressure Die casting (3) Christmas tree (d) Shell molding (4) Carburetor A. a-1, b-4, c-3, d-2 B. a-3, b-1, c-4, d-2 C. a-3, b-1, c-2, d-4 D. a-1, b-3, c-4, d-2	[B]

64.	Titanium is one of the difficult-to-work alloy because of its A. Simple cubic structure B. Hexagonal structure C. Hexagonal close packed structure D. Face centered cubic structure	[C]
65.	G02 code in the CNC programming refers to A. Linear Interpolation B. Circular Interpolation, Clockwise C. Circular Interpolation, Counter Clockwise D. Point-to-point positioning	[B]
66.	According to Castigliano's second theorem, for a body having constant temperature and material with linear-elastic behavior, the displacement component at the point of application of the load, in the load direction is equal to A. $\frac{\partial \bar{U}}{\partial P}$ B. $\frac{\partial P}{\partial \bar{U}}$ C. $\frac{\partial \bar{U}}{\partial P}+\frac{\partial U}{\partial P}$ D. $\frac{\partial U}{\partial P}-\frac{\partial \bar{U}}{\partial P}$	[A]
67.	When the fluid is made to flow through a circular pipe of radius 0.05 m and with a uniform velocity of 1 m/s such that its Reynolds number is 1000. At what length the fully developed condition can be attained A. 5 m B. 0.5 m C. 2.5m D. 10 m	[A]
68.	Golf ball travels longer distance when compared to smooth ball because dimples A. Make the flow laminar B. Make the flow turbulent C. Rotates ball and lifts up D. Provides additional force	[B]
69.	For an orthogonal cutting operation, the rake angle is 10^0 and the coefficient of friction is 0.5. Find the shear angle. A. 16.12^0 B. 23.17^0 C. 32.26^0 D. 36.72^0	[D]
70.	In the CNC machining, point-to-point system is used in which of the following process? A. Reaming B. Grooving C. Parting D. Facing	[A]
71.	Tooth paste can be considered as one of the example for A. Shear thickening fluid B. Shear thinning fluid C. Bingham plastic D. Anti-thixotropic	[C]
72.	Calculate the machining time for drilling 4 holes of 16 mm diameter each on a flange from the following data. Flange thickness = 30 mm, cutting speed = 22 m/min, and feed = 0.2 mm/rev. A. 0.342 min B. 0.684 min C. 1.026 min D. 1.368 min	[D]
73.	During an orthogonal cutting operation, cutting force is 950 N and thrust force is 475 N and rake angle is zero. Determine the coefficient of friction between chip and tool. A. 0.3 B. 0.4 C. 0.5 D. 1.0	[C]

74.	Which of the following is true in welding electrode coating. i. Cellulose — a) slag forming ii. SiO2 — b) Shielding iii. Ferro silicon — c) binding iv. Sodium silicate — d) Deoxidising A. i-a, ii-b, iii-d, iv-c B. i-b, ii-a, iii-d, iv-c C. i-b, ii-a, iii-c, iv-d D. i-a, ,ii-b, ,iii-c, ,iv-d	[B]
75.	The function of the encoder in a CNC machine is to sense and control _____ A. Spindle speed B. Table position C. Spindle position D. Spindle start/stop	[B]
76.	A circular beam is subjected to shear force of 7 kN. The beam diameter is 150 mm. Determine the maximum shear stress developed in the circular beam, A. 396 kN/m^2 kN/m^2 B. 2)528 kN/m^2 C. 3)594 kN/m^2 D. 4) 264	[B]
77.	In a shaper, length of stroke is 300 mm, number of double strokes per minute is 40 and ratio of return time to cutting time is 1:2. Find the cutting speed. A. 6 m/min B. 12 m/min C. 18 m/min D. 24 m/min	[C]
78.	Match the fallowing casting defects with their definition. a) Cold shut — i) Non filling portion of cavity. b) Hot tear — ii) Discontinuity due to contraction. c) Rat tail — iii) Crack due to residual stress. d) Misrun — iv) due to usage of wax pattern in sand mould. A. a-ii, b-iii, c-iv, d-i B. a-iv, b-iii, c-i, d-ii C. a-ii, b-iv, c-i, d-iii D. a-iii, b-iv, c-i, d-ii	[A]
79.	Dimensions for kinematic viscosity is A. $M^0L^2T^{-1}$ B. $M^1L^{-1}T^{-1}$ C. $M^0L^{-1}T^{-1}$ D. $M^1L^2T^{-1}$	[A]
80.	A cylinder of 25 mm diameter and 100 mm long is turned with a tool, for which the relation VT0.25 = 55 is applicable. For a tool feed of 0.046 mm/rev, the number of tool regrinds required to produce 425 cylinders is A. 12 B. 22 C. 43 D. 4) 85	[D]

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