Sr No.	PhD Mechanical Engineering
1	Which fraction comes next in the sequence

$$\frac{1}{2}, \frac{3}{4}, \frac{5}{8}, \frac{7}{16}, ?$$

Alt1	9/32
Alt2	10/17
Alt3	11/34
Alt4	12/35

2	Choose the missing term out of the given options: Ac__cab__baca__aba__acac
Alt1	aacb
Alt2	acbc
Alt3	babb
Alt4	bcbb

3	Leaf is related to Sap in the same way as Bone is related……………?.............
Alt1	Fluid
Alt2	Blood
Alt3	Marrow
Alt4	Calcium

4	Select the lettered pair that has the same relationship as the original pair of words: Rotate: Gyrate
Alt1	Putrefy: Reject
Alt2	Anachronism: Cubism
Alt3	Accolade: Criticism
Alt4	Absolve: Exonerate

5	Choose the alternative, which is similar to the given words: Liver : Heart : Kidney
Alt1	Blood
Alt2	Nose
Alt3	Lung
Alt4	Urine

6	Spot the defective segment from the following:
Alt1	The more you read
Alt2	the more will you
Alt3	get to know
Alt4	about more things

7	Choose the meaning of the idiom/phrase from among the options given:
	A rainy day
Alt1	a holiday
Alt2	a difficult time
Alt3	a fine day
Alt4	a wet day

8	The villagers plan to ------- the elections in protest.
Alt1	avoid
Alt2	ignore
Alt3	neglect
Alt4	boycott

9	Choose the option closest in meaning to the given word:
	PUERILE
Alt1	vulgar
Alt2	perverse
Alt3	childish
Alt4	young

10	Choose the antonymous option you consider the best:
	OBTUSE
Alt1	fast
Alt2	sharp
Alt3	reliable
Alt4	lucid

11	In a Cricket tournament, each of the six teams will play every other term exactly once during the league phase. How many matches will be played during the league phase in total ?
Alt1	12
Alt2	36
Alt3	15
Alt4	24

12	A walks 10 metres in front and 10 metres to the right. The every time turning to his left, he waks 5, 15 and 15 metres respectively. How far is he now from the starting point ?
Alt1	15 metres
Alt2	5 metres
Alt3	10 metres
Alt4	30 metres

13	The sum of the income of A and B is more than that of C and D taken together. The sum of the income of A and C is the same as that of b and D taken together. Moreover, A earns half as much as the sum of the income of b and D. Whose income is he highest ?
Alt1	A
Alt2	B

Alt3	C
Alt4	D

14	Five boys A, B, C, D and E are seated on a bench. A is to the left of C. b is to the immediate right of D and there are two people between C and D. E is to the extreme right of the row. Who is exactly at the middle of this group ?
Alt1	A
Alt2	B
Alt3	C
Alt4	E

15	A man is facing south. He turns 1350 in the anticlockwise direction and then 1800 in the clockwise direction. Which direction is he facing now?
Alt1	North East
Alt2	North West
Alt3	South East
Alt4	South West

16	Find the number which when added to itself 17 times becomes 126.
Alt1	13
Alt2	7
Alt3	9
Alt4	18

17	Ravi is exactly 9999 days old today. How old is he?
Alt1	27
Alt2	28
Alt3	26
Alt4	29

18	A Maths teacher usually has 21 students in his class. A,B & C are asleep. D&E are in the bathroom and the teacher has sent F&G to the principal's office. How many students are left in the classroom?
Alt1	18
Alt2	19
Alt3	15
Alt4	17

19	JIPMER is coded as 589142; AIPMT is coded as 78910; Then JEE is coded as
Alt1	910
Alt2	544
Alt3	789
Alt4	914

20	Mr. Arvind drove 90 km at 30 kmph and then an additional 90 km at 45 kmph. What is his average speed over his 180 km ?
Alt1	37.5 kmph
Alt2	35 kmph
Alt3	36 kmph
Alt4	38 kmph

21	In grey cast iron, carbon is present in the form of
Alt1	Cementite
Alt2	Flakes
Alt3	Free carbon
Alt4	Spheroids

22	The following structure is obtained by austempering process of heat treatment
Alt1	Toorsite
Alt2	Martensite
Alt3	Sorbite
Alt4	Bainite

23	If V is the volume of metal in a casting and A its surface area, then time of solidification will be proportional to
Alt1	V, 1/A
Alt2	1/V, A
Alt3	V^2, 1/A
Alt4	V^2, $1/A^2$

24	Blanking and Piercing operation can be performed simultaneously in
Alt1	Simple die
Alt2	Progressive die
Alt3	Compound die
Alt4	Combination die

25	Which is the most important characteristic of a measuring instrument?
Alt1	Repeatability
Alt2	Precision
Alt3	Accuracy
Alt4	Readability

26	Expressing a dimension as 32.5/32.3 mm is the case of
Alt1	Unilateral tolerance
Alt2	Bilateral tolerance
Alt3	Limiting dimension
Alt4	Basic size

27	Clinometer is an instrument concerned with
Alt1	Angular measurement
Alt2	Roundness measurement

Alt3	Linear measurement
Alt4	Flatness measurement

28	Graphical method, simplex method and transportation method are concerned with
Alt1	Value analysis
Alt2	Linear programming
Alt3	Break even analysis
Alt4	Queuing theory

29	The probability distribution of activity times in PERT follows ………… distribution
Alt1	Normal
Alt2	Binomial
Alt3	Beta
Alt4	Exponential

30	A shaft of diameter d and length l has been loaded axially. The ratio of change in diameter to the original is called
Alt1	Longitudinal strain
Alt2	Shear strain
Alt3	Volumetric strain
Alt4	Lateral strain

31	A bicycle remains stable in running through a bend because of
Alt1	Gyroscopic action
Alt2	Coriolis acceleration
Alt3	Centrifugal action
Alt4	Radius of curved path

32	Efficiency of a single riveted lap joint lies in the range
Alt1	25 – 40 %
Alt2	45 – 65 %
Alt3	65 – 75 %
Alt4	75 – 85 %

33	The bearing characteristic number relating absolute viscosity of lubricant (Z), speed of journal (N) and bearing pressure (p) is defined as
Alt1	ZN/p
Alt2	Zp/N
Alt3	pN/Z
Alt4	ZpN

34	In a reversible isothermal process undergone by an ideal gas
Alt1	Heat transfer is zero
Alt2	Change in internal energy is zero
Alt3	Work transfer is zero
Alt4	Heat transfer is equal to work transfer

35	If hot water and cold water are mixed, then the entropy of the system will
Alt1	Increase
Alt2	Decrease
Alt3	Remain same
Alt4	May increase / decrease

36	In the heat flow equation $Q=kA(t_1-t_2)/x$, the term x/kA is known as
Alt1	Thermal resistance
Alt2	Thermal coefficient
Alt3	Temperature gradient
Alt4	Thermal conductivity

37	LMTD in case of counter flow heat exchanger as compared to parallel flow heat exchanger is
Alt1	Higher
Alt2	Lower
Alt3	Same
Alt4	Depends on temperature conditions

38	The ratio of clearance volume to the swept volume is called
Alt1	Clearance ratio
Alt2	Expansion ratio
Alt3	Cut-off ratio
Alt4	Compression ratio

39	During the adiabatic cooling of moist air
Alt1	DBT remains constant
Alt2	Specific humidity remains constant
Alt3	Relative humidity remains constant
Alt4	WBT remains constant

40	Bodies in floatation to be in stable equilibrium, the necessary condition is that the centre of gravity is located below the
Alt1	Centre of gravity
Alt2	Centroid
Alt3	Metacentre
Alt4	Epicentre

41	In terms of speed of rotation of the impeller (N), discharge (Q) and change in total head (H) through the machine, the specific speed for a pump is
Alt1	$(N\sqrt{Q})/H^{(3/4)}$
Alt2	$(Q\sqrt{N})/H^{(3/4)}$
Alt3	$(N\sqrt{Q})/H^{(5/4)}$
Alt4	$(Q\sqrt{N})/H^{(5/4)}$

42	When a steel containing more than 0.8% carbon is cooled slowly below the lower critical point, it contains

Alt1	Ferrite mainly
Alt2	Pearlite mainly
Alt3	Ferrite and pearlite
Alt4	Pearlite and cementite

43	A milling cutter having 8 teeth is rotating at 150 rpm. If the feed per tooth is 0.1 mm, the table speed in mm per minute is
Alt1	120
Alt2	187
Alt3	125
Alt4	70

44	A particle is projected at an angle Ө to the horizontal and it attains a maximum height H. the time taken by the projectile to reach the highest point of its path is
Alt1	√H/g
Alt2	√(2H/g)
Alt3	√(2H sinθ)/g
Alt4	√2H/sinθ

45	The outside diameter of a hollow shaft is twice its inside diameter. The ratio of its torque carrying capacity to that of a solid shaft of the same material and the same outside diameter is
Alt1	15/16
Alt2	3/4
Alt3	1/2
Alt4	1/16

46	For same maximum pressure and heat input, the most efficient cycle is
Alt1	Diesel cycle
Alt2	Dual cycle
Alt3	Otto cycle
Alt4	Stirling cycle

47	Air at 20°C blows over a plate of 50 cm × 75cm maintained at 250°C. If the convection heat transfer coefficient is 25W/m2 ^{o}C, the heat transfer rate is
Alt1	215.6 kW
Alt2	2156 kW
Alt3	2.156 kW
Alt4	21.56 kW

48	The process used for summer air conditioning are
Alt1	Heating and humidification
Alt2	Cooling and humidification
Alt3	Heating and dehumidification
Alt4	Cooling and dehumidification

49	The equation of free vibration of a system is $\ddot{x}$ +36π^2 x=0. Its natural frequency is
Alt1	6 Hz

	Alt2	3π Hz
	Alt3	3 Hz
	Alt4	6π Hz

50	People arrive at a hotel in a poission distributed arrival rate of 8 per hour. Service time distribution is closely approximated by the negative exponential. The average service time is 5 minutes. The mean number in the waiting line will be
Alt1	1/3
Alt2	2/3
Alt3	4/3
Alt4	5/3

51	A steel ball is dropped from a height of h_1 onto a steel plate and rebounds to a height h_2. The coefficient of restitution between the ball and plate will be
Alt1	h_1/h_2
Alt2	$h_2/(2h_1)$
Alt3	$\sqrt{h_2/2h_1}$
Alt4	$\sqrt{h_2/h_1}$

52	A simply supported beam with a span of 4.5 meters carries a point load of 30KN at 3 meters from left support. For the section $Ixx=54.97\times10^{-6}\ m^4$ and $E=200GN/m^2$. The deflection under the load will be
Alt1	4.09 mm
Alt2	5.09 mm
Alt3	4.09 cm
Alt4	5.09 cm

53	A fly wheel of moment of inertia 9.8 kg m^2 fluctuates by 30 rpm for a fluctuation in energy of 1396 Joules. The mean speed of flywheel in rpm is
Alt1	600
Alt2	900
Alt3	968
Alt4	2940

54	A gear set has a pinion with 20 teeth and gear with 40 teeth and have a module of 5mm. the length of the line of action is 19 mm. The centre distance for the gear set in mm is
Alt1	140
Alt2	150
Alt3	160
Alt4	170

55	A Carnot engine receiving heat at 400 K has an efficiency of 25%. The COP of a Carnot refrigerator working between the same temperature limits is
Alt1	1
Alt2	2
Alt3	3
Alt4	4

56	Water having kinematic viscosity of 0.01 stoke flows at a velocity of 2m/sec in a pipe of 15cm diameter. For dynamic similarity, the velocity of oil of kinematic viscosity 0.03 stoke in a pipe of same diameter will be
Alt1	0.33 m/sec
Alt2	0.66 m/sec
Alt3	2 m/sec
Alt4	6 m/sec

57	The operating temperature of a cold storage is -2°C. Heat leakage from the surrounding is 30kW for the ambient temperature of 40°C. The actual COP of the refrigeration plant used is one-fourth that of an ideal plant working between the same temperatures. The power required to drive the plant is
Alt1	1.86 kW
Alt2	3.72 kW
Alt3	7.44 kW
Alt4	18.6 kW

58	A cylindrical roller bearing is subjected to radial force of 4500 N and application factor 1.3. What is the equivalent dynamic load acting on bearing if it has 90% reliability with desired life of 10000 hrs?
Alt1	3461.5 N
Alt2	5000 N
Alt3	5450 N
Alt4	5850 N

59	Match the following physical quantities in Group 1 with their dimensions in Group2 1. Work done (Energy) (W) --- A). [M L2 T – 3] 2. Power (P) --------------- B). [M L– 1 T – 1] 3. Momentum (M) --------- C). [M L2 T– 2] 4. Modulus of elasticity (E) --- D). [M L T – 1] 5. Dynamic viscosity ( ) ------ E. [M L– 1 T– 2]
Alt1	1-(A), 2-(B), 3-(C), 4-(D), 5-(E)
Alt2	1-(C), 2-(A), 3-(D), 4-(E), 5-(B)
Alt3	1-(D), 2-(B), 3-(C), 4-(A), 5-(E)
Alt4	1-(B), 2-(A), 3-(C), 4-(D), 5-(E)

60	The elongation of a bar is 0.5 mm, when a tensile stress of 200 N/mm^2 acts on it. Determine original length of a bar if modulus of elasticity is 150 x 10^3 GPa
Alt1	375.93 mm
Alt2	300 mm

Alt3	360 mm
Alt4	427.3 mm

61	Determine torque transmitted on the pinion shaft if torque transmitted on gear shaft is 20 Nm. Consider Gear ratio = 4
Alt1	8 Nm
Alt2	5 Nm
Alt3	80 Nm
Alt4	16 Nm

62	The parameters of a fin are given below.Diameter of the fin d = 2 cm, Thermal conductivity k = 200 W/mK, Convective heat transfer coefficient h = 12 W/m^{2}K Base temperature of the fin Ts = 500 ^{0}C, The air temperature T8 = 50 ^{0}C, Calculate the rate of heat transfer from the fine.
Alt1	119.7 W
Alt2	97.93 W
Alt3	57.7 W
Alt4	4.62 W

63	Consider that heat transfer is taking place through a fin having circular cross-sectional area, one dimensionally as shown in figure. The rate of heat transfer by conduction into a section at x is equal to
Alt1	sum of rate of heat transfer by convection out of the element (x+dx) and heat transfer by convection from the surface between x to (x+dx)
Alt2	sum of rate of heat transfer by conduction out of the element (x+dx) and heat transfer by conduction from the surface between x to (x+dx)
Alt3	sum of rate of heat transfer by conduction out of the element (x+dx) and heat transfer by convection from the surface between x to (x+dx)
Alt4	none of the above

64	What is the correct formula for thermal resistance (R_k) of a spherical shell of inner and outer radii as r_i and r_o respectively and k being the thermal conductivity?
Alt1	R_k= (r_i – r_o) / 4 π r_i r_o k
Alt2	R_k= 4 π r_i r_o k / (r_i – r_o)
Alt3	R_k= 4 π r_i r_o k / (r_i – r_o)
Alt4	R_k= r_i r_o / 4 π k (r_i – r_o)

65	What is the value of shear stress acting on a plane of circular bar which is subjected to axial tensile load of 100 kN? (Diameter of bar = 40 mm , θ = 42.3^o)
Alt1	58.73 Mpa
Alt2	40.23 Mpa
Alt3	39.60 Mpa
Alt4	45.61 Mpa

66	Match the following Manufacturing processes with their Types and select the correct option. 1. Metal forming -------------- A). Grinding 2. Surface finish --------------- B). Rivetting 3. Sheet metal working ------ C). Extrusion 4. Metal joining ----------------D). Blanking
Alt1	1-(D), 2-(A), 3-(C), 4-(B)
Alt2	1-(C), 2-(A), 3-(D), 4-(B)
Alt3	1-(A), 2-(D), 3-(C), 4-(B
Alt4	1-(D), 2-(A), 3-(B), 4-(C)

67	Match the following Group-1 with Group-2 and select the correct answer from the options below (A) pressure head - (1) μ / ρ (B) velocity head - (2) vd / v (C) kinematic viscosity - (3) $v^2 / \rho g$ (D) Reynolds number - (4) $p / \rho g$ - (5) $v^2 / 2 g$
Alt1	A-(5), B-(3), C-(2), D-(1)
Alt2	A-(4), B-(1), C-(3), D-(2)
Alt3	A-(4), B-(5), C-(1), D-(2)
Alt4	A-(3), B-(5), C-(2), D-(1)

68	Match the following group 1 items with group 2 items and select the correct option. (1) PMM1 ---------------------- (A) Heat pump (2) PMM2 ---------------------- (B) Violates the statement that total energy of the universe is constant (3) Reversible heat engine ---(C) Violates Kelvin-Planck statement (4) Carnot cycle --------------- (D) Reversible process

Alt1	1-(B), 2-(C), 3-(A), 4-(D)
Alt2	1-(A), 2-(C), 3-(B), 4-(D)
Alt3	1-(C), 2-(B), 3-(A), 4-(D)
Alt4	1-(D), 2-(C), 3-(A), 4-(B)

69	Calculate logarithmic decrement if damping factor is 0.33.
Alt1	1.36
Alt2	3.23
Alt3	5.16
Alt4	2.19

70	Which of the following relations is true when springs are connected parallel? where K = spring stiffness
Alt1	$K_e = K_1 + K_2$
Alt2	$(1 / K_e) = (1/K_1) + (1/ K_2)$
Alt3	$K_e = (1/K_1) + (1/ K_2)$
Alt4	None of the above

71	What is the correct formula for absolute pressure?
Alt1	$P_{abs} = P_{atm} - P_{gauge}$
Alt2	$P_{abs} = P_{vacuum} - P_{atm}$
Alt3	$P_{abs} = P_{vacuum} + P_{atm}$
Alt4	$P_{abs} = P_{atm} + P_{gauge}$

72	Which current is used in Tungsten Inert-Gas (TIG) welding?
Alt1	Only A.C. can be used as welding current
Alt2	Only D.C. can be used as welding current
Alt3	Both A.C. and D.C. can be used as welding current
Alt4	Neither of them cannot be used

73	Calculate the number of teeth on wheel, when number of teeth on pinion and wheel are equal. Pressure angle is 25°
Alt1	11
Alt2	12
Alt3	7
Alt4	9

74	Which of the following are the cold working processes?
Alt1	Forging
Alt2	Bending
Alt3	Machining
Alt4	Pipe Welding

75	Blow holes in casting are caused by
Alt1	excessive moisture
Alt2	low permeability

Alt3	excessive fine grains
Alt4	all of the above

76	In metal cutting operation, maximum heat (i.e. 80-85%) is generated in
Alt1	the shear zone
Alt2	the chip-tool interface zone
Alt3	the tool-work interface zone
Alt4	the crater zone

77	The Laser Beam Machining process can be carried out, when the media for energy transfer between tool and work piece is
Alt1	air
Alt2	liquid
Alt3	vacuum
Alt4	any of the above medium

78	The angle between side cutting edge and end cutting edge is called as
Alt1	approach angle
Alt2	nose angle
Alt3	side relief angle
Alt4	end relief angle

79	Which of the following materials is/are used for Electrical Discharge Machining (EDM) process?
Alt1	Brass
Alt2	Copper
Alt3	Graphite
Alt4	All the above

80	Which type of chips form while machining of brittle materials?
Alt1	continuous chips
Alt2	discontinuous chips
Alt3	Built-up chips
Alt4	Serrated chips

81	Which type of mechanism is used in shaper machine?
Alt1	Indexing mechanism
Alt2	Four-bar chain mechanism
Alt3	Quick return mechanism
Alt4	toggle mechanism

82	Which of the following can be considered as more compact efficient heat exchanger?
Alt1	Car radiators
Alt2	Stirling engine regenerator
Alt3	Ceramic regenerator in gas turbine
Alt4	Refrigeration unit

83	Generally, natural convection occurs due to
Alt1	change in velocity of a fluid
Alt2	change in density of a fluid
Alt3	change in molecular structure of a fluid
Alt4	change in viscosity of a fluid

84	The mixture of α-ferrite and cementite is called as _____
Alt1	Ledeburite
Alt2	Pearlite
Alt3	Bainite
Alt4	Austenite

85	What is the crystal structure of δ-ferrite?
Alt1	Body centred cubic structure
Alt2	Face centred cubic structure
Alt3	Orthorhombic crystal structure
Alt4	Hexagonal crystal structure

86	What is the function of hydraulic motor? 1. hydraulic motor converts hydraulic oil under pressure into torque and angular displacement 2. hydraulic motor converts hydraulic oil under pressure into force and linear displacement 3. hydraulic motor converts hydraulic energy into mechanical energy 4. hydraulic motor converts mechanical energy into hydraulic energy
Alt1	1 and 4
Alt2	1 and 3
Alt3	2 and 3
Alt4	). 2 and 4

87	The angle between normal stress and tangential stress is known as angle of _____
Alt1	Declination
Alt2	Orientation
Alt3	Obliquity
Alt4	Rotation

88	Erichsen cupping test is known as
Alt1	creep test
Alt2	torsion test
Alt3	fatigue test
Alt4	formability test

89	What is the ratio of amplitude of response to that of the input called?
Alt1	Response
Alt2	Gain
Alt3	Phase
Alt4	Frequency

90	The smallest change in measured value to which the instrument will respond is called
Alt1	accuracy
Alt2	precision
Alt3	resolution
Alt4	sensitivity

91	Which effect is useful in measuring rapidly varying forces
Alt1	Piezoelectric
Alt2	strain gauge
Alt3	Photovoltaic
Alt4	pneumatic gauging

92	One ton of refrigeration is equal to the refrigeration effect corresponding to melting of 1000 kg of ice
Alt1	in 1 hour
Alt2	in 1 minute
Alt3	in 24 hours
Alt4	in 12 hours

93	The vapour compression refrigerator employs the following cycle
Alt1	Rankine
Alt2	Carnot
Alt3	Reversed Carnot
Alt4	Brayton

94	Any point on a link connecting double slider crank chain will trace a
Alt1	straight line
Alt2	circle
Alt3	ellipse
Alt4	Parabola

95	A circular bar moving in a round hole is an example of
Alt1	incompletely constrained motion
Alt2	partially constrained motion
Alt3	completely constrained motion
Alt4	successfully constrained motion

96	The length AB of a pipe ABC in which the liquid is flowing has diameter (d1) and is suddenly enlarged to diameter (d2) at B which is constant for the length BC. The loss of head due to sudden enlargement is
Alt1	$((V_1 - V_2))^2/g$

Alt2	$((V_1)^2 - (V_2)^2)^2/g$
Alt3	$(V_1-V_2)^2/2g$
Alt4	$((V_1)^2 - (V_2)^2)^2/2g$

97	Coefficient of contraction is the ratio of
Alt1	actual velocity of jet at vena contracta to the theoretical velocity
Alt2	loss of head in the orifice to the head of water available at the exit of the orifice
Alt3	actual discharge through an orifice to the theoretical discharge
Alt4	area of jet at vena contracta to the area of orifice

98	The meta-centric heights of two floating bodies A and B are 1 m and 1.5 m respectively. Select the correct statement.
Alt1	The bodies A and B have equal stability
Alt2	The body A is more stable than body B
Alt3	The body B is more stable than body A
Alt4	The bodies A and B are unstable

99	In time study, the rating factor is applied to determine
Alt1	standard time of a job
Alt2	merit rating of the worker
Alt3	fixation of incentive rate
Alt4	normal time of a worker

100	In inventory control theory, the economic order quantity is
Alt1	average level of inventory
Alt2	optimum lot size
Alt3	capacity of a warehouse
Alt4	lot size corresponding to break-even analysis