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SET-X

PHD-EE-2023-24 Mechanical Engineering

10017

		Sr. No
Time: 11/4 Hours	Max. Marks : 100	Total Questions: 100
Roll No. (in figures)	(in words)	
Name	Date of Birth	
Father's Name	Mother's Name	
Date of Examination		
(Signature of the Candidate)		(Signature of the Invigilator)

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SE

1	. Type of spring used to absorb shocks and vibrations in vehicles is:			
	(1) Helical spring		(2) Spiral spring	
	(3) Multi-leaf spr	ing	(4) Disk spring	
2.	. According to first	law of thermodyna	mics:	
	(1) Total internal	energy of a system	during a process rem	ains constant
	(2) Total energy of	of a system remains	constant	
	(3) Work done by	a system is equal to	the heat transferred	by the system
	(4) None of these			
3.	For a given applied	l load, induced stre	ss is a function of:	
	(1) Cross sectiona	l area of the body		
	(2) Material of the	body		
	(3) Both (1) and (2	2)		
	(4) None of these			
4.	Superheated vapor	behaves:		
	(1) Exactly as gas		(2) As steam	
	(3) As ordinary vap	oor	(4) Approximate	ly as a gas
5.	The temperature d			steady state heat flow and
	(1) Logarithmic	(2) Parabolic	(3) Hyperbolic	(4) Exponential
6.	One ton of refrigera	tion is equal to:		
	(1) 210 kJ/min	(2) 3.5 kJ/min	(3) 105 kJ/min	(4) 250 kJ/min

7.	The moment of iner	rtia of a square sectio	n of size 1 unit about	tits diagonal is:
	(1) 1/4	(2) 1/8	(3) 1/12	(4) 1/24
8.	The unit of Bulk M	odulus is :		
	(1) Nm	(2) MPa	(3) mm	(4) N/m^3
9.	A steel bar of 40 m of 200 KN. If the l will be:	m × 40 mm square c ength of bar is 2m a	ross-section is subject and $E = 2 \times 10^5$ MPa	eted to an axial tensile load t, the elongation of the bar
	(1) 1.50 mm	(2) 1.25 mm	(3) 0.75 mm	(4) 0.50 mm
10.	The unit of stiffness	s is :		
	(1) N/m^3	$(2) N/m^2$	(3) Nm2	(4) N/m
11.	If pressure angle is	20°, then minimum i	number of teeth is:	
	(1) 27	(2) 20	(3) 07	(4) None of these
12.	Cavitation gives da	mage to turbine on :		
	(1) Outlet on the co	onvex side of blades		
	(2) Inlet on the cor	vex side of blades		
	(3) Both of these			
	(4) None of these			
13.	Maximum bending (w/unit length) over	moment in a can r whole length 'L' is	tilever beam with	uniformly distributed load
	(1) ωL^2	(2) $(\omega L^2)/2$	(3) $(\omega L^2)/4$	(4) $(\omega L^2)/8$
14.	Bending stress at no	eutral axis is :		
	(1) Maximum		(2) Zero	
	(3) Can't be zero		(4) None of these	
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15	5. Which of the following is not a type of transmission shaft?		
	(1) Crankshaft	(2) Line shaft	
	(3) Counter shaft	(4) Transmission shaft	
16.	Lame's theory is associated with:	r^{-1}	
	(1) Thin cylindrical shells	(2) Thick cylindrical shells	
	(3) Direct and bending stresses	(4) None of the above	
17.	The maximum principal strain theory is	also known as:	
	(1) Rankine's theory	(2) Guest's theory	
	(3) Saint Venant's theory	(4) Von-Mises theory	
18.	Two springs of stiffness k_1 and k_2 rest the stiffness of the composite spring?	pectively are connected in series, what will be	
	(1) $k = \frac{k_1 \times k_2}{k_1 + k_2}$ (2) $k = \frac{k_1 + k_2}{k_1 \times k_2}$	(3) $k = k_1 \times k_2$ (4) $k = k_1 + k_2$	
19.	The point of contra-flexure occurs in:		
	(1) Cantilever beams	(2) Simply supported beams	
	(3) Overhanging beams	(4) Fixed beams	
20.	The pair is known as a higher pair, whe pair is:	n the relative motion between the elements of a	
	(1) Turning only	(2) Sliding only	
	(3) Rolling only	(4) Partly turning and Partly sliding	
21.	Two shafts, one solid and the other ho having same length and weight. The hol	ollow, are made of the same materials and are low shaft as compared to solid shaft is:	
	(1) More strong	(2) Less strong	
	(3) Have same strength	(4) None of the above	

22.	A structural member subjected to an axial compressive force is called:			
	(1) Beam	(2) Column	(3) Frame	(4) Strut
23.	A downward vertic m long beam. This left ends is:	al load of 10 kN acts beam is simply supp	at a distance of 40 corted at both ends.	cm from the left end on a 1 The vertical reaction at the
	(1) 4	(2) 5	(3) 0.25	(4) 6
24.	Nusselt number in	case of free convection	on is the function of	:
	(1) Reynolds numb	per and Prandtl numb	er	
	(2) Reynolds numl	per only		
	(3) Grashoff numb	er only		
	(4) Grashoff numb	per and Prandtl numb	er	
25.	For psychrometric			
_0.				(m. 14. 14. 14. 14. 14. 14. 14. 14. 14. 14
	(1) Constant relati	ve humidity lines are	e uphill straight line	s to the right.
	(2) Constant wet b	oulb temperature line	s are downhill strai	ght lines to the right.
	(3) Constant entha	dpy lines are coincid	ent with constant v	vet bulb temperature lines.
	(4) None of these			
26.	The difference bety	ween the total head	line and the hydrau	lic grade line represents:
	(1) The velocity h	eaa	(2) The piezoel	ectric head
	(3) The pressure h	ead	(4) The elevati	on head
27.	Which one of the f	ollowing is a fire tu	be boiler?	
	(1) Babcock - Wil	cox boiler	(2) Locomotiv	e boiler
	(3) Both of these		(4) None of th	
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28	A refrigerator and a heat pump operate between the same temperature limits. If the COP of the refrigerator is 4, the COP of the heat pump would be:				If the
	(1) 3	(2) 4	(3) 5	(4) 6	
29.	. In axial flow turb	oine :			
	(1) Inlet is axial	and outlet is radial	(2) Inlet is a	xial and outlet is axial	
	(3) Inlet is radia	l and outlet is axial	(4) Inlet is ra	adial and outlet is radial	
30.	If a material expa	ands freely due to hea	ting, it will deve	elop :	
	(1) Tensile stress	S	(2) Compres	sive stress	
	(3) No stress		(4) Thermal	stress	
31.	Poisson's ratio is	equal to :			
	(1) Lateral Strain	/ Longitudinal Strain	n		
	(2) Lateral Strain × Longitudinal Strain				
	(3) Longitudinal	Strain / Lateral Strain	1		
	(4) None of these	2			
32.	The energy stored	l in a body when strai	ined within elast	ic limit is known as:	
	(1) Proof resilien	ce	(2) Impact e	nergy	
	(3) Strain energy		(4) Potnetial	energy	
33.	The increase in ha	ardness due to cold w	orking is called	:	
	(1) Cold hardenir	ng	(2) Work ha	rdening	
	(3) Age hardening	g	(4) None of	these	
34.	For extrusion, imp	oortant mechanical pr	operty of a mate	erial is :	
	(1) Elasticity	(2) Ductility	(3) Plasticity	(4) None of these	

	(2) Velocity inci	reases		
	(3) Velocity inci	reases and Pressure of	lrops	
	(4) None of thes	e		
36.	Reaming is a pro	ocess used to:		
	(1) Create a circ	ular hole in metals		
	(2) Cut a slot on	the existing hole su	rface	
	(3) Finish an ex	isting hole surface		
	(4) Make non-ci	rcular holes in meta	ls	
37.	80 per unit, resp			oduct are Rs. 20,000 and Rs. units. To break even, the unit
	(1) 150	(2) 120	(3) 130	(4) 100
38.	_	dulus of elasticity of or the material will b		s its modulus of rigidity. The
	(1) 1.50	(2) 0.25	(3) 0.50	(4) 0.75
39.	Acceptable Qual	ity Level (AQL) is a	associated with:	
	(1) Producer's ri	sk		
	(2) Consumer's	risk		
	(3) Lot tolerance	e percent defective		
		going quality limit		
40.			square thread screw itch diameter of threa	and nut having coefficient or ad = d is given by:
	(1) $d > \pi \mu L$	(2) $d > \mu L$	(3) $\mu > Ld$	(4) None of these

35. When steam flows through the fixed blades in reaction turbine :

(1) Pressure increases

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4	1. The REL chart is used for:		
	(1) Designing the layout of plants		
	(2) Estimating the valuation of stock		
	(3) Analyzing the movement of an ite		
	(4) Maintaining the issue and receipt		
42		reatment process for surface hardening?	
	(1) Normalizing (2) Annealing	(3) Carburizing (4) None of these	
43.	_	e of an immersed body acts through which one	of
	(1) Centre of gravity	(2) Centre of pressure	
	(3) Metacentre	(4) Centre of buoyancy	
44.	In a hollow cylindrical product manufipart is:	actured by centrifugal casting, the density of th	ıe
	(1) Maximum at the outer region		
	(2) Maximum at the inner region		
	(3) Maximum at the mid-point between	n outer and inner surfaces	
	(4) Uniform throughout		
45.	A typical Fe-C alloy containing greater	than 0.8%, C is known as:	
	(1) Eutectoid steel	(2) Hypoeutectoid steel	
	(3) Mild steel	(4) Hypereutectoid steel	
46.	An autocollimator is used to:		
	(1) Measure small angular displacemen	ts on flat surfaces	
	(2) Compare known and unknown dime	ensions	
	(3) Both of these		
	(4) None of these		
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47.	The ratio of total emissive power of body to the total emissive power of a black body at the same temperature is called:				
	(1) Absorptivity (2) Transmissivity	(3) Reflectivity (4) None of these			
48.	The angle of a twist drill that determines	s its rake angle is:			
	(1) Lip relief angle	(2) Chisel edge angle			
	(3) Helix angle	(4) Point angle			
49.	Material Requirements Planning include	e:			
	(1) bill of material	(2) inventory level			
	(3) production schedule	(4) All of these			
50.	In a flange coupling, the bolts arc subje	ected to:			
	(1) Tensile stress	(2) Compressive stress			
	(3) Shear stress	(4) None of these			
51.	Moving average method is used to:				
	(1) Manage supply chains				
	(2) Control inventory levels				
	(3) Calculate optimum production levels				
	(4) Make sales forecast				
52.	Ishikawa diagram is used to:				
	(1) Identify different types of quality	defects			
	(2) Find quantitative relation between	a defect and a process parameter			
	(3) Find relation between defects and	their causes			
	(4) Prioritized quality defects	•			

5	3. A moving mandrel is	used in :		
	(1) wire drawing	(2) forging	(3) bending	(4) None or these
54	I. Brazing and Soldering	g are:		
	(1) Plastic joining me	ethods		
	(2) Homogeneous joi	ning methods		
	(3) Autogenous joini	ng methods		
	(4) Heterogeneous jo	ining methods		
55	. Bodies in flotation to that the centre of grav			and sufficient condition is
	(1) Metacentre		(2) Centre of pressu	re
	(3) Centre of gravity		(4) Centre of buoya	ncy
56.	A quantitative measure	e of maintainabilit	y is:	
	(1) Downtime		(2) Mean Time to R	epair
	(3) Mean Time between	en Failure	(4) System availabil	lity
57.	Friction at the tool-chi	o interface can be	reduced by:	
	(1) Decreasing the rak	e angle		
	(2) Increasing the cutti	ng speed		
	(3) Decreasing the cutt	ing speed		
	(4) None of these			
58.	Which one of the follow	ving is <i>not</i> a chara	acteristic of JIT manu	facturing system?
	(1) Reduction of lot siz	es		
	(2) Efficient use of buf	fer inventory		
	(3) Small but frequent	deliveries		
	(4) Higher productivity			

10		1 -ing m	netal nowders?
59.	Which one of the following methods can	be used for producing in	ding
	(1) Atomization	(2) Machining and B	amg
	(3) Electrolysis	(4) All of these	
60.	The Coriolis component of acceleration	acts:	
00.	(1) Along the sliding surface		
	(2) Perpendicular to the sliding surface		
	(3) At 45 to the sliding surface		
	(4) Parallel to the sliding surface		
	The type of control chart used to monitor	or the amount of dispersi	on in a sample is:
61.		(3) X bar-chart (4	1) R-chart
	(1) c-chart (2) p-chart	(3) 11 32	
62.	'Production Planning' involves integration	on of :	
	scheduling, routing, estimating and disp	atching activities. This	statement is:
	(1) Scheduling, routing, estimating and	dispatching activities	
	(2) Scheduling, routing and selling acti		
	(3) Scheduling, routing and marketing	activities	
	(4) None of these		
63.	Which of the following casting proc mould?	esses uses expendable	pattern and expendable
	(1) Shell mould casting	(2) Investment casti	ng
	(3) Pressure die casting	(4) Centrifugal cast	ing
64.	In resistance seam welding, the electro	de is in the form of a:	
	(1) Cylinder (2) Flat plate	(3) Circular disc	(4) None of these
65.	The binding material used in cemented	d carbide cutting tools	is:
	(1) Graphite (2) Tungsten	(3) Nickel	(4) Cobalt
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66.	In a homogeneous isotropic elastic material, the modulus of elasticity E in terms of G
	and K is equal to:

$$(1) \ \frac{9KG}{G+3K}$$

$$(2) \ \frac{9KG}{3G+K}$$

$$(3) \ \frac{3K+G}{3G+K}$$

(1)
$$\frac{9KG}{G+3K}$$
 (2) $\frac{9KG}{3G+K}$ (3) $\frac{3K+G}{3G+K}$ (4) $\frac{6KG}{K+3G}$

The number of defectives produced by a six sigma process (in parts per million) is: 67.

- (1) 5.2
- (2) 4.2
- (3) 3.2
- (4) 2.2

Which one of the following is not a method of calculating depreciation? **68.**

(1) Straight line method

- (2) Sum of year digits (SYD) method
- (3) Declining balance method
- (4) All of these

Index jigs are used to: **69.**

- (1) Drill equidistant holes on a circular flange
- (2) To manufacture components with awkward shape
- (3) Drill components both with internal and external diameters
- (4) Drill round parts like pipe flange

The rotary internal combustion engine is the inversion of: **70.**

(1) Four bar link chain

- (2) Double slider crank chain
- (3) Single slider crank mechanism (4) Rocker crank mechanism

71. In LPP, the condition to be satisfied is:

- (1) Constraints as well as objective tunction have to be linear
- (2) Only objective function has to be linear
- (3) Constraints can be non-linear
- (4) None of the above

			Α
72.	PERT and CPM are basically used in:		
	(1) Decision making	(2) Layout designing	
	(3) Assessing quality	(4) Defect reduction	
73.	Process layout is used for:		
	(1) Batch production	(2) Continuous type of product	
	(3) Effective utilisation of machines	(4) None of the above	
74.	PERT is:		
	(1) Target oriented	(2) Event oriented	
	(3) Activity oriented	(4) Cost oriented	
75.	5. Two beams, one having square cross section and another circular cross-section, subjected to the same amount of bending moment. If the cross sectional area as well the material of both the beams are the same then:		, are ell as
	(1) Maximum bending stress develope	d in both the beams is the same	
	(2) Circular beam experiences more be	ending stress than the square one	
	(3) Square beam experiences more ber	nding stress than the circular one	
	(4) As the material is same both the be	eams will experience same deformation	
76.	Two pipe systems in series are said to	be equivalent when:	
	(1) The average diameter in both syste	ems is the same.	
	(2) The discharge under the same head	d is same in both systems.	
	(3) The average friction factor in both	systems is the same.	

(4) Total length of the pipe is the same in both the systems.

77.	Boundary layer separation is caused by	
	(1) Adverse pressure gradient	
	(2) Laminar flow changing to turbulent	flow
	(3) Reduction pressure to vapour pressure	re
	(4) None of these	
78.	In which of the following resistance we out simultaneously?	elding, a large number of welds can be carried
	(1) Spot welding	(2) Projection welding
	(3) Seam welding	(4) Percussion welding
79.	Which of the following welding process	es results in the smallest heat affected zone?
	(1) Shielded metal arc welding	(2) Gas welding
	(3) Laser beam welding	(4) Thermit welding
80.	The Klein's diagram is used when:	
	(1) Crank has uniform angular velocity	
	(2) Crank has non-uniform angular velo	ocity
	(3) Crank has uniform angular accelerate	tion
	(4) Crank has non-uniform angular acce	eleration
81.	In powder metallurgy, sintering of a con	nponent:
	(1) Improves strength and reduces hard	ness
	(2) Reduces brittleness and improve str	ength
	(3) Improves hardness and reduces toug	hness
	(4) Reduces porosity and increases britt	leness

A

82.	One Time Measurement Unit (TMU) du	ring Method Study is equal to:
	(1) 0.0001 minute	(2) 0.0006 minute
	(3) 0.006 minute	(4) 0.001 minute
83.	Motion study is carried out to:	
	(1) Observe actions of an operator	(2) Study layout
	(3) Study safety arrangements	(4) All of these
84.	Percent idle time for men or machines is	found by :
	(1) Work sampling	(2) Method study
	(3) Work study	(4) ABC analysis
85.	In projection welding, the depth of proje	ection is about :
	(1) 40% of sheet thickness	(2) 60% of sheet thickness
	(3) 80% of sheet thickness	(4) 20% of sheet thickness
86.	In a quasi-equilibrium process, the press	sure in a system :
	(1) Remains constant	(2) Varies with temperature
	(3) Is constant everywhere, at an instan	t (4) Increase if volume increases
87.	Which of the following is a surface structure of common metals?	(two-dimensional) imperfection in the crystal
	(1) Vacancy (2) Dislocation	(3) Inclusion (4) None of these
88.	A steel bar of 40 mm \times 40 mm s compressive load of 200 kN. If the le elongation of the bar will be:	equare cross-section is subjected to an axial $E = 200 \text{ GPa}$, the
	(1) 1.25 mm (2) 2.70 mm	(3) 4.05 mm (4) 5.40 mm

	laminar to turbulent flow in free convect	tion?	
	(1) Reynolds number	(2) Grashof numbe	r
	(3) Peclet number	(4) Rayleigh numb	er
90.	During normalizing process of steel, the	specimen is heated:	
	(1) Between the upper and lower critical	l temperature and coo	oled in still air.
	(2) Above the upper critical temperature	e and cooled in furna	ce.
	(3) Above the upper critical temperature	e and cooled in still a	ir.
	(4) Between the upper and lower critical	l temperature and coo	oled in furnace.
91.	For a ductile material, toughness is a me	asure of:	
	(1) Resistance to scratching		
	(2) Ability to absorb energy till elastic l	imit	
	(3) Resistance to indentation		
	(4) None of these		
92.	In the 3-2-1 principle of fixture design, 3	3 refers to the number	r of :
	(1) Clamps required		
	(2) Degrees of freedom of the workpiec	e k v _{ij} .	
	(3) Operations carried out on the primar	y datum face	
	(4) None of these		
93.	A steel bar 200 mm in diameter is turned of 4 mm. The rotational speed of the work in mm ³ /s is:		_
	(1) 160 (2) 167.6	(3) 1600	(4) 1675.5

89. Which one of the following non-dimensional numbers is used for transition from

•		A
94.	The strain energy stored in a spring, suffering permanent distortion, is known	when subjected to maximum load, without as:
	(1) Impact energy	(2) Proof resilience
	(3) Proof stress	(4) Modulus of resilience
95.	For same power output and same conengines, four-stroke engine have:	mpression ratio, as compared to two -stroke
	(1) Higher fuel consumption	(2) Lower thermal efficiency
	(3) Higher exhaust temperatures	
96.	Reciprocating compressors are usually p	•
	(1) High present the state of t	deferred for :
	(1) High pressure and high discharge	(2) High pressure and low discharge
	(3) Low pressure and high discharge	(4) Low pressure and low discharge
97.	For a four-cylinder vertical engine, the c	
	(1) 1-2-3-4 (2) 3-4-1-2	
	(=) 5 1 1 2	(3) 1-3-4-2 (4) 4-3-2-1
98.	Two balls of equal mass and of perfectly	y elastic material are lying on the floor. One of
	the ball with velocity v is made to street	ole at
	will move with a velocity:	ck the second ball. Both the balls after impact
	(1)	
	(1) v (2) v/2	(3) v/4 (4) v/8
99.	Bell Coleman cycle consists of:	(1) 113
	(1) Two isobars and two isentropic	(2) T
	(3) Two isotherms and two isochores	(2) Two isochores and two isentropic
		(4) Two isotherms and two isentropic
100.	Increase in entropy of a system represent	ts:
	(1) Increase in availability of energy	
	(3) Decrease in pressure	(2) Increase in temperature
	· · · · · · · · · · · · · · · · · · ·	(4) Degradation of energy

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В

PHD-EE-2023-24

SET-X

Mechanical Engineering

10010

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1.	The REL chart is used for:		
	(1) Designing the layout of plants		
	(2) Estimating the valuation of stock		
	(3) Analyzing the movement of an ite	em in a store	
	(4) Maintaining the issue and receipt t	record	
2.	Which one of the following is a heat treatment process for surface hardening?		
	(1) Normalizing (2) Annealing	(3) Carburizing (4) None of these	
3.	Resultant pressure of the liquid in case of an immersed body acts through which on the following?		oí
	(1) Centre of gravity	(2) Centre of pressure	
	(3) Metacentre	(4) Centre of buoyancy	
4.	4. In a hollow cylindrical product manufactured by centrifugal casting, the density part is:		ıe
	(1) Maximum at the outer region		
	(2) Maximum at the inner region		
	(3) Maximum at the mid-point betwee	en outer and inner surfaces	
	(4) Uniform throughout		
5.	A typical Fe-C alloy containing greater	er than 0.8%, C is known as:	
	(1) Eutectoid steel	(2) Hypoeutectoid steel	
	(3) Mild steel	(4) Hypereutectoid steel	
6.	An autocollimator is used to:		
	(1) Measure small angular displaceme	ents on flat surfaces	
	(2) Compare known and unknown dimensions		
	(3) Both of these		
	(4) None of these		

7.	The ratio of total emissive power of body the same temperature is called:	y to the total emissive power of a black body
	(1) Absorptivity (2) Transmissivity	(3) Reflectivity (4) None of these
8.	The angle of a twist drill that determines	its rake angle is:
	(1) Lip relief angle	(2) Chisel edge angle
	(3) Helix angle	(4) Point angle
9.	Material Requirements Planning include	:
	(1) bill of material	(2) inventory level
	(3) production schedule	(4) All of these
10.	In a flange coupling, the bolts arc subject	eted to:
	(1) Tensile stress	(2) Compressive stress
	(3) Shear stress	(4) None of these
11.	In LPP, the condition to be satisfied is:	
	(1) Constraints as well as objective tune	ction have to be linear
	(2) Only objective function has to be lin	near
	(3) Constraints can be non-linear	
	(4) None of the above	
12.	PERT and CPM are basically used in:	
	(1) Decision making	(2) Layout designing
	(3) Assessing quality	(4) Defect reduction
13.	Process layout is used for:	
	(1) Batch production	(2) Continuous type of product
	(3) Effective utilisation of machines	(4) None of the above

B 3

14.	P	ER	T	ic	
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(1) Target oriented

(2) Event oriented

(3) Activity oriented

(4) Cost oriented

15. Two beams, one having square cross section and another circular cross-section, are subjected to the same amount of bending moment. If the cross sectional area as well as the material of both the beams are the same then:

- (1) Maximum bending stress developed in both the beams is the same
- (2) Circular beam experiences more bending stress than the square one
- (3) Square beam experiences more bending stress than the circular one
- (4) As the material is same both the beams will experience same deformation
- **16.** Two pipe systems in series are said to be equivalent when :
 - (1) The average diameter in both systems is the same.
 - (2) The discharge under the same head is same in both systems.
 - (3) The average friction factor in both systems is the same.
 - (4) Total length of the pipe is the same in both the systems.
- 17. Boundary layer separation is caused by:
 - (1) Adverse pressure gradient
 - (2) Laminar flow changing to turbulent flow
 - (3) Reduction pressure to vapour pressure
 - (4) None of these
- **18.** In which of the following resistance welding, a large number of welds can be carried out simultaneously?
 - (1) Spot welding

(2) Projection welding

(3) Seam welding

(4) Percussion welding

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- (2) Gas welding (1) Shielded metal arc welding
- (4) Thermit welding (3) Laser beam welding
 - The Klein's diagram is used when: 20.
- (1) Crank has uniform angular velocity
- (2) Crank has non-uniform angular velocity
- (3) Crank has uniform angular acceleration
- (4) Crank has non-uniform angular acceleration
- For a ductile material, toughness is a measure of 21.
- (1) Resistance to scratching
- (2) Ability to absorb energy till elastic limit
- (3) Resistance to indentation
- (4) None of these

In the 3-2-1 principle of fixture design, 3 refers to the number of 22.

- (1) Clamps required
- (2) Degrees of freedom of the workpiece
- (3) Operations carried out on the primary datum face
 - (4) None of these
- of 4 mm. The rotational speed of the work piece is 160 rpm. The material removal rate A steel bar 200 mm in diameter is turned at a feed of 0.25 mm/rev with a depth of cut 23.
- (3) 1600

(2) 167.6

(1) 160

10

24.	24. The strain energy stored in a spring, when subjected to maximum road, without suffering permanent distortion, is known as:	as:	ii subjected to maximum road, wintout
	(1) Impact energy	(2)	(2) Proof resilience
	(3) Proof stress	(4)	(4) Modulus of resilience
25.	For same power output and same corengines, four-stroke engine have:	npres	For same power output and same compression ratio, as compared to two -stroke engines, four-stroke engine have:
	(1) Higher fuel consumption	(2)	(2) Lower thermal efficiency
	(3) Higher exhaust temperatures	(4)	(4) Higher thermal efficiency
26.	Reciprocating compressors are usually preferred for:	refen	ed for :
	(1) High pressure and high discharge	(2)	(2) High pressure and low discharge
	(3) Low pressure and high discharge	(4)	(4) Low pressure and low discharge
27.	For a four-cylinder vertical engine, the commonly used firing order is	omm	only used firing order is :
	(1) 1-2-3-4 (2) 3-4-1-2	(3)	(3) 1-3-4-2 (4) 4-3-2-1
28.	Two balls of equal mass and of perfectly	y elas	Two balls of equal mass and of perfectly elastic material are lying on the floor. One of
	the ball with velocity v is made to struc will move with a velocity:	ck th	the ball with velocity v is made to struck the second ball. Both the balls after impact will move with a velocity:
	(1) v (2) v/2	(3) v/4	v/4 (4) v/8
29.	Bell Coleman cycle consists of:		
	(1) Two isobars and two isentropic	(2)	(2) Two isochores and two isentropic
	(3) Two isotherms and two isochores	(4)	(4) Two isotherms and two isentropic
30.	Increase in entropy of a system represents :	ts:	
	(1) Increase in availability of energy	(2)	(2) Increase in temperature
	(3) Decrease in pressure	(4)	(4) Degradation of energy

31.	Type of spring used to absorb shocks an	d vibrations in vehicles is:
	(1) Helical spring	(2) Spiral spring
	(3) Multi-leaf spring	(4) Disk spring
32.	According to first law of thermodynamic	es:
	(1) Total internal energy of a system du	ring a process remains constant
	(2) Total energy of a system remains co	nstant
	(3) Work done by a system is equal to the	ne heat transferred by the system
	(4) None of these	
33.	For a given applied load, induced stress	is a function of:
	(1) Cross sectional area of the body	
	(2) Material of the body	
	(3) Both (1) and (2)	
	(4) None of these	
34.	Superheated vapor behaves:	
	(1) Exactly as gas	(2) As steam
	(3) As ordinary vapor	(4) Approximately as a gas
35.	The temperature distribution for a holiconstant value of thermal conductivity is	llow cylinder for steady state heat flow and
	(1) Logarithmic (2) Parabolic	(3) Hyperbolic (4) Exponential
36.	One ton of refrigeration is equal to:	T
	(1) 210 kJ/min (2) 3.5 kJ/min	(3) 105 kJ/min (4) 250 kJ/min

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37.	The moment of inertia of a square section of size 1 unit about its diagonal is:			t its diagonal is :
	(1) 1/4	(2) 1/8	(3) 1/12	(4) 1/24
38.	The unit of Bulk M	odulus is :		
	(1) Nm	(2) MPa	(3) mm	(4) N/m^3
39.				cted to an axial tensile load a, the elongation of the bar
	(1) 1.50 mm	(2) 1.25 mm	(3) 0.75 mm	(4) 0.50 mm
40.	The unit of stiffness	s is :		
	(1) N/m^3	(2) N/m^2	(3) Nm ²	(4) N/m
41.	Moving average method is used to:			
	(1) Manage supply	chains		
	(2) Control invento	ory levels		
	(3) Calculate optim	num production level	s	
	(4) Make sales fore	ecast		
42.	Ishikawa diagram is	s used to:		
	(1) Identify differen	nt types of quality de	efects	
	(2) Find quantitativ	e relation between a	defect and a process	s parameter
	(3) Find relation be	etween defects and th	neir causes	
	(4) Prioritized qual	ity defects		
43.	A moving mandrel	is used in :		
	(1) wire drawing	(2) forging	(3) bending	(4) None or these

44. Brazing and Soldering are:

	(1) Plastic joining methods				
	(2) Homogeneous joining methods				
	(3) Autogenous joining methods				
	(4) Heterogeneous joining methods				
45.	Bodies in flotation to be in stable equilibrium that the centre of gravity is located below	orium, the necessary and sufficient condition is the:			
	(1) Metacentre	(2) Centre of pressure			
	(3) Centre of gravity	(4) Centre of buoyancy			
46.	A quantitative measure of maintainabilit	y is :			
	(1) Downtime	(2) Mean Time to Repair			
	(3) Mean Time between Failure	(4) System availability			
47.	Friction at the tool-chip interface can be	reduced by :			
	(1) Decreasing the rake angle				
	(2) Increasing the cutting speed				
	(3) Decreasing the cutting speed				
	(4) None of these				
48.	Which one of the following is not a char	racteristic of JIT manufacturing system?			
	(1) Reduction of lot sizes	system.			
	(2) Efficient use of buffer inventory				
	(3) Small but frequent deliveries				
	(4) Higher productivity				
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49.	Which one of the following methods can be used for producing metal powders?			
	(1) Atomization		(2) Machining and	grinding
	(3) Electrolysis		(4) All of these	
50.	The Coriolis compo	onent of acceleration	acts:	
	(1) Along the sliding	ng surface		
	(2) Perpendicular t	o the sliding surface		
	(3) At 45 to the slice	ding surface		
	(4) Parallel to the s	sliding surface		
51.	The type of control	chart used to monito	or the amount of dispe	ersion in a sample is:
	(1) c-chart	(2) p-chart	(3) X bar-chart	(4) R-chart
52.	'Production Planning	ng' involves integration	on of:	
	scheduling, routing	, estimating and disp	atching activities. Th	is statement is:
	(1) Scheduling, rou	ating, estimating and	dispatching activitie	S
	(2) Scheduling, rou	ating and selling activ	vities	
	(3) Scheduling, rou	iting and marketing	activities	
	(4) None of these			
53.	Which of the followould?	owing casting proce	esses uses expendab	le pattern and expendable
	(1) Shell mould cas	sting	(2) Investment cas	ting
	(3) Pressure die cas	sting	(4) Centrifugal cas	eting
54.	In resistance seam v	welding, the electrod	e is in the form of a	
	(1) Cylinder	(2) Flat plate	(3) Circular disc	(4) None of these
55.	The binding materia	al used in cemented	carbide cutting tools	is:
	(1) Graphite	(2) Tungsten	(3) Nickel	(4) Cobalt

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U						
56.	In a homogeneous isotropic elastic material, the modulus of elasticity E in terms of G and K is equal to :					ticity E in terms of G
	$(1) \frac{9KG}{G+3K} $ (2)	$\frac{9KG}{3G+K}$	(3)	$\frac{3K+G}{3G+K}$	(4)	$\frac{6KG}{K+3G}$
57.	The number of defective	s produced by a	six s	sigma process (ir	n part	s per million) is:
	(1) 5.2 (2)	4.2	(3)	3.2	(4)	2.2
58.	Which one of the follow	ing is <i>not</i> a metl	nod o	of calculating dep	precia	ation ?
	(1) Straight line method		(2)	Sum of year dig	its (S	SYD) method
	(3) Declining balance m	ethod	(4)	All of these		
59.	Index jigs are used to:					
	(1) Drill equidistant holes on a circular flange					
	(2) To manufacture components with awkward shape					
	(3) Drill components both with internal and external diameters					
	(4) Drill round parts like	e pipe flange				
60.	The rotary internal comb	oustion engine is	the	inversion of:		
	(1) Four bar link chain		(2)	Double slider cr	ank (chain
	(3) Single slider crank n	nechanism	(4)	Rocker crank m	echa	nism
61.	Two shafts, one solid and the other hollow, are made of the same materials and are having same length and weight. The hollow shaft as compared to solid shaft is:					
	(1) More strong		(2)	Less strong		
	(3) Have same strength		(4)	None of the abo	ve	
62.	A structural member sub	jected to an axia	al con	mpressive force	is cal	led :

(3) Frame

(4) Strut

(2) Column

(1) Beam

63.	A downward vertical load of 10 kN acts at a distance of 40 cm from the left end on a 1 m long beam. This beam is simply supported at both ends. The vertical reaction at the left ends is:					
	(1) 4	(2) 5	(3) 0.25	(4) 6		
64.	Nusselt number in case of free convection is the function of:					
	(1) Reynolds number and Prandtl number					
	(2) Reynolds numb	per only				
	(3) Grashoff numb	er only				
	(4) Grashoff numb	er and Prandtl numb	er			
65.	For psychrometric	charts:				
	(1) Constant relative humidity lines are uphill straight lines to the right.					
	(2) Constant wet bulb temperature lines are downhill straight lines to the right.					
	(3) Constant enthalpy lines are coincident with constant wet bulb temperature lines.					
	(4) None of these					
66.	. The difference between the total head line and the hydraulic grade line represents :					
	(1) The velocity he	ead	(2) The piezoelect	ric head		
	(3) The pressure he	ead	(4) The elevation l	nead		
67.	Which one of the fo	ollowing is a fire tub	e boiler?			
	(1) Babcock - Wile	cox boiler	(2) Locomotive bo	piler		
	(3) Both of these		(4) None of these			
68.	8. A refrigerator and a heat pump operate between the same temperature limits. If the COP of the refrigerator is 4, the COP of the heat pump would be:					
	(1) 3	(2) 4	(3) 5	(4) 6		

69.	In axial flow turbin			·
	(1) Inlet is axial an		(2) I-1-4:	d autlat is swipl
			(2) Inlet is axial ar	
	(3) Inlet is radial a	nd outlet is axial	(4) Inlet is radial a	nd outlet is radial
70.	If a material expand	ds freely due to heating	ng, it will develop:	
	(1) Tensile stress		(2) Compressive st	ress
	(3) No stress		(4) Thermal stress	
71.	If pressure angle is	20°, then minimum r	number of teeth is:	
	(1) 27	(2) 20	(3) 07	(4) None of these
72.	Cavitation gives da	mage to turbine on:		
	(1) Outlet on the co	onvex side of blades		
	(2) Inlet on the cor	nvex side of blades		
	(3) Both of these			
	(4) None of these			
73.	Maximum bending (w/unit length) over	g moment in a can r whole length 'L' is :	tilever beam with u	uniformly distributed load
	(1) ωL^2	(2) $(\omega L^2)/2$	(3) $(\omega L^2)/4$	(4) $(\omega L^2)/8$
74.	Bending stress at ne	eutral axis is :		
	(1) Maximum		(2) Zero	
	(3) Can't be zero		(4) None of these	
75.	Which of the follow	ving is <i>not</i> a type of t	transmission shaft?	
	(1) Crankshaft		(2) Line shaft	
	(3) Counter shaft		(4) Transmission s	haft

76.	Lame's theory is associated with:	
	(1) Thin cylindrical shells	(2) Thick cylindrical shells
	(3) Direct and bending stresses	(4) None of the above
77.	The maximum principal strain theory is	also known as :
	(1) Rankine's theory	(2) Guest's theory
	(3) Saint Venant's theory	(4) Von-Mises theory
78.	Two springs of stiffness k_1 and k_2 respective stiffness of the composite spring?	pectively are connected in series, what will be
	(1) $k = \frac{k_1 \times k_2}{k_1 + k_2}$ (2) $k = \frac{k_1 + k_2}{k_1 \times k_2}$	(3) $k = k_1 \times k_2$ (4) $k = k_1 + k_2$
79.	The point of contra-flexure occurs in:	
	(1) Cantilever beams	(2) Simply supported beams
	(3) Overhanging beams	(4) Fixed beams
80.	The pair is known as a higher pair, when pair is:	n the relative motion between the elements of a
	(1) Turning only	(2) Sliding only
	(3) Rolling only	(4) Partly turning and Partly sliding
81.	In powder metallurgy, sintering of a con	nponent:
	(1) Improves strength and reduces hards	ness
	(2) Reduces brittleness and improve stre	ength
	(3) Improves hardness and reduces toug	
	(4) Reduces porosity and increases britt	leness
82.	One Time Measurement Unit (TMU) du	ring Method Study is equal to:
	(1) 0.0001 minute	(2) 0.0006 minute
	(3) 0.006 minute	(4) 0.001 minute

83.	Motion study is carried out to:		
	(1) Observe actions of an operator	(2) Study layout	
	(3) Study safety arrangements	(4) All of these	
84.	Percent idle time for men or machines is	found by:	
	(1) Work sampling	(2) Method study	
	(3) Work study	(4) ABC analysis	
85.	In projection welding, the depth of proje	ction is about :	
	(1) 40% of sheet thickness	(2) 60% of sheet thickness	
	(3) 80% of sheet thickness	(4) 20% of sheet thickness	
86.	In a quasi-equilibrium process, the press	ure in a system :	
	(1) Remains constant	(2) Varies with temperature	
	(3) Is constant everywhere, at an instant	(4) Increase if volume increases	
87.	Which of the following is a surface structure of common metals?	(two-dimensional) imperfection in the crystal	
	(1) Vacancy (2) Dislocation	(3) Inclusion (4) None of these	
88.		quare cross-section is subjected to an axiangth of the bar is 2 m and $E = 200$ GPa, the	
	(1) 1.25 mm (2) 2.70 mm	(3) 4.05 mm (4) 5.40 mm	
89.	Which one of the following non-dime laminar to turbulent flow in free convect	ensional numbers is used for transition from	
	(1) Reynolds number	(2) Grashof number	
	(3) Peclet number	(4) Rayleigh number	
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90.	During normalizing process of steel, the specimen is heated:				
	(1) Between the upper and lower critical temperature and cooled in still air.				
	(2) Above the upper critical temperature and cooled in furnace.				
	(3) Above the upper critical temperatu				
	(4) Between the upper and lower critic				
91.	Poisson's ratio is equal to:	•			
	(1) Lateral Strain / Longitudinal Strain				
	(2) Lateral Strain × Longitudinal Strain				
	(3) Longitudinal Strain / Lateral Strain				
	(4) None of these				
92.	The energy stored in a body when strain	ned within elastic limit is known as:			
	(1) Proof resilience	(2) Impact energy			
	(3) Strain energy	(4) Potnetial energy			
93.	The increase in hardness due to cold we	orking is called:			
	(1) Cold hardening	(2) Work hardening			
	(3) Age hardening	(4) None of these			
94.	For extrusion, important mechanical pr	operty of a material is:			
	(1) Elasticity (2) Ductility	(3) Plasticity (4) None of these			
95.	When steam flows through the fixed bla	ades in reaction turbine:			
	(1) Pressure increases				
	(2) Velocity increases				
	(3) Velocity increases and Pressure dro	ops			
	(4) None of these				

96. Reaming is a process used to:

(1) Create a circular hole in metals

(3) Finish an existing hole surface

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(4) Make non-circular holes in metals

(2) Cut a slot on the existing hole surface

	80 per unit, respectively. The demand for the item is 500 units. To break even, the unit price of the items in Rs. should be:					
	(1) 150	(2) 120	(3) 130	(4) 100		
98.	The Young's modulus of elasticity of a material is 2.5 times its modulus of rigidity. The Poisson's ratio for the material will be:					
	(1) 1.50	(2) 0.25	(3) 0.50	(4) 0.75		
99.	Acceptable Quality	Level (AQL) is asso	ciated with:			
	(1) Producer's risk					
	(2) Consumer's risk					
	(3) Lot tolerance percent defective					
	(4) Average outgoing	ng quality limit				
100.	Self locking condition for a pair of square thread screw and nut having coefficient of friction = μ , lead of thread = L and pitch diameter of thread = d is given by :					
	(1) $d > \pi \mu L$	(2) $d > \mu L$	(3) $\mu > Ld$	(4) None of these		

97. The fixed cost and the variable cost of production of a product are Rs. 20,000 and Rs.

Total No. of Printed Pages: 17

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C

ARE ASKED TO DO SO)

SET-X

PHD-EE-2023-24 Mechanical Engineering

10011

		Sr. No
Time: 11/4 Hours	Max. Marks : 100	Total Questions: 100
Roll No. (in figures)	(in words)	
Name	Date of Birth	
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 unfairmeans / 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 shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University Website. The complaint be sent by the students to the Controller of Examinations by hand or through email. 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.

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1.		Two shafts, one solid and the other hollow, are made of the same materials and are having same length and weight. The hollow shaft as compared to solid shaft is:			
	(1) More strong	(2) Less strong			
		(4) None of the above			
2.	2. A structural member subjected to an axis	al compressive force is called:			
	(1) Beam (2) Column	(3) Frame (4) Strut			
3.	그는 그 가는 그 그는 그리고 있다면 하나 있다. 것이 걸려면 하나 없는데 다른데 그 없는데 그 없는데 하는데 하는데 하는데 하는데 하는데 하는데 하는데 하는데 하는데 하	at a distance of 40 cm from the left end on a 1 ported at both ends. The vertical reaction at the			
	(1) 4 (2) 5 red 11 s s s s	(3) 0.25 (4) 6			
4.	4. Nusselt number in case of free convection	on is the function of:			
	(1) Reynolds number and Prandtl numb	er Paris an (E)			
	(2) Reynolds number only	il. Moving average inched - used -:			
	(3) Grashoff number only	(1) Manage supply distan-			
	(4) Grashoff number and Prandtl numb	er (2) Connel in Little invess			
5	5. For psychrometric charts:	els Cate June opnemie, produment Euril			
	(1) Constant relative humidity lines are	uphill straight lines to the right.			
	(2) Constant wet bulb temperature lines	s are downhill straight lines to the right.			
	(3) Constant enthalpy lines are coincide	ent with constant wet bulb temperature lines.			
	(4) None of these	to the fy the rest types of quality or			
6	6. The difference between the total head li	ne and the hydraulic grade line represents:			
	(1) The velocity head	(2) The piezoelectric head			
	(3) The pressure head	(4) The elevation head			

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the

7.	Which one of the following is a fire tube boiler?	10
	(1) Babcock - Wilcox boiler (2) Locomotive boiler	
	(3) Both of these (4) None of these (1)	
8.	A refrigerator and a heat pump operate between the same temperature limits. COP of the refrigerator is 4, the COP of the heat pump would be:	
	(1) 3 (2) 4 (3) 5 (4) 6	2
9.	In axial flow turbine:	
t ry to s	(1) Inlet is axial and outlet is radial (2) Inlet is axial and outlet is axial	
	(3) Inlet is radial and outlet is axial (4) Inlet is radial and outlet is radial	
10.	If a material expands freely due to heating, it will develop:	
	(1) Tensile stress (2) Compressive stress (3)	
	(3) No stress (4) Thermal stress (4)	
11.	Moving average method is used to:	
	(1) Manage supply chains	
	(2) Control inventory levels 12 december 12 control inventory levels (b)	
	(3) Calculate optimum production levels	
	(4) Make sales forecast	
12.	Ishikawa diagram is used to:	
100		
	(1) Identify different types of quality defects	
	(2) Find quantitative relation between a defect and a process parameter	
	(3) Find relation between defects and their causes	
	(4) Prioritized quality defects	

13.	A moving mandrel is used in : bear set on	a zbedisin	To partie	Mich one of the I	
	(1) wire drawing (2) forging			(4) None or these	
14.	Brazing and Soldering are:			(3) Electrolysis	
	(1) Plastic joining methods	a. colerano	To Joana	The Cariolis comp	.05
	(2) Homogeneous joining methods			(1) Along the slids	
	(3) Autogenous joining methods	omas gair	rle affro!	(1) Parpendienter	
	(4) Heterogeneous joining methods				
15.	Bodies in flotation to be in stable equilibre that the centre of gravity is located below	rium, the n	ecessary	and sufficient cond	ition is
	(1) Metacentre	(2) Centre	of pressu	ire	
		(4) Centre		incy	
16.	A quantitative measure of maintainability	is:	tan esam	Reduce boul	
	(1) Downtime	(2) Mean	Time to F	Repair	
	(3) Mean Time between Failure zanchi	(4) System	n availabi	lityiq zaari (1.4)	
17.	Friction at the tool-chip interface can be re	educed by	Al main	On Time Measure	
	(1) Decreasing the rake angle			etan in 1000 i. (1)	
	(2) Increasing the cutting speed				
	(3) Decreasing the cutting speed			magin vi00 is 113	
	(4) None of these	- 433	ma kam	abote a smily is ca	23.
18.	Which one of the following is not a characteristic and the second	cteristic of	JIT man	ufacturing system?	
	(1) Reduction of lot sizes to 112 the	18-78	Hazin	rii Stedy adaty a	
	(2) Efficient use of buffer inventory	nachine;	n steat a	Percent (die cime f	24.
	(3) Small but frequent deliveries			galgerse the William	
	(4) Higher productivity				

(4) Reduces porosity and increases brittleness
22. One Time Measurement Unit (TMU) during Method Study is equal to:
(1) 0.0001 minute
(2) 0.0006 minute

(3) Domaising the Cl.

Seattle to smoth the

(3) 0.006 minute (4) 0.001 minute

23. Motion study is carried out to:

4

(1) Observe actions of an operator (2) Study layout

(3) Study safety arrangements (4) All of these

24. Percent idle time for men or machines is found by:

(1) Work sampling
(2) Work study
(2) Method study

(3) Work study

(4) ABC analysis achery enterly

25.	In projection welding, the depth of projection	ction is about : 64 9	St. Taliff the count	
	(1) 40% of sheet thickness	(2) 60% of sheet th	iickness	
	(3) 80% of sheet thickness	(4) 20% of sheet th	nickness	
26.	In a quasi-equilibrium process, the pressu	are in a system : 🤟		
	(1) Remains constant	(2) Varies with ten	nperature on the state	
	(3) Is constant everywhere, at an instant	(4) Increase if volu	ime increases IE3	
27.	Which of the following is a surface (structure of common metals?		mperfection in the cryst	tal
	(1) Vacancy (2) Dislocation	(3) Inclusion	(4) None of these	
28.	A steel bar of 40 mm × 40 mm so compressive load of 200 kN. If the ler elongation of the bar will be:			
	(1) 1.25 mm (2) 2.70 mm	(3) 4.05 mm	(4) 5.40 mm	
29.	Which one of the following non-dime laminar to turbulent flow in free convect		used for transition fro	ır
	(1) Reynolds number	(2) Grashof number	or and a state of	
	(3) Peclet number	(4) Rayleigh numb	er er	
30.	During normalizing process of steel, the	specimen is heated:	that a steel d of mid	
	(1) Between the upper and lower critica	l temperature and co	oled in still air.	
	(2) Above the upper critical temperature	e and cooled in furna	ice. 😂 (island) (i)	
	(3) Above the upper critical temperature	e and cooled in still a	(*) Square bean rii	
	(4) Between the upper and lower critical	l temperature and co	oled in furnace.	

31.	In LPP, the condition to be satisfied is: and to repole air gardent pointsigns of	25.
	(1) Constraints as well as objective tunction have to be linear	
	(2) Only objective function has to be linear	
	(3) Constraints can be non-linear and any order regretary programme production and	.86
	(4) None of the above the grown (4)	
32.	PERT and CPM are basically used in : The trade of the standard	
. X 7	(1) Decision making (2) Layout designing	27.
	(3) Assessing quality (4) Defect reduction (5) Defect reduction (6)	
33.	Process layout is used for:	
	(1) Batch production (2) Continuous type of product	.19£
	(3) Effective utilisation of machines (4) None of the above 10 machines	
34.	PERT is:	
	(1) Target oriented (2) Event oriented	29
	(3) Activity oriented (4) Cost oriented	
35.	Two beams, one having square cross section and another circular cross-section subjected to the same amount of bending moment. If the cross sectional area as we the material of both the beams are the same then:	ell as
	(1) Maximum bending stress developed in both the beams is the same	
	(2) Circular beam experiences more bending stress than the square one	
	(3) Square beam experiences more bending stress than the circular one	
	(4) As the material is same both the beams will experience same deformation	

36.	Two pipe systems in series are said to be equivalent when:	
	(1) The average diameter in both systems is the same.	
	(2) The discharge under the same head is same in both systems.	
	(3) The average friction factor in both systems is the same.	
	(4) Total length of the pipe is the same in both the systems.	
37.	Boundary layer separation is caused by:	
	(1) Adverse pressure gradient	
	(2) Laminar flow changing to turbulent flow	
	(3) Reduction pressure to vapour pressure and digital and division and distributions of the second s	
	(4) None of these	
38.	In which of the following resistance welding, a large number of welds can be carried	
	out simultaneously?	
	(1) Spot welding (2) Projection welding	
	(3) Seam welding (4) Percussion welding	
39.	Which of the following welding processes results in the smallest heat affected zone?	
	(1) Shielded metal arc welding (2) Gas welding	
	(3) Laser beam welding (4) Thermit welding	
40.	The Klein's diagram is used when:	
	(1) Crank has uniform angular velocity	
	(2) Crank has non-uniform angular velocity and the last league of the state of the	
	(3) Crank has uniform angular acceleration	
	(4) Crank has non-uniform angular acceleration	

d	ľ	1	,	
2	٠		L	

41.	If pressure angle is 20°, then minimum	number of teeth is:
	(1) 27 (2) 20	(3) 07 (4) None of these
42.	Cavitation gives damage to turbine on :	(2) The discharge instar the same nearly
	(1) Outlet on the convex side of blades	
	(2) Inlet on the convex side of blades	rumos adres origina to dispute and a for
	(3) Roth of these	37. Bornadan jayors , controls caused by
	(4) None of these	treature and are visit in
43.		tilever beam with uniformly distributed lo
	(1) ωL^2 (2) $(\omega L^2)/2$	(3) $(\omega L^2)/4$ (4) $(\omega L^2)/8$
44.	Bending stress at neutral axis is:	38. In which of the Inflowing rest to the V
	(1) Maximum	(2) Zero
	(3) Can't be zero	(4) None of these
45.	Which of the following is not a type of t	ransmission shaft?
		(2) Line shaft
	(3) Counter shaft	(4) Transmission shaft
46.	Lame's theory is associated with:	(3) Laster beauty with ling
	(1) Thin cylindrical shells	(2) Thick cylindrical shells
	(3) Direct and bending stresses	(4) None of the above
47.	The maximum principal strain theory is	also known as: Minumod and Mario (5)
	(1) Rankine's theory	(2) Guest's theory
	(3) Saint Venant's theory	(4) Von-Mises theory

			12.0
48.	Two springs of stiffness k_1 and k_2 resp the stiffness of the composite spring?	ectively are connected in series, what	will be
	(1) $k = \frac{k_1 \times k_2}{k_1 + k_2}$ (2) $k = \frac{k_1 + k_2}{k_1 \times k_2}$		
49.	The point of contra-flexure occurs in:		
	(1) Cantilever beams	(2) Simply supported beams	
	(3) Overhanging beams	(4) Fixed beams	
50.	The pair is known as a higher pair, wher pair is:	the relative motion between the eleme	
	(1) Turning only	(2) Sliding only	
A 60:	(3) Rolling only	(4) Partly turning and Partly sliding	25
51.	Poisson's ratio is equal to:	price of the items in Rs. should be:	
	(1) Lateral Strain / Longitudinal Strain	150 (2) 120	
	(2) Lateral Strain × Longitudinal Strain	The "coops madulys of clasticity of a	
	(3) Longitudinal Strain / Lateral Strain	2 of some cation for the material will be .	
	(4) None of these	grammer (2) 0.25	
52.	The energy stored in a body when straine	ed within elastic limit is known as:	.68.
	(1) Proof resilience	(2) Impact energy	
	(3) Strain energy	(4) Potnetial energy	
53.	The increase in hardness due to cold wor	king is called: Total a must be a least	
	(1) Cold hardening	(2) Work hardening	
	(3) Age hardening	(4) None of these	

54. For extrusion, important mechanical property of a material is:

(3) Plasticity

(2) Ductility

(1) Elasticity

(4) None of these

55.	When steam flows t	hrough the fixed bla	des in reactio	n turbine :	in square on't	-84
	(1) Pressure increas	ses		st afters) - 21	ा १० - ५०० चिन असी	
	(2) Velocity increas	ses and a second				
	(3) Velocity increas	ses and Pressure dro				
	(4) None of these				in to be to the self."	.任和
56.	Reaming is a proces	ss used to:				
	(1) Create a circula	r hole in metals				
	(2) Cut a slot on the	e existing hole surfa	ce		modern tegan I	në.
	(3) Finish an existing	ng hole surface		g117 (1. C to 207	2 12	.06
	(4) Make non-circu	lar holes in metals				
57.	The fixed cost and 80 per unit, respectiprice of the items in (1) 150	vely. The demand for	or the item is:	500 units.	are Rs. 20,000 at To break even, the	e unit
58.	The Young's modul Poisson's ratio for the (1) 1.50	us of elasticity of a rate material will be: (2) 0.25	naterial is 2.5	times its n		y. The
59.	Acceptable Quality	Level (AQL) is asso	ciated with:			
	(1) Producer's risk				me grand HT	
					ill gritan in	
	(2) Consumer's risk				(2 Sections)	
	(3) Lot tolerance pe	ercent defective	artitu ant) eronitye.;	" tall a red"	53
	(4) Average outgoing	ng quality limit			ornali o uj	
60.	Self locking condition $= \mu$, lead of	on for a pair of squ thread = L and pitch	are thread scr	rew and nu hread = d i	t having coeffici s given by:	ent of
	(1) $d > \pi \mu L$	(2) $d > \mu L$	(3) $\mu > Ld$		None of these	

61.	Type of spring used to absorb shocks and	vibr	ations in vehicles	is: I be use of I:	.58
	(1) Helical spring	(2)	Spiral spring		
se alt	(3) Multi-leaf spring	(4)	Disk spring	A wast bar of \$1 of 200 key, he d	
62.	According to first law of thermodynamics				
	(1) Total internal energy of a system duri	ng a	process remains	constant	
	(2) Total energy of a system remains con	stan	t make it is		.07
	(3) Work done by a system is equal to the	e he	at transferred by t	he system	
	(4) None of these		engin hardes a		
63.	For a given applied load, induced stress is	s a fi	unction of:		
	(1) Cross sectional area of the body				
	(2) Material of the body			punishmil/ (D)	
	(3) Both (1) and (2)				
	(4) None of these				
64.	Superheated vapor behaves:		na harry (may to)	Re John private	
	(1) Exactly as gas		As steam		
	(3) As ordinary vapor	(4)	Approximately a	s a gas	
65.	The temperature distribution for a hol constant value of thermal conductivity is		-		
	(1) Logarithmic (2) Parabolic	(3)	Hyperbolic	(4) Exponential	
66.	One ton of refrigeration is equal to:			is Mayanar at	
	(1) 210 kJ/min (2) 3.5 kJ/min	(3)	105 kJ/min	(4) 250 kJ/min	
67.	The moment of inertia of a square section	n of	size 1 unit about	its diagonal is :	
	(1) 1/4 (2) 1/8	(3)	1/12	(4) 1/24	
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68.	The unit of Bulk	Modulus is :		Street Technical and a street and a street
	(1) Nm	(2) MPa	(3) mm	(4) N/m3
69.	of 200 KN. If the	mm × 40 mm square length of bar is 2m	and $E = 2 \times 10^5 \text{ M}$	jected to an axial tensile load Pa, the elongation of the bar
	will be:			wetam tjachaza 🔊
	(1) 1.50 mm	(2) 1.25 mm	(3) 0.75 mm	(4) 0.50 mm
70.	The unit of stiffne	ess is :		
	(1) N/m^3	$(2) N/m^2$	(3) N m ²	(4) N/m
71.	The REL chart is	thed up for the	transferra engine de ef	, ve non six W (E)
	(1) Designing the			
		e valuation of stock		Be Republication
		movement of an iten		
		he issue and receipt re	oord	
	_			Call to Colonia (Ca
72.	Which one of the	following is a heat tre	atment process for s	urface hardening?
	(1) Normalizing	(2) Annealing	(3) Carburizing	(4) None of these
73.	_	of the liquid in case	of an immersed bod	y acts through which one of
	the following?	O Assistant		
	(1) Centre of grav	rity - y magan z pagak i ki j	(2) Centre of pres	SALA TARREST SELECTION
	(3) Metacentre		(4) Centre of buoy	
74.	In a hollow cylind	rical product manufa	ctured by centrifuga	l casting, the density of the
	part is:	Silahsagh at		
	(1) Maximum at th			Section to washing the first
	(2) Maximum at th	ne inner region	nu finatra vendu o	66. (h. hey h. he
	(3) Maximum at th	ne mid-point between	outer and inner surf	aces
	(4) Uniform through	ghout no and the n		in the place of the INT

75.	A typical Fe-C alloy containing greater th	han 0.8%, C is known as:	
	(1) Eutectoid steel	(2) Hypoeutectoid steel	
	(3) Mild steel	(4) Hypercutectoid steel	
76.	An autocollimator is used to:	(i) Operations are ideal out on the parmi	
	(1) Measure small angular displacement	s on flat surfaces	
otes	(2) Compare known and unknown dime	nsions attentibe at one 001 and to be for the	
67 L		or I now The notational special of the w	
	(4) None of these	ी क्रांचा 🕾	
	3091 (8)		
77.	the same temperature is called:	y to the total emissive power of a black body	a
	(1) Absorptivity (2) Transmissivity	(3) Reflectivity (4) None of these	
78.	The angle of a twist drill that determines	sits rake angle is:	
		(2) Chisel edge angle	
	(3) Helix angle	(4) Point angle whom and control	
79.	Material Requirements Planning include		
	(1) bill of material	(2) inventory level	
	(3) production schedule	(4) All of these	
80.	In a flange coupling, the bolts are subject	ted to describe and high discherence	
	(1) Tensile stress	(2) Compressive stress	
	(3) Shear stress and the best plane to not	(4) None of these phonogenical and 178	
81.	For a ductile material, toughness is a me	easure of:	
	(1) Resistance to scratching		
	(2) Ability to absorb energy till elastic l		
	(3) Resistance to indentation	stoclay a diversion flor	
	(4) None of these	DV (S) 7 (F)	

(1) v

(2) v/2

(3) v/4

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(4) v/8

89.	Bell Coleman cycle consists of:	
	(1) Two isobars and two isentropic	(2) Two isochores and two isentropic
	(3) Two isotherms and two isochores	(4) Two isotherms and two isentropic
90.	Increase in entropy of a system represer	nts :
	(1) Increase in availability of energy	(2) Increase in temperature
	(3) Decrease in pressure	(4) Degradation of energy
91.	The type of control chart used to monite	or the amount of dispersion in a sample is:
	(1) c-chart (2) p-chart	(3) X bar-chart (4) R-chart
92.	'Production Planning' involves integrati	on of :
	scheduling, routing, estimating and disp	patching activities. This statement is:
		l dispatching activities working and the
	(2) Scheduling, routing and selling acti	vities Incompanents but some vities
	(3) Scheduling, routing and marketing	activities activities
	(4) None of these	100. The entary mornal combine con engine is
93.	Which of the following casting proc	esses uses expendable pattern and expendable
	mould?	Tusuum Zin zusi (tusuz itginid - 1)
	(1) Shell mould casting	(2) Investment casting
	(3) Pressure die casting	(4) Centrifugal casting
94.	In resistance seam welding, the electro	de is in the form of a:
	(1) Cylinder (2) Flat plate	(3) Circular disc (4) None of these
95.	The binding material used in cemented	carbide cutting tools is:
	(1) Graphite (2) Tungsten	(3) Nickel (4) Cobalt

- In a homogeneous isotropic elastic material, the modulus of elasticity E in terms of Gand K is equal to:

- (1) $\frac{9KG}{G+3K}$ (2) $\frac{9KG}{3G+K}$ (3) $\frac{3K+G}{3G+K}$ (4) $\frac{6KG}{K+3G}$
- The number of defectives produced by a six sigma process (in parts per million) is: 97.
 - (1) 5.2
- (2) 4.2
- (3) 3.2
- (4) 2.2
- Which one of the following is not a method of calculating depreciation? 98.
 - (1) Straight line method

- (2) Sum of year digits (SYD) method
- (3) Declining balance method
- (4) All of these

- 99. Index jigs are used to:
 - (1) Drill equidistant holes on a circular flange
 - (2) To manufacture components with awkward shape
 - (3) Drill components both with internal and external diameters
 - (4) Drill round parts like pipe flange
- The rotary internal combustion engine is the inversion of: 100.

124 Investment (St

(1) Four bar link chain

- (2) Double slider crank chain
- (3) Single slider crank mechanism
- (4) Rocker crank mechanism

In real and the removational, the cluctrode is in the form of

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SET-X

Mechanical Engineering

10004

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Date of Examination		
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	1. For a ductile material, toughness is a	measure of:
	(1) Resistance to scratching	
	(2) Ability to absorb energy till elasti	c limit
	(3) Resistance to indentation	
	(4) None of these	
2	2. In the 3-2-1 principle of fixture design	, 3 refers to the number of:
	(1) Clamps required	
	(2) Degrees of freedom of the workpi	ece
	(3) Operations carried out on the prim	ary datum face
	(4) None of these	
3.		ned at a feed of 0.25 mm/rev with a depth of cut work piece is 160 rpm. The material removal rate
	(1) 160 (2) 167.6	(3) 1600 (4) 1675.5
4.	The strain energy stored in a spring suffering permanent distortion, is know	g, when subjected to maximum load, without en as:
	(1) Impact energy	(2) Proof resilience
	(3) Proof stress	(4) Modulus of resilience
5.	For same power output and same co- engines, four- stroke engine have:	ompression ratio, as compared to two -stroke
	(1) Higher fuel consumption	(2) Lower thermal efficiency
	(3) Higher exhaust temperatures	(4) Higher thermal efficiency
6.	Reciprocating compressors are usually p	preferred for :
	(1) High pressure and high discharge	(2) High pressure and low discharge
	(3) Low pressure and high discharge	(4) Low pressure and low discharge
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7.	For a four-cylinder	vertical engine, the o	comn	only used firi	ng order is:	
	(1) 1-2-3-4	(2) 3-4-1-2	(3)	1-3-4-2	(4) 4-3-2-1	
8.	Two balls of equal the ball with veloci	ty v is made to stru				
	will move with a ve	•	(0)		(4)19	
	(1) v	(2) v/2	(3)	v/4	(4) v/8	
9.	Bell Coleman cycle	consists of:				
	(1) Two isobars and	l two isentropic	(2)	Two isochore	es and two isentro	pic
	(3) Two isotherms	and two isochores	(4)	Two isothern	ns and two isentro	pic
10.	Increase in entropy	of a system represer	nts:			
	(1) Increase in avai			Increase in te	mperature	
	(3) Decrease in pre	And the same file.	(4)	Degradation	of energy	
44						
11.	Poisson's ratio is eq					
	(1) Lateral Strain /	•				
	(2) Lateral Strain ×	Longitudinal Strain	1			
	(3) Longitudinal St	rain / Lateral Strain				
	(4) None of these					
12.	The energy stored in	n a body when strain	ned v	vithin elastic li	mit is known as:	
	(1) Proof resilience	;	(2)	Impact energ	y .	
	(3) Strain energy		(4)	Potnetial ene	ergy	
13.	The increase in hard	dness due to cold we	orkin	g is called:		
	(1) Cold hardening	,	(2)	Work harder	ning	
	(3) Age hardening		(4)	None of thes	se .	

	sticity		property of a material	
(1) 1:16	,	(2) Ductility	(3) Plasticity	(4) None of these
		through the fixed	blades in reaction turl	
(1) Pre	ssure increa	ises		
(2) Ve	locity increa	ises		
(3) Vel	ocity increa	ses and Pressure	irops	
	ne of these		37 37	
16. Reamin	g is a proce	ss used to		
		r hole in metals		
		e existing hole sur	face	
(3) Fini	sh an existi	ng hole surface		
(4) Mal	ke non-circu	lar holes in metal	S	
80 per u	nit, respecti			duct are Rs. 20,000 and Rs. nits. To break even, the unit
(1) 150		(2) 120	(3) 130	(4) 100
		us of elasticity of a		its modulus of rigidity. The
(1) 1.50		(2) 0.25	(3) 0.50	(4) 0.75
19. Acceptal	ole Quality l	Level (AQL) is as	sociated with:	
(1) Prod	ucer's risk			
(2) Cons	sumer's risk			
(3) Lot t	olerance per	cent defective		
(4) Aver	age outgoin	g quality limit		

4			· · · · · · · · · · · · · · · · · · ·
20.	Self locking condition for a pair of squ friction = μ , lead of thread = L and pitch	are thread screw and diameter of thread =	
	(1) $d > \pi \mu L$ (2) $d > \mu L$	(3) $\mu > Ld$	(4) None of these
21.	In LPP, the condition to be satisfied is:		
	(1) Constraints as well as objective tune	ction have to be linea	ır
	(2) Only objective function has to be li	near	
	(3) Constraints can be non-linear		
	(4) None of the above		
22	PERT and CPM are basically used in:		
	(1) Decision making	(2) Layout design	ing
	(3) Assessing quality	(4) Defect reducti	ion
23	Process layout is used for:		
	(1) Batch production	(2) Continuous ty	pe of product
	(3) Effective utilisation of machines	(4) None of the a	bove
24	PERT is:		
	(1) Target oriented	(2) Event oriente	ed
	(3) Activity oriented	(4) Cost oriented	1
25	. Two beams, one having square cross subjected to the same amount of bend the material of both the beams are the	ing moment. If the c	er circular cross-section, are cross sectional area as well as
	(1) Maximum bending stress develop		
	(2) Circular beam experiences more b		
	(3) Square beam experiences more be		
	(4) As the material is same both the b	eams will experience	ce same deformation
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26.	Two pipe systems in series are said to be equivalent when:	
	(1) The average diameter in both systems is the same.	
	(2) The discharge under the same head is same in both systems.	
	(3) The average friction factor in both systems is the same.	
	(4) Total length of the pipe is the same in both the systems.	
27.		
	(1) Adverse pressure gradient	
	(2) Laminar flow changing to turbulent flow	
	(3) Reduction pressure to vapour pressure	
	(4) None of these	
28.	In which of the following resistance welding, a large number of welds can be carried out simultaneously?	i
	(1) Spot welding (2) Projection welding	
	(3) Seam welding (4) Percussion welding	
29.	Which of the following welding processes results in the smallest heat affected zone?	
	(1) Shielded metal arc welding (2) Gas welding	
	(3) Laser beam welding (4) Thermit welding	
30.	The Klein's diagram is used when:	
	(1) Crank has uniform angular velocity	
	(2) Crank has non-uniform angular velocity	
	(3) Crank has uniform angular acceleration	
	(4) Crank has non-uniform angular acceleration	

31.	Two shafts, one solid and the other hollow, are made of the same materials and are having same length and weight. The hollow shaft as compared to solid shaft is:				
	(1) More strong		(2)]	Less strong	
	(3) Have same stre	ngth	(4)	None of the abo	ove
32.	A structural member	er subjected to an axi	al con	pressive force	is called :
	(1) Beam	(2) Column	(3)	Frame	(4) Strut
33.					m from the left end on a 1. The vertical reaction at the
	(1) 4	(2) 5	(3)	0.25	(4) 6
34.	Nusselt number in	case of free convecti	on is t	he function of :	
	(1) Reynolds numb	per and Prandtl numb	oer		
	(2) Reynolds numb	per only			
	(3) Grashoff numb	er only			
	(4) Grashoff numb	er and Prandtl numb	er		
35.	For psychrometric	charts:			
	(1) Constant relativ	ve humidity lines are	uphil	l straight lines	to the right.
	(2) Constant wet b	ulb temperature line	s are d	lownhill straigh	nt lines to the right.
	(3) Constant entha	lpy lines are coincid	ent wi	th constant wet	bulb temperature lines.
	(4) None of these				
36.	The difference bety	ween the total head li	ine an	d the hydraulic	grade line represents :
	(1) The velocity he	ead	(2)	The piezoelect	cric head
	(3) The pressure h	ead	(4)	The elevation	head

37.	. Which one of the following is a fire tube boiler?		
	(1) Babcock - Wilcox boiler	(2) Locomotive boiler	
	(3) Both of these	(4) None of these	
38.	A refrigerator and a heat pump operat	e between the same temperature limits. If the	
	(1) 3 (2) 4	(3) 5 (4) 6	
39.	In axial flow turbine:		
	(1) Inlet is axial and outlet is radial	(2) Inlet is axial and outlet is axial	
	(3) Inlet is radial and outlet is axial	(4) Inlet is radial and outlet is radial	
40.	If a material expands freely due to heating	ng, it will develop:	
	(1) Tensile stress	(2) Compressive stress	
	(3) No stress	(4) Thermal stress	
41.	The type of control chart used to monito	or the amount of dispersion in a sample is:	
	(1) c-chart (2) p-chart	(3) X bar-chart (4) R-chart	
42.	'Production Planning' involves integration	on of:	
	scheduling, routing, estimating and dispa	atching activities. This statement is:	
	(1) Scheduling, routing, estimating and	dispatching activities	
	(2) Scheduling, routing and selling activ	vities	
	(3) Scheduling, routing and marketing a	activities	
	(4) None of these		
43.	Which of the following casting proce mould?	sses uses expendable pattern and expendable	
	(1) Shell mould casting	(2) Investment casting	
	(3) Pressure die casting	(4) Centrifugal casting	

	(1) Cylinder	(2) Flat plate	(3) Circular disc	(4) None of these
45.	The binding materia	al used in cemented	carbide cutting tools	is:
	(1) Graphite	(2) Tungsten	(3) Nickel	(4) Cobalt
46.	In a homogeneous and K is equal to:	isotropic elastic mat	erial, the modulus of	f elasticity E in terms of G
	$(1) \ \frac{9KG}{G+3K}$	$(2) \ \frac{9KG}{3G+K}$	$(3) \ \frac{3K+G}{3G+K}$	$(4) \frac{6KG}{K+3G}$
47.	The number of defe	ectives produced by	a six sigma process (i	in parts per million) is:
	(1) 5.2	(2) 4.2	(3) 3.2	(4) 2.2
48.	Which one of the fo	ollowing is <i>not</i> a me	thod of calculating de	epreciation?
	(1) Straight line me	ethod	(2) Sum of year di	gits (SYD) method
	(3) Declining balan	nce method	(4) All of these	
49.	Index jigs are used	to:		
	(1) Drill equidistar	nt holes on a circular	flange	
	(2) To manufacture	e components with a	wkward shape	
	(3) Drill componer	nts both with interna	l and external diame	ters
	(4) Drill round par	ts like pipe flange		
50.	The rotary internal	combustion engine i	s the inversion of:	
	(1) Four bar link c	hain	(2) Double slider	crank chain
	(3) Single slider cr	ank mechanism	(4) Rocker crank	mechanism

44. In resistance seam welding, the electrode is in the form of a:

51.	. In powder metallurgy, sintering of a component:			
	(1) Improves strength and reduces hard	Iness		
	(2) Reduces brittleness and improve str	ength		
	(3) Improves hardness and reduces tou	ghness		
	(4) Reduces porosity and increases brit	tleness		
52.	One Time Measurement Unit (TMU) du	aring Method Study is equal to:		
	(1) 0.0001 minute	(2) 0.0006 minute		
	(3) 0.006 minute	(4) 0.001 minute		
53.	Motion study is carried out to:			
	(1) Observe actions of an operator	(2) Study layout		
	(3) Study safety arrangements	(4) All of these		
54.	Percent idle time for men or machines is	found by:		
	(1) Work sampling	(2) Method study		
	(3) Work study	(4) ABC analysis		
55.	In projection welding, the depth of proje	ction is about :		
	(1) 40% of sheet thickness	(2) 60% of sheet thickness		
	(3) 80% of sheet thickness	(4) 20% of sheet thickness		
56.	In a quasi-equilibrium process, the press	ure in a system :		
	(1) Remains constant	(2) Varies with temperature		
	(3) Is constant everywhere, at an instant	(4) Increase if volume increases		

	D
57.	Which of the following is a surface (two-dimensional) imperfection in the crystal structure of common metals?
	(1) Vacancy (2) Dislocation (3) Inclusion (4) None of these
58.	A steel bar of 40 mm \times 40 mm square cross-section is subjected to an axial compressive load of 200 kN. If the length of the bar is 2 m and E = 200 GPa, the elongation of the bar will be:
	(1) 1.25 mm (2) 2.70 mm (3) 4.05 mm (4) 5.40 mm
59.	Which one of the following non-dimensional numbers is used for transition from laminar to turbulent flow in free convection?
	(1) Reynolds number (2) Grashof number
	(3) Peclet number (4) Rayleigh number
60.	During normalizing process of steel, the specimen is heated:
	(1) Between the upper and lower critical temperature and cooled in still air.
	(2) Above the upper critical temperature and cooled in furnace.
	(3) Above the upper critical temperature and cooled in still air.
	(4) Between the upper and lower critical temperature and cooled in furnace.
61.	The REL chart is used for:
	(1) Designing the layout of plants
	(2) Estimating the valuation of stock
	(3) Analyzing the movement of an item in a store
	(4) Maintaining the issue and receipt record
62.	2 description process for surface hardening?
	(1) Normalizing (2) Annealing (3) Carburizing (4) None of these

		11
63.	Resultant pressure of the liquid in case the following?	of an immersed body acts through which one of
	(1) Centre of gravity	(2) Centre of pressure
	(3) Metacentre	(4) Centre of buoyancy
64.	In a hollow cylindrical product manufactory part is:	ctured by centrifugal casting, the density of the
	(1) Maximum at the outer region	
	(2) Maximum at the inner region	
	(3) Maximum at the mid-point between	Outer and inner surfaces
	(4) Uniform throughout	outer and finier surfaces
65.	A typical Fe-C alloy containing greater t	hon 0.90% CC: 1
	(1) Eutectoid steel	
	(3) Mild steel	(2) Hypoeutectoid steel
	(3) Wild Steel	(4) Hypereutectoid steel
66.	An autocollimator is used to:	
	(1) Measure small angular displacement	s on flat surfaces
	(2) Compare known and unknown dime	nsions
	(3) Both of these	
	(4) None of these	
67.	The ratio of total emissive power of body the same temperature is called:	y to the total emissive power of a black body at
	(1) Absorptivity (2) Transmissivity	(3) Reflectivity (4) None of these
68.	The angle of a twist drill that determines	its rake angle is:
	(1) Lip relief angle	(2) Chisel edge angle
	(3) Helix angle	(4) Point angle

69.	Material Requirements Planning include	:
	(1) bill of material	(2) inventory level
	(3) production schedule	(4) All of these
70.	In a flange coupling, the bolts arc subjec	ted to:
	(1) Tensile stress	(2) Compressive stress
	(3) Shear stress	(4) None of these
71.	Moving average method is used to:	
	(1) Manage supply chains	
	(2) Control inventory levels	
	(3) Calculate optimum production level	S
	(4) Make sales forecast	
72.	Ishikawa diagram is used to:	
	(1) Identify different types of quality de	efects
	(2) Find quantitative relation between a	
	(3) Find relation between defects and the	eir causes
	(4) Prioritized quality defects	
73.	A moving mandrel is used in:	
	(1) wire drawing (2) forging	(3) bending (4) None or these
74.	Brazing and Soldering are:	(1) Hone of these
	(1) Plastic joining methods	
	(2) Homogeneous joining methods	
	(3) Autogenous joining methods	
	(4) Heterogeneous joining methods	

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75.	Bodies in flotation to be in stable equil that the centre of gravity is located below	ibrium, the necessary and sufficient condition is
	(1) Metacentre	(2) Centre of pressure
	(3) Centre of gravity	(4) Centre of buoyancy
76.	A quantitative measure of maintainabili	ty is :
	(1) Downtime	(2) Mean Time to Repair
	(3) Mean Time between Failure	(4) System availability
77.	Friction at the tool-chip interface can be	e reduced by :
	(1) Decreasing the rake angle	
	(2) Increasing the cutting speed	
	(3) Decreasing the cutting speed	
	(4) None of these	
78.	Which one of the following is not a cha	racteristic of JIT manufacturing system?
	(1) Reduction of lot sizes	(2) Efficient use of buffer inventory
	(3) Small but frequent deliveries	(4) Higher productivity
79.	Which one of the following methods can	n be used for producing metal powders?
	(1) Atomization	(2) Machining and grinding
	(3) Electrolysis	(4) All of these
80.	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	

81.	Type of spring used to absorb shocks and	l vibrations in vehicles is :
	(1) Helical spring	(2) Spiral spring
	(3) Multi-leaf spring	(4) Disk spring
82.	According to first law of thermodynamic	s :
	(1) Total internal energy of a system du	ring a process remains constant
	(2) Total energy of a system remains co	
	(3) Work done by a system is equal to the	ne heat transferred by the system
	(4) None of these	
83.	For a given applied load, induced stress	is a function of:
	(1) Cross sectional area of the body	
	(2) Material of the body	
	(3) Both (1) and (2)	
	(4) None of these	
84.	Superheated vapor behaves:	
	(1) Exactly as gas	(2) As steam
	(3) As ordinary vapor	(4) Approximately as a gas
85.	The temperature distribution for a hoconstant value of thermal conductivity is	llow cylinder for steady state 1
	(1) Logarithmic (2) Parabolic	(3) Hyperbolic (4) Exponential
86.	One ton of refrigeration is equal to:	(1) Exponential
	(1) 210 kJ/min (2) 3.5 kJ/min	(3) 105 kJ/min (4) 250 kJ/min

P. T. O.

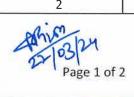
87	7. The moment of i	nertia of a square sec	ction of size I unit al	out its diagonal is :	
	(1) 1/4	(2) 1/8	(3) 1/12	(4) 1/24	
88	3. The unit of Bulk	Modulus is:			
	(1) Nm	(2) MPa	(3) mm	(4) N/m^3	
89	A steel bar of 40 of 200 KN. If th will be:	m mm imes 40~mm~square length of bar is $2r$	e cross-section is sub $E=2 \times 10^5 M$	ojected to an axial tensile I IPa, the elongation of the	oad bar
	(1) 1.50 mm	(2) 1.25 mm	(3) 0.75 mm	(4) 0.50 mm	
90.	. The unit of stiffn	ess is:			
	$(1) \text{ N/m}^3$	$(2) N/m^2$	(3) Nm2	(4) N/m	
91.	If pressure angle	is 20°, then minimu	m number of teeth is	:	
	(1) 27	(2) 20	(3) 07	(4) None of these	
92.	Cavitation gives	damage to turbine or	ı:		
	(1) Outlet on the	convex side of blade	es		
	(2) Inlet on the co	onvex side of blades			
	(3) Both of these				
	(4) None of these	;			
93.		ng moment in a ca er whole length 'L' i		n uniformly distributed l	oad
	(1) ωL^2	(2) $(\omega L^2)/2$	(3) $(\omega L^2)/4$	(4) $(\omega L^2)/8$	
94.	Bending stress at	neutral axis is:			
	(1) Maximum		(2) Zero		
	(3) Can't be zero		(4) None of thes	e	
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			mission shaft?
95.	Which of the following is <i>not</i> a type of t	ransi	IIISSION SINGS
	(1) Crankshaft		Line shaft
	(3) Counter shaft	(4)	Transmission shaft
96.	Lame's theory is associated with:		garda — Pilipina — Pil
	(1) Thin cylindrical shells	(2)	Thick cylindrical shells
	(3) Direct and bending stresses	(4)	None of the above
97.	The maximum principal strain theory is	also l	known as:
	(1) Rankine's theory	(2)	Guest's theory
	(3) Saint Venant's theory	(4)	Von-Mises theory
98.	Two springs of stiffness k_1 and k_2 respective stiffness of the composite spring?	ectiv	vely are connected in series, what will be
	(1) $k = \frac{k_1 \times k_2}{k_1 + k_2}$ (2) $k = \frac{k_1 + k_2}{k_1 \times k_2}$	(3)	$k = k_1 \times k_2$ (4) $k = k_1 + k_2$
99.	The point of contra-flexure occurs in:		
	(1) Cantilever beams	(2)	Simply supported beams
	(3) Overhanging beams		Fixed beams
100.	The pair is known as a higher pair, when pair is:	n the	relative motion between the elements of a
	(1) Turning only	(2)	Sliding only
	(3) Rolling only	(4)	Partly turning and Partly sliding
			y shanig

Answer key	ys of PHD-EE-2023-24	(MECHANICAL ENGG.)	entrance exam dated	22.03.2024
Q. NO.	А	В	С	D
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3	1	2	4	4
4	4	1	4	2
5	1	4	2	4
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7	3	4	2	3
8	2	3	3	2
9	2	4	2	1
10	4	3	3	4
11	4	1	4	1
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13 14	2	1	4	2
	2	2	4	3
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1/	3	1	2	2
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31	1	3	1	1
32	3	2	1	4
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36	3	1	2	1
37	2	3	1	2
38	2	2	2	3
39	3	2	3	2
40	4	4	1	3
41	1	4	4	4
42	3	3	1	1
43	2	4	2	2
44	1	4	2	3
45	4	1	1	4
46	. 1	2		1
47	4	2	2	3
48	3	2	1	4
49	4	4	3	1
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27/03/24



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Q. NO.	Α	В	С	D
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62				
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95	4	3	4	1
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97	3	2	3	3
98	2	2		
	1	3	1	3
99	1			

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