

MECHANICAL ENGINEERING

Date : 19th January 2019 Time : 2 : 00 to 4 : 00



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JPS	C-AE	Exam	n dated : 19.01.2020 📎	ENGINEERS ACADEMY
1.	Hydraulic gradie	nt line represents the su	m of	
	(a) Datum head	and pressure head		
	(b) Datum head	and kinetic head		
	(c) Pressure hea	d and Kinetic head		
	(d) Pressure, Da	tum and kinetic head		
	Ans. (a)			
2.	In a locomotive	poiler, the shell length is		
	(a) 2 m	(b) 3 m	(c) 4 m	(d) 5 m
	Ans. (c)			
3.	What should be	pH value of water used	in boilers?	
	(a) 0	(b) 7	(c) less than 7	(d) more than 7
	Ans. (d)			
4.	Number of valve	e required to operate the	rotary pump:	
	(a) 4	(b) 3	(c) 2	(d) zero
	Ans. (c)			
5.	Major loss of en	ergy in a typical power	plant takes palce in	
	(a) Condenser	(b) Pump	(c) Boiler	(d) Turbine
	Ans. (a)			
6.	What is the criti	cal point of steam gener	ration in 'once through' boile	r?
	(a) 211.2 bar	(b) 221.2 bar	(c) 23.1.2 bar	(d) 24.1.2 bar
	Ans. (b)			
7.	The motion betw	een a pair which takes	place in is known as	s incompletely constrained motion
	(a) One direction	n only	(b) Two directions of	only
	(c) More than or	ne direction	(d) None of these	
	Ang (a)			
	Ans. (C)			
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ENGINEERS ACADEMY Mechanical Engineering (Technical) **Detailed Solutions** Which of the following is an example of externally fired boiler? 8. (a) Lancashire boiler (b) Cochran boiler (c) Babcock and Wilcox boiler (d) Scotch Marine boiler Ans. (c) 9. If shaft angle in ' θ ' and friction angle in ' ϕ ', maximum efficiency of spiral gear will be (a) $\cos(\theta + \phi) + \frac{1}{\sin(\theta - \phi)} + 1$ (b) $\sin(\theta + \phi) + \frac{1}{\cos(\theta + \phi)} + 1$ (c) $\cos(\theta + \phi) + \frac{1}{\sin(\theta - \phi)} + 1$ (d) $\cos(\theta + \phi) + \frac{1}{\cos(\theta - \phi)} + 1$ Ans. (*) 10. A rotary internal combustion engine has following number of cylinders (a) Seven (b) Six (c) Four (d) Three Ans. (a) 5, 7, 9 number of cylinder is required A typewrite mechanism has six links, seven binary joints and no higher pairs. This mechanism could be 11. (a) Unsound in kinematics (b) Sound in kinematics (c) It depends on fixed links (d) Cannot say anything Ans. (b) N = 6, j = 7F = 3(N-1)-23F = 15 - 14 = 115-14 = (1) D.O.F is '1' i.e. it is constrained mechanism 12. In any truncated conical pivot bearing, for unifrom wear, the frictional rorque transmitted is (a) $\mu W \operatorname{cosec} \propto (r_1 + r_2)$

(b)
$$\frac{1}{2}$$
 µW cosec $\propto (r_1 + r_2)$

- (c) μW cosec $\propto (r_1 r_2)$
- (d) $\frac{1}{2}$ µW coses \propto (r₁-r₂)

Ans. (b)

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13.	The Coriolis i	is acceleration leads the s	liding velocity by	
	(a) 45°	(b) 90°	(c) 135°	(d) 180°
	Ans. (b)			
			1	
			$a_c = 2Vw$	
			mmm	
		Coriol	is acceleration is 90° lead	
14.	For products	subjected to large vibration	ons, which of the joint is bette	er?
	(a) Threaded	(b) Hinged	(c) Welded	(d) Ball and socket
	Ang (a)			
	Ans. (C)			
15.	The purpose of	of link is to		
	(a) Transmit r	motion (b) Guide links	(c) Provide support	(d) All of these
	Ans (a)			
	11105. (11)			
16.	Set screws ca	in be subjected to		
	(a) Tensile loa	ad only		
	(b) Compressi	ive laod only		
	(c) Both tensi	ile and compressive load		
	(d) Neither te	ensile nor compressive lo	ad	
	Ans. (a)			
17.	For a double of helix angle	threaded screw, nominal will be	dia. and pitch are 100 mm and	d 12 mm respectively. The tangent
	(a) 0.021	(b) 0.041	(c) 0.061	(d) 0.081
	Ans. (*)			
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18.	When a fastner is the	hreaded into a ta	pped hole, it is called as	
	(a) Screw	(b) Bolt	(c) Washer	(d) Nut
	Ans. (a)			
19.	The section modulus	s of a circular pla	ate of diameter, d, about an axi	s, through its centre of gravity, is
	πd^3	πd^4	πd^3	πd^4
	(a) $\frac{\pi a}{16}$	(b) $\frac{\pi a}{16}$	(c) $\frac{\pi a}{32}$	(d) $\frac{\pi a}{32}$
	Ans. (a)			
20.	The property of any	material due to	which it can be rolled into plat	tes is called
	(a) Ductility	(b) Elasticity	(c) Malleability	(d) Plasticity
	Ans. (c)			
21.	For a velocity ratio	requirement of 7	0 : 1, which type of gear is mo	ore suitable?
	(a) Spur	(b) Worm	(c) Helical	(d) Bevel
	Ans. (b)			
22.	Which is the limiting	g value of Poisso	n's ratio?	
	(a) 0 and 0.2	(b) 0 and 0.5	(c) 0.2 and 0.5	(d) 0.5 and 0.8
	Ans. (b)			
23.	During bending of a	a beam, which la	yer remains unchanged?	
	(a) Neutral Axis	(b) Load Axis	(c) Support Axis	(d) Rotational Axis
	Ans. (a)			
24.	For a mild steel bod	ly of effective de	pth 400 mm, the depth of neutr	ral axis is
	(a) 172 mm	(b) 212 mm	(c) 272 mm	(d) 312 mm
	Ans. (*)			
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25.	A 2 m long bar	is extended by 2	mm under ax	ial stress of 2N/mm ²	² . The modulus of	resilience is
	(a) 0.01	(b) 0.02		(c) 0.10	(d) 0.20	
	Ans. (*)					
		modulus of resi	lence $=\frac{1}{2}\sigma$	$\times \varepsilon = \frac{\sigma^2}{2E}$		(i)
	From equation (i)	$\varepsilon = \frac{\Delta L}{L}$	$=\frac{2}{2000}$, s = 2N/mm ²	2	
)	1	2		
			$=\frac{1}{2}\times$	$2 \times \frac{2}{2000}$		
			$=\frac{1}{1000}$	$\frac{1}{2} = 0.001$		
26.	A steel rod of 40 elongation, if E =	0 mm diameter an = 200 GPa.	nd 4 m length	is subjected to an a	axial load of 80 kM	N. Calcualte the
	(a) 1.13 mm	(b) 1.23 mm		(c) 1.27 mm	(d) 1.33 mm	
	Ans. (c)					
			$\delta L = \frac{PL}{AE}$	$=\frac{80\times10^{a}\times4000}{\frac{\pi}{4}\times(40)^{2}\times200\times10^{2}}$	0 ³	
			$=\frac{32}{\pi\times}$	$\frac{20 \times 10^3 \times 4000}{1600 \times 200 \times 10^3}$		
			= 1.27	32 mm		
27.	Which of the following the fol	lowing is not an a	amorphous ma	iterial?		
	(a) Rubber	(b) Plastic		(c) Lead	(d) Glass	
	Ans. (c)					
	Amorphous \rightarrow h	aving no definite	shape, form o	or structure		
28.	Normalising is be	est used for which	n material?			
	(a) Low and me	dium carbon steel				
	(b) High Carbon	Steel				
	(c) Cast Iron					
	(d) Steel wires a	ind plates				
	Ans. (a)					
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8.	Computer Science & Engg.	30	10	5	10	5		
9.	Metallurgy Engineering	22	18	100	4	(3)		
10.	Textile Engineering	22	18		4	-		
11.	Biotechnology engineering	30	18	6	6	1		

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З.	General Knowledge/Awareness, Reasoning, Numerical Ability and General English	100	100	90 Min.
4.	Technical (CE • EE • ME)	100	100	90 Min.
5.	General Knowledge/Awareness, Reasoning, Numerical Ability and General English	100	100	90 Mi n .
6.	Technical (CE • EE • ME)	100	100	90 Min.
7.	General Knowledge/Awareness, Reasoning, Numerical Ability and General English	100	100	90 Min.
8.	Technical (CE • EE • ME)	100	100	90 Mi n .



JPSO	C-AE	Exam dated : 19.01.2020	ENGINEERS ACADEMY
29.	The load at the end of a cantile	ver beam is increased. Probable	e failure may occur at
	(a) middle (b) end	(c) support	(d) anywhere
	Ans. (c)		
30.	Which one of the following factor	r is not related to quality of co	oke?
	(a) Moisture (b) Ignitabil	ity (c) Shape	(d) Conductivity
	Ans. (c)		
	shape is not property		
31.	What does TRIP steel stands for	?	
	(a) Transformation Induced Plast	icity (b) Transforma	tion Induced Property
	(c) Transformation Induced Poro	sity (d) Transformation	tion Induced Pearlite
	Ans. (a)		
32.	For a BCC structure atomic pack	king factor is	
	(a) 0.54 (b) 0.64	(c) 0.68	(d) 0.74
	Ans (c)		
	71ns. (C)		
	Atomic packing factor = $\frac{\text{occupic}}{\text{Total}}$	ed volume valume	
33.	Atomic packing factor = $\frac{\text{occupic}}{\text{Total}}$ In metal machining, the zone whethe tool face is called	ed volume valume ere the heat is generated due to	friction between the moving chip and
33.	Atomic packing factor = $\frac{\text{occupic}}{\text{Total}}$ In metal machining, the zone whethe tool face is called (a) Friction zone	ed volume valume ere the heat is generated due to (b) Work-tool o	o friction between the moving chip and contact zone
33.	Atomic packing factor = $\frac{\text{occupic}}{\text{Total}}$ In metal machining, the zone whethe tool face is called (a) Friction zone (c) Shear zone	ed volume valume ere the heat is generated due to (b) Work-tool c (d) None of (A	o friction between the moving chip and contact zone a), (B), (C)
33.	Atomic packing factor = $\frac{\text{occupic}}{\text{Total}}$ In metal machining, the zone whethe tool face is called (a) Friction zone (c) Shear zone Ans. (a)	ed volume valume ere the heat is generated due to (b) Work-tool o (d) None of (A	o friction between the moving chip and contact zone .), (B), (C)
33.	Atomic packing factor = $\frac{\text{occupic}}{\text{Total}}$ In metal machining, the zone whether tool face is called (a) Friction zone (c) Shear zone Ans. (a) The three distinct source of heat	ed volume valume ere the heat is generated due to (b) Work-tool c (d) None of (A in metal cutting are given be	friction between the moving chip and contact zone a), (B), (C)
33.	Atomic packing factor = $\frac{\text{occupic}}{\text{Total}}$ In metal machining, the zone whethe tool face is called (a) Friction zone (c) Shear zone <i>Ans. (a)</i> The three distinct source of heat (1) Shear zone \rightarrow where the price	ed volume valume ere the heat is generated due to (b) Work-tool o (d) None of (A in metal cutting are given be mary plastic or shear deformat	friction between the moving chip and contact zone a), (B), (C) low ion take place
33.	Atomic packing factor = $\frac{\text{occupic}}{\text{Total}}$ In metal machining, the zone whether tool face is called (a) Friction zone (c) Shear zone <i>Ans. (a)</i> The three distinct source of heat (1) Shear zone \rightarrow where the prii (2) The chip \rightarrow tool interface \rightarrow heated chip and tool interface at	ed volume valume ere the heat is generated due to (b) Work-tool o (d) None of (A in metal cutting are given be mary plastic or shear deformat where is secondary plastic d flanks where friction rubbling	o friction between the moving chip and contact zone a), (B), (C) low ion take place eformation due to friction between the occurs
33.	Atomic packing factor = $\frac{\text{occupic}}{\text{Total}}$ In metal machining, the zone whether tool face is called (a) Friction zone (c) Shear zone <i>Ans. (a)</i> The three distinct source of heatt (1) Shear zone \rightarrow where the privile (2) The chip \rightarrow tool interface \rightarrow heated chip and tool interface at Thrust force will increase with in	ed volume valume ere the heat is generated due to (b) Work-tool o (d) None of (A in metal cutting are given be mary plastic or shear deformat where is secondary plastic d flanks where friction rubbling increase in	o friction between the moving chip and contact zone a), (B), (C) low ion take place eformation due to friction between the occurs
33.	Atomic packing factor = $\frac{\text{occupic}}{\text{Total}}$ In metal machining, the zone whether tool face is called (a) Friction zone (c) Shear zone <i>Ans. (a)</i> The three distinct source of heat (1) Shear zone \rightarrow where the prii (2) The chip \rightarrow tool interface \rightarrow heated chip and tool interface at Thrust force will increase with in (a) Tool nose radius	ed volume valume ere the heat is generated due to (b) Work-tool o (d) None of (A in metal cutting are given be mary plastic or shear deformat where is secondary plastic d flanks where friction rubbling norease in (b) Cutting edg	o friction between the moving chip and contact zone a), (B), (C) low ion take place eformation due to friction between the occurs
33.	Atomic packing factor = $\frac{\text{occupic}}{\text{Total}}$ In metal machining, the zone whether tool face is called (a) Friction zone (c) Shear zone <i>Ans. (a)</i> The three distinct source of heat (1) Shear zone \rightarrow where the pridication of the second	ed volume valume ere the heat is generated due to (b) Work-tool o (d) None of (A in metal cutting are given be mary plastic or shear deformat where is secondary plastic d flanks where friction rubbling norease in (b) Cutting edg (d) End angle	o friction between the moving chip and contact zone a), (B), (C) low ion take place eformation due to friction between the occurs
33.	Atomic packing factor = $\frac{\text{occupic}}{\text{Total}}$ In metal machining, the zone whether tool face is called (a) Friction zone (c) Shear zone <i>Ans. (a)</i> The three distinct source of heat (1) Shear zone \rightarrow where the prii (2) The chip \rightarrow tool interface \rightarrow heated chip and tool interface at Thrust force will increase with in (a) Tool nose radius (c) Rake angle <i>Ans. (b)</i>	ed volume valume ere the heat is generated due to (b) Work-tool o (d) None of (A in metal cutting are given be mary plastic or shear deformate where is secondary plastic d flanks where friction rubbling increase in (b) Cutting edg (d) End angle	o friction between the moving chip and contact zone a), (B), (C) low ion take place eformation due to friction between the occurs ge angle
33.	Atomic packing factor = $\frac{\text{occupic}}{\text{Total}}$ In metal machining, the zone whether tool face is called (a) Friction zone (c) Shear zone <i>Ans. (a)</i> The three distinct source of heat (1) Shear zone \rightarrow where the prii (2) The chip \rightarrow tool interface \rightarrow heated chip and tool interface at Thrust force will increase with it (a) Tool nose radius (c) Rake angle <i>Ans. (b)</i>	ed volume valume ere the heat is generated due to (b) Work-tool o (d) None of (A in metal cutting are given be mary plastic or shear deformat where is secondary plastic d flanks where friction rubbling increase in (b) Cutting edg (d) End angle	o friction between the moving chip and contact zone a), (B), (C) low ion take place eformation due to friction between the occurs ge angle

Med	hanical Engineering (Technical)	Detailed	Solutions	×	ENGINEERS	ACADEMY
35.	The tool life can be enhanced by					
	(a) Increasing rake angle		(b) Decreasing	rake	angle	
	(c) Increasing side cutting rake angle		(d) Decreasing	side	cutting rake angl	e
	Ans. (a)					
	$\alpha \uparrow$ Force \downarrow Tool life \uparrow					
36.	Fixture is used as aused in	the manu	facturing indust	ry.		
	(a) Work-holding or support device		(b) Tool-holdin	g dev	ice	
	(c) Cutting tool		(d) Welding too	ol		
	Ans. (b)					
27	Other and a fight and the first to different		-4:- 1-64:	- 6 4	G	•
37.	Strength of the weld is due to diffusion	on and par	(b) Illtragonia	01 U	ie flying surface	In
	(a) Laser beam welding		(d) Cas weldin	weidir	1g	
	(c) Diffusion weiding		(d) Gas weidin	g		
	Ans. (c)					
20		1.1.4		4	.1	
30.	(a) Short singuit values	ied to gen	(h) On an air and	it rul		
	(a) Closed circuit voltage		(b) Open circu	lit voi	lage	
	(c) Closed circuit voltage		(u) Open are v	onago	6	
	Ans. (b)					
39	Which of the following are moulding	material d	efects?			
• • •	(a) Cut and Washes (b) Fusion	indici iui u	(c) Metal pene	tratio	n (d) All of the	286
	(u) out and musics (o) rusion		(c) metar pene	ti utioi		
	Ans. (d)					
40.	When the molten metal is passed through	igh an orif	ice, it breaks in	to pie	ces under high p	ressure fluid, the
	process is known as	C		I	C I	
	(a) Crushing (b) Electrolysis		(c) Reduction		(d) Atomizati	on
	Ans. (d)					
41.	The planning of material requirements	, does not	include			
	(a) Bill of material (b) Inventory le	vel	(c) Production	schec	lule(d) Material	price
	Ans. (d)					
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42.	Elements of TQM does not inclu-	le				
	(a) Customer focus		(b) Continuous	s impr	ovement	
	(c) Intrinsic decision making		(d) Team lead	ership		
	Ans. (a)					
	To be successful implementing To	QM, an orga	nization must con	ncentr	ate on eight key e	elements
	(1) Ethics (4) Trainin	ıg	(7) Recognitio	n		
	(2) Integrity (5) Team	work	(8) Communic	ation		
	(3) Trust (6) Lead	ership				
43.	During a machining process, chip is	velocity is 0.2	2 m/s with chip th	icknes	s ratio of 0.6. The	cutting velocity
	(a) 0.23 m/s (b) 0.28 m/s		(c) 0.33 m	/s	(d) 0.38 n	n/s
	Ans. (c)					
		$\frac{V_{\rm f}}{V_{\rm c}} = r \ ($	chip thickness ra	tio)		
		0.2				
		$\frac{V_c}{V_c} = 0.6$	5			
		$V_{c} = \frac{1}{3}$	= 0.33 m/s			
44.	Which of the following is independent	ndent of sale	s forecast?			
	(a) Productivity (b) Inventor	y control	(c) Production	contr	ol (d) Production	n plan
	Ans. (a)					
45.	Which of the following time estimates	nate is relate	d to PERT?			
	(a) One time estimate		(b) Two time	estim	ate	
	(c) Three time estimate		(d) Four time	estima	ate	
	Ans. (c)					
46.	The SIMPLEX method is used for	or				
	(a) Linear programming		(b) Value anal	vsis		
	(c) Operation research		(d) Model ana	lvsis		
	(.)		()			
	Ans. (a)					
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47.	In plant layout, grea	ater flexiblility is	obtained in	case of			
	(a) process layout	(b) Product lay	vout	(c) Fixed pos	ition lay	out (d) Combi	nation layout
	Ans. (a)						
48.	If t_0 is optimistic tin by	me, t _p is pessimist	ic tme and t	is most likel	y time, t	hen the probailist	ic time is given
	(a) $(4t_0 + t_p + t_n)/6$	(b) $(t_0 + 4t_p + t_n)/6$	6	(c) $(t_0 + t_p + 4t_n)$)/6	(d) $(t_0 + t_p + t_n)/3$	
	Ans. (b)						
49.	A product can be p The second has a f methods is (a) 20	broduced by two r fixed cost of 2000 (b) 50	methods. Fir and variabl	st have a fixe e cost of 20. (c) 70	ed cost of The brea	of 1500 and varia akeven quantity b (d) 90	able cost of 30. between the two
	() _1	(0) 11					
	Ans. (b)						
50.	 Which one is not c (a) Determines the (b) Estabilishes price (c) Determines state (d) Useful in autom 	1500 + 30 1 orrect about critic status of each ac prities among vari- us of each activit nobile industry onl	x = 2000 x = 500 x = 50 x = 50 cal ratio scheetivity ous activities ty y	+ 20x eduling?			
	Ans. (d)						
51.	Just-in- requence to Which of following (a) PC	echniare register of the p (b) MAR	processor is	connected to	memory	Bus? (d) IR	
				(-)			
52.	Ans. (b)MAR is connected to the memory BUS in order to access the memory. The processor BUS is used to connected the various parts in order to provide a direct connection to the CPU.A box that can repsent two different condition in a flow chart.						
	(a) Circle	(b) Square		(c) Diamond		(d) Paralleogra	am
	Ans (c)						
	A diamond shape h	ox denotes either	a truth valu	ie or a false	value		
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JPSC	C-AE Exam da	ted : 19.01.2020 📏	ENGINEERS ACADEMY
53.	A flow chart that outlines the main segments	s of any program :	
	(a) Micro (b) Queue	(c) Macro	(d) Union
	Ans. (c)		
54.	Queing theory is associated with		
	(a) Production time (b) Waiting time	(c) Planning time	(d) Sales time
	Ans. (b)		
55.	Which one is a valid variable declaration in	FORTRAN?	
	(a) Real : Celcius (b) Real Celcius	(c) Celcius Real	(d) Real : : Celcius
	Ans. (d)		
56.	When the sleeve of a porter governer move	s upwards, the govener	speed
	(a) Decreases	(b) Increases	
	(c) Remain constant	(d) First increases,	then decrease
	Ans. (b)		
	When the sleeve of a porter governor move	s upwards, the governo	or speed increases
57.	An example of the delimiter in a FORTAN	program is	
	(a) Semi colon (b) Double colon	(c) Single colon	(d) Comma
	Ans. (d)		
	Delimieter is the comma character, which a value.	ects as a field delimiter	in sequence of comma-separated
58.	In order to balance receiprocating masses		
	(a) Only primary forces and couples must b	e balanced	
	(b) Only secondary forces and couple must	be balanced	
	(c) Both (A) and (B)		
	(d) None of (A), (B) or (C)		
	Ans. (c)		
59.	In high speed engines, the cam follower sho	uld move	
	(a) with uniform velocity	(b) in cycloidal mot	ion
	(c) in sample harmonic motion	(d) in circular motio	n
	Ans. (b)		
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Me	chanical Engineering (Technical)	Detailed Solutions	ENGINEERS ACADEMY
60.	A taper provided on the pattern for	its easy and clean withdrawa	al from the mould is known as
	(a) Shrinkage allowance	(b) Distortion al	lowance
	(c) Machining allowance	(d) Draft allowa	ance
	Ans. (d)		

61. A body is subjected to a direct tensile stress of 300 MPa in one plane accompanied by a simple shear stress of 200 MPa. The maximum shear stress will be

(a) 150 MPa	(b) 200 MPa	(c) 250 MPa	(d) 300 MPa
-------------	-------------	-------------	-------------

Ans. (c)

$$\begin{split} \sigma_{1,2} &= \frac{1}{2} \Big[(\sigma_x + \sigma_y) \pm \sqrt{(\sigma_x - \sigma_y)^2 + 4\tau_{xy}^2} \Big] \\ \sigma_y &= 0 \\ &= \frac{1}{2} \Big[300 \pm \sqrt{(300)^2 + 4 \times (200)^2} \Big] \\ &= \frac{1}{2} \Big[300 \pm \sqrt{90000 + 160000} \Big] \\ \sigma_{1,2} &= \frac{1}{2} \Big[(300 \pm 600) \Big] \\ \sigma_1 &= \frac{1}{2} \Big[(300 \pm 600) \Big] \\ \sigma_2 &= \frac{1}{2} \Big[-200 \Big] = -100 \,\text{MPa} \\ \sigma_2 &= \frac{1}{2} \Big[-200 \Big] = -100 \,\text{MPa} \\ \tau_{\text{max}} &= \frac{\sigma_1 - \sigma_2}{2} = \frac{400 + 100}{2} = 250 \,\text{MPa} \end{split}$$

The energy stored in a body when strained within elastic limit is known as

(a) Strain energy (b) Impact energy (c) Resilience (d) Elastic energy

Ans. (c)

62.

Resilience : Energy store within the elastic limit is know as resilience.

- 63. Screws used for power transmission should have
 - (a) fine threads (b) strong teeth (c) low efficiency (d) high efficiency
 - Ans. (d)

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JPS	C-AE	Exam dated	d : 19.01.2020	> e	NGINEERS A	ACADEMY
64.	Carnot cycle efficiency is ma	ximum when				
	(a) Initial temperature is 0 K		(b) Final tempe	erature i	s 0 K	
	(c) Initial temperature is 0 °C		(d) Final tempe	erature is	s 0° C	
_						
	Ans. (b)					
65.	A piston cylinder arrangemen	t has air at 600 k	Pa, 290 K and	volume	of 0.01 m ³ . Duri	ng a constant
	$(a) 0.10 \text{ m}^3 \qquad (b) 0.05$	m^3	$(a) 0.01 \text{ m}^3$		(d) 0.15 m^3	
		, 111	(c) 0.01 III		(u) 0.13 III	
	Ans. (a)					
		$P_{1} = 600$	kPa			
		$T_1 = 290$	k			
		$V_1 = 0.01$	m ³			
		$V_2 = ?$				
		w = pdv				
		$W = P \times 54 \times 10^3 = 600$	$\begin{bmatrix} \mathbf{v}_2 - \mathbf{v}_1 \end{bmatrix}$ $\times 10^3 \begin{bmatrix} \mathbf{V} - 0 \end{bmatrix}$)11		
		$V_{2} = 0.1$	m^3	,1]		
66.	Work done in a free expansion	on process is				
	(a) Positive (b) Neg	ative	(c) Zero		(d) Maximum	
	Ans. (c)					
67.	Flow work is analogous to					
	(a) Stirring work (b) Elec	etrical work	(c) Displaceme	ent work	(d) Shaft work	
	Ans. (c)					
	Flow work is the displacement	nt work done at th	e moving system	n bound	ary.	
68.	Which one of the following	represents the ener	gy in storage?			
	(a) Work (b) Hea	t	(c) Energy		(d) Internal ene	rgy
	Ans. (d)					
60	The short coming of first law	of thermodynami	os is			
07.	(a) Direction of process		(h) Possibility	of proce		
	(a) Direction of process		(d) Overtity			
	(c) Quality of energy		(d) Quantity of	energy		
	Ans. (a)					
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		_				

Med	hanical Engineering (Technical)	Detailed Solutions	ENGINEERS ACADEMY
70.	For a reversible process		
	(a) ds = $\frac{dQ}{T}$ (b) ds < $\frac{dQ}{T}$	(c) ds > $\frac{dQ}{T}$	(d) ds $\geq \frac{dQ}{T}$
	Ans. (a)		
71.	In a steady flow process, across the	control volume mass and en	ergy flow
	(a) Varies continuously	(b) Remain const	tant
	(c) Depends on control surface	(d) Depends on t	type of process
	Ans. (b)		
72.	A polytropic process with $n = -1$, ini m^3 . The work done is	tiates with $P = V = 0$ and end	nds with $P = 600$ kPa and $V = 0.01$
	(a) 2 kJ (b) 3 kJ	(c) 4 kJ	(d) 6 kJ
	Ans. (b)		
		$P_{\rm e}V_{\rm e} = P_{\rm e}V_{\rm e}$	
		$=\frac{1}{\eta-1} \frac{\eta-1}{\eta-1}$	
	\Rightarrow	$=\frac{-600\times0.01}{-2}=3$ kJ	
73.	A thermal reservoir is a body of		
	(a) Small heat capacity	(b) Large heat ca	apacity
	(c) Infinite heat capacity	(d) Large work a	capacity
	Ans (c)		
74.	For an ideal gas, enthalpy is represen	ted by	
	(a) $H = U - RT$ (b) $H = U + R'$	$\Gamma \qquad (c) H = RT - U$	(d) $H = -(U + RT)$
	Ans. (b)		
75.	Ammonia has a boiling point of		
	(a) -33.3 °C (b) -43.3 °C	(c) -53.3 °C	(d) -63.3 °C
	Ans. (a)		
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JPSC	C-AE	Exam dated	l : 19.01.2020 🗡 e	ENGINEERS ACADEMY
76.	If the pressure range	e of compressor is low, the	n the COP will be	
	(a) low	(b) high	(c) remains unchanged	d (d) Cannot be determined
	Ans. (b)			
77.	The convective heat	transfer coefficient does n	ot depend on	
	(a) surface type	(b) surface orientation	(c) surface material	(d) surface area
	Ans. (a)			
78.	Gas turbines are pre	eferred in aircraft propulsion	n, due to	
	(a) The are heavy		(b) They have low po	ower to weight ratio
	(c) They have high	power to weight ratio	(d) They are efficient	
	Ans. (c)			
79.	During steady state distribution is	heat transport in a thin plat	te with uniform tempera	ature, the nature of temperature
	(a) Parabolic	(b) Logarithmic	(c) Linear	(d) Exponential
	Ans. (c)			
80.	A long conduit of 4	cm outer diameter is carry	ving steam. Currently it	is insulated with 20 mm thick
	insulation. Additiona	l insulation required to redu	ce the heat loss by two	o third is
	(a) 90 mm	(b) 110 mm	(c) 120 mm	(d) 140 mm
	Ans. (*)			
81.	Among the following	g, the best insulator is		
	(a) Air	(b) Water	(c) Ash	(d) Aluminium
	Ans. (a)			
82.	In lumped capacity	heat transfer model, the va	riation of temperature	with time is
	(a) Linear	(b) Parabolic	(c) Exponential	(d) Hyperbolic
	Ans. (c)			
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Med	hanical Engineering (Technical) Detailed	Solutions	NGINEERS ACADEMY
83.	The ratio between emissive power and intensity	of normal radiation is	
	(a) π (b) $\pi/2$	(c) $2/\pi$	(d) $\pi/3$
	Ans. (a)		
84.	For an infinitely long fin, efficiency is given by		
	1 2	1	3
	(a) $\frac{mL}{mL}$ (b) $\frac{mL}{mL}$	(c) $\overline{2mL}$	(d) $\frac{1}{mL}$
	Ans. (a)		
85.	Two infinte paralle plate are kept at a distance	, Y, The value of shape	e factor is
	(a) zero (b) one	(c) Y	(d) Infinity
	Ans. (b)		
86.	A solar thermal operated vapour absorption sys	tem is capable of	
	(a) Continuous and intermittent operation	(b) both continuous an	d intermittent operation
	(c) No operation	(d) Intermittent operation	ion
	4 mg (d)		
	Ans. (a)		
87.	For an incompressible fluid, the density		
	(a) Varies with temperature only	(b) Varies with pressu	re only
	(c) Varies with both pressure and temperature	(d) Remain constant	
	Ans (d)		
88.	In what form solar energy is radiated from the	Sun?	
	(a) Ultraviolet radiation	(b) Infrared radiation	
	(c) Electro magnetic waves	(d) Transverse waves	
	Ans. (c)		
89.	Newtonian fluids are the one which		
89.	Newtonian fluids are the one which (a) Obeys Newton's law of viscosity	(b) Obeys Hoook's law	W
89.	Newtonian fluids are the one which (a) Obeys Newton's law of viscosity (c) Obeys Willianmson's law	(b) Obeys Hoook's law (d) Obeys power law	W
89.	Newtonian fluids are the one which (a) Obeys Newton's law of viscosity (c) Obeys Willianmson's law <i>Ans. (a)</i>	(b) Obeys Hoook's law (d) Obeys power law	W
89.	Newtonian fluids are the one which (a) Obeys Newton's law of viscosity (c) Obeys Willianmson's law <i>Ans. (a)</i>	(b) Obeys Hoook's law (d) Obeys power law	w

JPSC	C-AE	Exam dated	: 19.01.2020	ENGINEERS ACADEMY
90.	Which fluid does not experie (a) Dillatant (b) Bing	ence stress during gham	flow? (c) Viscoplastic	(d) Inviscid
	Ans. (d)			
91.	A beaker contains water upto (a) h/3 from top (b) h/2	h height. The loc from top	ation of centre of pre (c) 2h/3 from top	(d) 3h/4 from top
	Ans. (c)			
92.	In a flow field, streemlines an (a) Parallel to each other (c) Intersect each other at an	nd equipotential lin cute angle	e are (b) Perpendicular to (d) Intersect at obtus	each other se angle.
	Ans. (b)			
93.	For an inclined plane for whi (a) Horizontal (b) Vert	ch postion, maximi	um total pressure max (c) Skewed	imum total pressure acts on it? (d) Inclined
	Ans. (d)			
94.	Which one of the following is (a) Alcohol (b) Wat	s an example of m	agneto fluids? (c) Liquid metal	(d) Ethylene Glycol
	Ans. (b)			
95.	Which one of the following r (a) Kaplan turbine (b) Pelt	needs maximum he on turbine	ad? (c) Francis turbine	(d) Reaction turbine
	Ans. (b)			
96.	Which one of the following is (a) Inviscid (b) Inco	s not a case of ide ompressible	al fluid flow ? (c) Forced vortex flo	ow (d) Super critical flow
	Ans. (c)			
97.	Generally runner blades are n (a) Cast Iron (b) Cas	made of t Steel	(c) Mild Steel	(d) High Carbon Steel
	Ans. (c)			
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(a)
$$W(V_{w1} + V_{w2})\frac{u}{g}$$
 (b) $W(V_{w1} - V_{w2})\frac{u}{g}$ (c) $(V_{w1} - V_{w2})\frac{u}{g}$ (d) $(V_{w1} + V_{w2})\frac{u}{g}$

Ans. (a)

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