(06 Marks)

USN		7			

	3	First/	Second Semes	ter B.E. Degr	ee Examination,	Dec.us/Jan.	09
			Elements	of Mecha	nical Enginee	ring	
			The state of the s	\times			
Tin	ne. 3	hrs.		*** (3)		Max. Ma	arks:100
	te: 1. 2. 3.	Answi Answi Answi	er all objective type	pe questions oni pe questions sho	ting at least TWO qu y in first & second w all not be repeated.	estions from e vriting pages.	ach part.
				PART	_ A		
126	16	ALSS.	se the correct answ	3			(04 Marks)
1	a.	(i) (ii)	The centrifugal another bulge rise (A) Lunar Tides The process in w	forces generated on this side of the (B) Earth Qua which, using the pa	kes (C) Volcanoe rinciple of photovoltaid	s (D) None.	
		œ.	(A) Helio Therm (C) Mechanical p		(B) Helio Electrica (D) None.		
		(iii)	Babcock and Wil	cox Boiler is	CONTROL TO U.S. C.	r. 1	
		(111)	(A) Low	(B) Hìgh	(C) Medium	(D) None.	
	020 m	(iv)	Actual energy sto	ored in the steam is	s called as		
			(A) Internal later (C) Internal energy	it heat	(B) Sensible heat (D) latent heat of I	evaporation.	
	ь.	With	neat sketch explain	n working of Land	hashire bo <mark>iler & als</mark> o s	how the path of	f flue gases (10 Marks)
		Espor	wall 3 views.)	sold he required to	produce 4 kg of steam	at a pressure o	f 6 bar and
	C.	temp	evalure of 250°C	from water at 30	0° C? Take $C_{pg} = 2.2$ /kg, $h_{fg} = 2085$ kJ/kg, $T_{fg} = 2085$ kJ/kg, $T_{fg} = 2085$	KIIKEN. Specia	fic heat of (06 Marks)
							(04 Marks)
2	a.		se the correct answ	er:	nters in the turbine blad	es where it unde	
		(i)	The high velocit	y steam particle es	(B) Change in dir	ection of motion	
			(A) Change in m	omenium	(D) None.		
		02202	(C) Change in ki	nenc energy			266
		(ii)	Kaplan turbine i	sa	(B) High head rea	ection	
			(A) Low head re	action	(D) Fire tube	10000000	
		,	(C) Impulse	om in coveral class			
		(iii)	Expansion of steam in several stag (A) Open cycle gas turbine		(B) Closed cycle	gas turbine	
			(C) Compounding	gas turome	(D) Impulse wate	r turbine.	
		ries.	(C) Compound	g in which the heat t	mergy of the steam is to	ansformed in to	mechanical
		(iv)	A prime mover	n the form of rola	y motion is called	negati wie felikaanse kerken in de 19	
			(A) Generator	(B) Alternator	(C) Steam turbine	(D) IC Engine.	
	**	317511	mant skatah avalai	n working of prese	sure - velocity compour	nding.	(06 Marks)
	b	M) LU	rentiate between h	moulse and Reacti	on turbine.	252	(04 Marks)
	C.	Dim	or cittlate octaveed in	A STATE OF THE PARTY OF THE PAR		2892 0	m6 Marks)

4) The wave function for the motion of particles in one dimensional potential box of
length a is given by $\psi_0 = D \sin \frac{n\pi}{2} x$. Where D is the normalization constant. The
value of D is
i) $\frac{1}{a}$ ii) $\sqrt{\frac{2}{a}}$ iii) a iv) $\sqrt{\frac{a}{2}}$ (04 Marks)
Set up time independent schrodinger wave equation, (06 Marks)
Write the physical significance of wave function. (04 Marks)
A quantum particle confined to one dimensional box of width 'a' is in its first excited state.
What is the probability of finding the particle over an interval of (a/2) marked
symmetrically at the centre of the box? (06 Marks)
 If the mobility of electron in a metal increases the resistivety. i) Decreases ii) Increases iii) Remains constant iv) none of these Ohms law relates to the electric field E, conductivity σ and current density J as i) J = G ii) J = σ.Ε
3) The average drift velocity Vd of electrons in a metal is related to the electric field E
and collision time r as
i) $\sqrt{\frac{eE\tau}{m}}$ ii) $\sqrt{\frac{m}{eE\tau}}$ iii) $\frac{eE\tau}{m}$ iv) $\frac{m}{eE\tau}$.
Vm γeEτ m eEτ
4) Experimentally specific heat at constant volume CV is given by
i) $\frac{3}{2}$ R ii) 10^4 RT iii) $\frac{2}{3}$ R iv) 10^4 R. (04 Marks)
2 10 10 10 11 11 11 10 10 10 10 10 10 10
Write down the assumptions of classical free electron theory. Explain failure of classical free electron theory. Find the temperature at which there is 1% probability that a state with an energy 0.5ev above fermi energy is occupied. (06 Marks)
 The unit of dipole moment / unit volume is i) Coulomb / metre ii) Coulomb / metre² iii) coulomb / metre³ iv) Coulomb. The flux density is related to the electric field as
i) $D = \varepsilon + E$ ii) $D = \varepsilon - E$ iii) $D = \frac{\varepsilon}{E}$ iv) $D = \varepsilon E$.
 3) In a solid or liquid dielectric with external applied electrical field, as the electronic polarizability σ_c increases the interval field E_i. i) Increases ii) Reduces iii) Remains constant iv) none of these.
4) In a dielectric, the polarization is
i) Linear function of applied field ii) Square function of applied field
iii) Exponential functions of applied field iv) Logarithmic function of applied field.
(04 Marks)
Derive an expression for internal field in case of one dimensional array of atoms in
dielectric solids. (06 Marks)
Describe Ferro electrics. (04 Marks)
Sulphur is elemental solid dielectric whose dielectric constant is 3.4. Calculate electronic plarizability if its density is 2.07× 10 ³ kg/m ³ and atomic wt is 32.07. (66 Marks)
<u>PART – B</u>

b. c. d.

a.

b. c. d.

a.

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c. d.

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The emission of photon without being aided by any external agency is called

i) Light amplification ii) Induced absorption iii) Stimulated emission iv) Spontaneous emission.

(i) Grinding is also called as (A) Twisting (B) Honing (C) Lapping (D) Abrassive machining (ii) In	6	a	Cho	ose the correct ansv	ver :				(04 Mark		
(ii) In			(i)	Grinding is also	called as				10/2-0-2-37		
(ii) In				(A) Twisting	(B) Honir	ng (C) Lapping	(D) Abrassi	ve machining		
tangential velocity. (A) Horizontal milling (B) Vertical milling (C) Down milling (D)Up milling (iii)			(ii)	In Proc	ess the workpied						
(A) Horizontal milling (B) Vertical milling (C) Down milling (D)Up milling (iii) is the type of artificial abrassive. (A) and stone (B) Corundum (C) Emery (D) Aluminium oxide (iv) Irregular shape of machining is done in (A) Angular milling (B) Form milling (C) Gang milling (D) End milling b. Draw the neat sketch of Horizontal milling machine & explain parts. (08 Marks) c. With neat sketch explain centerless grinding process & also cylindrical grinding process (88 Marks) 7 a. Choose the correct answer: (04 Marks) (i) The hard filler material used in Brazing is (A) Solder (B) Flux (C) Spelter (D) Electrode (ii) Resistance of lubricating oil to flow is (A) Porosity (B) Electricity (C) Viscosity (D) None. (iii) French chalk is (A) Filler material (B) Flux (C) Lubricant (D) Solder (iv) Support provided for rotating shaft is (A) Bearing (B) Lubricant (C) Axle (D) Hook. b. Explain with neat sketch flame characteristics of oxy-acetylene gas welding. (08 Marks) c. Explain with neat sketch plummer block (08 Marks) 8 a. Choose the correct answer: (04 Marks) (i) For converting rotary motion in to rectilinear motion type of gear used is (A) Spur gear (B) Rack & penion (C) Spiral gear (D) Bevel gear. (ii) In an open belt drive, to increase the arc of contact of the belt and driven pulley			그는 그								
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3 of 3