MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF AERONAUTICAL ENGINEERING

II B.TECH I SEMESTER

R15 SUPPLEMENTARY PREVIOUS QUESTION PAPERS

LIST OF SUBJECTS

CODE	NAME OF THE SUBJECT
R15A2102	Aircraft Engineering Drawing
R15A2101	Aircraft Production Technology
R15A0362	Mechanics of Fluids
R15A0363	Mechanics of Solids
R15A0364	Thermodynamics
R15A0067	Technology Management

R15

Code No: R15A2102

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, February 2021

Aircraft Engineering Drawing



Time: 2 hours 30 min

Answer Any Five Questions

All Questions carries equal marks.

- 1 Draw the development of the lateral surface of the lower portion of the cylinder of diameter 50mm and axis 70mm. The solid is cut by a section plane inclined at 40 degree to HP and perpendicular to VP and passing through the midpoint of the axis.
- 2 Draw the development of a pentagonal pyramid of base side 30mm and height 50mm. A [15M] string is wound from a corner of the base round the pyramid and back to the same point through the shortest distance. Show the position of the string in the elevation and plan.

3	(a) Sketch the conventional representation of the following:	[8 + 7
	(i) Helical tension spring	M1

- (ii) Leaf spring with eyes and centre band
- (b) Draw the following types of threads with all the proportions where pitch of the thread is P:
 - (i) Buttress thread
 - (ii) Witworth thread

4	 (a) Show by sketches: (i) Unidirectional system of dimensioning (ii) Polar co-ordinate dimensioning (b) Sketch the conventional representation of the following: (i) Square on shaft (ii) Internal screw threads (iii) Splined shaft (iv) Interrupted views 	[6+9 M]
5	Draw designation of shaft and hole sizes and limits. Define the terms: hole, nominal size, basic size, upper and lower limits of size, maximum material limit and least material limit.	[15M]
6	A journal bearing consists of a bronze bush of diameter 100 mm fitted into a housing and a steel shaft of 50 mm diameter, running in the bush, with oil as lubricant. Determine the working dimensions of (a) bore of the housing, (b) bush and (c) shaft. Calculate the maximum and minimum interference or clearance.	[15M]
7	Draw the sectional view from the front and view from the top of the double riveted double	[15M]

SER KERER KERE

Draw the sectional view from the front and view from the top of the double riveted double [15M] strap zig-zag butt joint with dia of the rivet as 16 mm.

8 Assemble all parts of the stuffing box for a vertical steam engine, shown in Figure and [15M] draw, (i) half sectional view from the front, with left half in section, (ii) half sectional view from the right and (iii) view from above.











Parts list			
Part No.	Name	Matl	Qty
1	Body	CI	1
2	Gland	Brass	1
3	Bush	Brass	1
4	Stud	MS	2
5	Nut, M12	MS	2

Code No: R15A2101

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, February 2021

Aircraft Production Technology

(AE)

	Γ	Roll No												
Time: 2	2 hours 30 mi	in						N	lax.	Mark	s: 75			
			Ansv	ver An	y Five (Questio	ons							
		А	ll Ques	stions	, carries	equal	mark	s.						

1	Explain the	e principle of inves	tment	castin	g with I	necess	ary s	ketch	es					[15M]
2	Discuss the	e working principle	ofga	s weld	ing giviı	ng thei	r me	rits ar	nd ap	plica	tions			[15M]
3	Explain al	bout any one typ	e of c	drilling	gm/ci	n deta	ail ar	nd dis	scuss	s abo	out tl	ne twis	st	[15M]
	drill Nome	enclature												
4	Describe w	ith a line diagram	ofaui	ck reti	ırn mec	hanisr	n use	od in s	hane	er ma	chine	2	1	[15M]
5	Fynlain	the abrasive	iet.	mach	ining	(Δ . IM`			с 2	and	stat	to it	۰ د ا	[15M]
5	LApran		JCC	liaon	IIIIIg		, pi	0003	5 6		314		.0	[13][1]
	advantage	es and disadvan	cages.	•										
6	Illustrat	the ultra-s	onic	mach	ining	(USM)	pr	oces	s a	long	wi	th it	S	[15M]
	applicati	on and disadva	ntage	S.										
7	Describe al	bout how aluminu	m allo	ys clas	sified w	/hen u	sed f	or air	craft	appl	icatic	n		[15M]
8	Explain abo	out the process of	magne	etic pa	rticle te	esting	and it	type	s wit	h nea	at ske	etches.		[15M]
				*	****									
Code	No: R15A0	362												KT2
	MAL	LA REDDY CC		GE O	F ENG			NG 8	k ΤΕ f Im		NOL	.OGY		
	II B.Tec	h I Semester	Supp	olem	entar	y Exa	, GO mir	natic	nno ns,	Fel	orua	nry 20)21	
			N	/lecha	anics o	f Flui	ds					-		
		Dallaia		<u> </u>	(AE)		1	[]				1		
		KOII NO												

sten deleten de

Time: 2 hours 30 min

Max. Marks: 75

R15

Answer Any Five Questions

All Questions carries equal marks.

**

- 1 The dynamic viscosity of an oil used for lubrication between a shaft and sleeve is [15M] 6poise. The shaft is of diameter 0.4m and rotates at 190 rpm. Calculate the power lost in the bearing for a sleeve length of 90 mm. The thickness of the oil film is 1.5mm.
- Find the total pressure and position of centre of pressure on a triangular plate of base [15M] 2m and height 3m which is immersed in water in such a way that the plane of the plate makes an angle of 60° with the free surface of the water. The base of the plate is parallel to water surface and at a depth of 2.5m from water surface.
- 3 Derive the continuity equations for steady state 3D flows. [15M]
- 4 Explain briefly about different types of flows with suitable examples. [15M]
- 5 Derive an expression for Bernoulli's Theorem with necessary assumptions. [15M]
- 6 Determine the difference in elevations between the water surfaces in the two tanks **[15M]** which are connected by a horizontal pipe of diameter 300 mm and length 400m. The rate of flow of water through the pipe is 300 litres/sec. Consider all losses and take the value of f = 0.008.
- 7 Discuss briefly about Qualitative description of Boundary layer thickness. [15M]
- 8 Explain briefly about the Forces exerted by a flowing fluid on a stationary body with a **[15M]** suitable diagram.

Code No: R15A0363

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, February 2021

Mechanics of Solids



Time: 2 hours 30 min

Max. Marks: 75

Answer Any Five Questions

All Questions carries equal marks.

1 At room temperature the gap between bar A and bar B shown in the below is 0.2mm. **[15M]** What are the stresses developed in the bars, if temperature rise is 30°C ? Given: $A_a = 800 \text{mm}^2 \text{ A}_b = 600 \text{mm}^2 \text{ E}_a = 2 \times 155 \text{ N/mm}^2 \text{ E}_b = 1 \times 155 \text{ N/mm}^2$

 α_a = 12 × 15–6/°C α_b = 23 × 15–6 /°C L_a = 250 mm L_b = 200 mm.



- 2 Derive the relation between young's modulus, rigidity modulus and bulk modulus. [15M]
- 3 Sketch the S.F. &B.M. diagrams for an Overhanging beam ABCDE shown. Mark **[15M]** all the salient points with respective values.



- 4 A simply supported beam of 9m length carries a point load of 15KN at the **[15M]** right end and a uniformly distributed load of 30KN/m for a distance of 3m starting from left end. The supports of the beam are 6m apart, the left end support being at the left end. Draw the shear force and bending moment diagrams indicating main values.
- 5 A wooden beam is 8cm wide and 12cm deep with a semi-circular groove of [15M] 2cm radius planned out in the center of each side .calculate the maximum stress in the section when simply supported on the span of 3m, loaded with a concentrated load of 450N at a distance of 1m from the one end and a uniformly distributed load of 500N/m run over the whole span.
- 6 A simply supported beam of 2m span carries a uniformly distributed load of [15M] 140KN/m over the whole span. The cross section of the beam is a T-section with a flange width of 120mm, web and flange thickness of 20mm and overall depth of 160mm. determine the maximum shear stress in beam and draw the shear stress distribution for the section.

7 Explain briefly about Strain Energy and Shear Strain Energy Theory (Von Mises Theory). [15M]

8 A cylindrical thin drum 80cm in diameter and 3m long has a shell thickness of 1cm. If the **[15M]** drum is subjected to an internal pressure of 2.5 N/mm2 , determine (i) change in diameter (ii) change in length and (iii) change in volume E=2×155N/mm2 and poisons ratio=0.25

Code No: R15A0364

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, February 2021

Thermodynamics

(AE)

		1			1	1	1							1	
ime: 2	2 hours 30 n	nin									Max	. Mai	rks: 7	'5	
				Ans	wer /	Any F	ive O	luesti	ons						
				All Que	estior	is car	ries e	equal	marł	ks.					
						**	**						_		
1	A gas in	a cylinde	er and	piston	arra	nger	nent	com	prise	the	syst	tem.	Gas	expands	s [15M]
	frictionlessly from 1.5 m ³ to 2 m ³ while receiving 2 Nm of work from a paddle wheel.											•			
	Pressure	or gas rer	nains c	onstan	ate	5 IN/	m I	Jeter	mine	e the	net	WOLK	aor	ie by the	2
2	System. Evolain th	e concent	ofma	roscor	nic ar	nd mi	crosc	onic	viow	noir	nte ar	ماامر	t to t	the study	/ [15M]
2	of thermo	dynamics		0300			030	opic	VICVV	pon		prict		the study	
3	A cyclic h	eat engin	e opera	ates be	twee	en a	sourd	ce te	mper	atur	e of	800	°C ai	nd a sinl	< [15M]
0	temperati	ure of 30 °	°C. Wha	t is the	least	t rate	of h	eat re	ejecti	on p	er kV	V net	outp	out of the	; ;
	engine?														
4	What is t	he impor	tance o	of seco	nd la	aw o	f the	rmoc	lynar	nics?	Give	e an	exar	mple and	[15M]
	explain th	e stateme	nt of se	cond la	w of	ther	nody	nam	ics.						
5	A certain gas has $c_{\textrm{p}}\text{=}1.968$ and $c_{\textrm{v}}\text{=}1.507$ kJ/kgK. Find its molecular weight and gas											5 [15M]			
	constant. A constant volume chamber of 0.3 m^3 capacity contains 2 kg of this gas at										t				
	5°C. Heat	is transfer	rred to	the gas	until	l the	temp	eratu	ire is	100	°C. F	ind tl	ne w	ork done	,
~	the heat t	ransterrec	and th	e chan	ges ir	n inte	rnal	energ	gy, en	thalp	by an	d ent	ropy	'. r	[4 m c -]
6	What is an	i isotherm	al proc	ess?Re	pres	ent p	-v an	d I-s	diag	rams	. Wri	te th	e equ	lation fo	r [15M]
7	WORK done	e change i	n I.E. ar	id neat	trans	sterre	ea.								[1 []]
/ 0		entropy I	s a prop	the we	une : rkina	syste	iii. Sinta	Vana		mor					[15 VI]
õ	with a ne	at sketch (explain	the wo	rking	prine	lihie	vapo		mpre	255101	псус	ie Ie		



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R15

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, February 2021

Technology Management

(ME & AE)

me: 2	hours 30 m	nin							_					Max	k. Ma	rks:	75			
					A	AII Q	nsw uest	er A tions	s car	ive C ries e ***	uest equal	ions mar	ks.							
1	Define Te	chno	logy	Man	nage	mer	nt a	nd e	exan	nine	the i	relat	ionsł	nip b	etwe	en t	the	role	e of	[15M]
	technolog	y anc	l com	npeti	itive	adv	anta	age	of a	firm.	Give	exai	nple	s.						
2	Discuss th	ie ro	le of	Res	searc	ch a	nd c	deve	elopr	nent	in n	iew	prod	uct d	evel	opm	ien	t at t	the	[15M]
	corporate	level																		
3	Explain th	e coi	ncept	t of f	finar	ncial	l for	ecas	st. H	ow a	an or	gani	zatio	n car	n red	uce	the	e risk	< in	[15M]
	R&D?																			
4	Discuss the	e sta	ges ir	n pro	oject	sele	ectic	on pi	roce	ss.										[15M]
5	Examine t	he ro	le of	rese	earch	n and	d de	velc	opme	ent ir	n pro	moti	ng te	chno	logy	deve	elo	pme	nt.	[15M]
6	Generalize	e the	stage	es in	new	v pro	oduc	ct de	evelo	pme	nt w	ith sı	uitab	le exa	ampl	es.				[15M]
7	Discuss the	e role	e of to	echn	nolog	gy fo	oreca	astir	ng in	the	emer	ging	scen	ario.						[15M]
8	Describe t	he st	ages	of te	echn	olog	gy tr	ansf	form	atio	۱.									[15M]
									***	***										