No of printed pages: 2

SEAT	No.
------	-----

#### SARDAR PATEL UNIVERSITY

[59]

### M.Sc. 2<sup>nd</sup>Semester (Surface Coating Technology) (CBCS) Examination Tuesday, 11<sup>h</sup> April, 2017

	Tuesday, 11 <sup>h</sup> Apr	il, 2	<u>2017</u>	
- 1	PS02CSCT01: Polymer Physics 8	& Pr	operties of Polymer	
Time:	10:00 am to 1:00 pm		Marks	: 70
N.B.	1) Marks allotted to the question are on its RHS			
	2) Illustrate your answer whereas necessary with the	e he	Ip of heat sketches and chemical equal	tion
Q.1	Choose the correct Answer from the Followin	ıgs:		
1.	Which one of the following statements is true?			[01]
	a) Gutta-percha exhibits rod-like	b)	Gutta-percha exhibits elastic like	
	structure and more crystalline		structure and more crystalline	
•	c) Gutta-percha exhibits rod like	d)	Gutta-percha exhibits elastic like	
	structure and more amorphous		structure and more amorphous	
2.	Which one of the following statements is true?			[01]
	a) A London dispersion force exists in	b)	A London dispersion force exists in	
	Low Polar polymers		Highly Polar polymers	
	c) A London dispersion force exists in	d)	A London dispersion force exists in	
	Medium Polar polymers		Non-Polar polymers	
3.	When a polar molecule lies adjacent to a non	-		[01]
	polar molecule tends to induce some electron			
	polar molecule creating a weakfo			
	a) London dispersion	-	Hydrogen bond	
4	c) Permanent dipoles	,	Induced diploes	F047
4.	In coating application, polar groups in the poly	/me	r tend to offent toward a metal	[01]
	substrate and thus produce optimum  a) Permeability	h)	 Viscosity	
	c) Adhesion	•	Friction	
· 5.	Which one of the following statements is not falso		Hodon	[01]
-	a) Tg of Polyethylene is +150°C		Tg of Polyethylene is -125°C	71
	· · · · ·	•	Tg of Polyethylene is -69°C	
6.	The absence of Long range order and owing to o	,	• • •	[01]
	motion, the molecules lose their mobility and the			
	called as			
	a) Super cooled Liquid	b)	Super-hot liquid	
·	c) Hydrodynamic volume	d)	Pore volume	
7.	Which one of the following statements is not falso	e?		[01]
	<ul> <li>a) A polymer capable of exhibiting</li> </ul>	b)	A polymer capable of exhibiting	
	long-range order is called as		long-range order is called as	
	Amorphous State.		Crystalline State.	
	c) A polymer capable of exhibiting	d)	A polymer capable of exhibiting	
	long-range order is called as Gas		long-range order is called as	
	State.	•	Liquid State.	FO 43
8.	9			[01]
	a) A crystalline polymer is made to	b)	A crystalline polymer is made to	
	exist in a glassy state by rapidly cooling its melt to a very low		exist in a glassy state by rapidly	
	temperature without allowing		heating without allowing enough	
÷	enough time to orient and form		time to orient and form crystallites	
	crystallites called as Quenching		called as Quenching	
	c) A amorphous polymer is made to	d)	A crystalline polymer is made to	
	exist in a rubbery state by rapidly	,	exist in a rubbery state by rapidly	

Q.2	cooling its melt to a very low temperature without allowing enough time to orient and form crystallites called as Quenching  Answer any Seven of the Followings:  cooling its melt to a very low temperature without allowing enough time to orient and form crystallites called as Quenching	[14]
	a. Two polymer samples can have the same chemical structure and almost similar	
	molecular weight distribution but may have different properties.	
	b. What is Grafting? Explain by giving suitable example.	
	c. Explain Viscoelastic Deformation.	
	d. Normally the polymer solution possesses high viscosity.	
	e. Write down the characteristics properties of a Good Plasticizer with example.	
	f. Give Classification of Adhesives by polarity giving suitable examples.	
	g. An ordinary rubber ball if cooled below - 70°C becomes so hard and brittle that it	
	will break into pieces like a glass ball falling on a hard surface!	
	h. Permeability is an important property which is affected by crystallinity.	
	i. Aromatic groups in a polymer backbone increase the thermal stability.	
Q.3 a.	Discuss in brief about co-polymerization.	[06]
	Classify and explain the polymers on the basis of Chemical and Geometrical structures.	[06]
	OR	
· .	What are Stereo-regular polymers? Draw structural formula indicating the stereo	[06]
b.		[OO]
	regular chain configuration in	
e de la companya de La companya de la co	(1) Atactic Polystyrene (2) Isotactic Polystyrene	
	(3) Cis, 1-4 Polyisoprene (4) Trans, 1-4 Polybutadiene.	
Q.4 a.	What are the factors affecting Glass transition temperature of a Polymer? Explain by	[06]
	giving the examples.	
b.	What is the importance of Tg? Calculate Tg of a copolymer with 30% Styrene, 40%	[06]
	MMA and 30 % Butyl acrylate. (Tg of Styrene= 100°C , MMA = 103°C, BA = - 54°C)	
	OR OR	
b.	Explain the concept of various transition states associated with low molecular weight	[06]
	compounds and polymeric materials.	
Q.5 a.	State various intermolecular forces and outline the effects of permanent dipoles on	[06]
	properties of polymers.	•
b.	Explain the process of polymer dissolution in detail.	[06]
	OR	[ne]
D.	What is H-bonding in polymer? Discuss the effect of Hydrogen bonding on the properties of polymers.	[06]
Q.6 a.		[06]
	stability.	[net
b.	Write a note on Antioxidants <b>and</b> Photo stabilizers used in Polymers.  OR	[06]
b.	Classification of Viscometer on the basis of their Rheological State	[06]
D.	- Classification of Modernote of the Sasie of their Middle Globe of the	K 3

			SEAT NO	SADDAD DATEL I		No of printed pa	ges: 2
	16	57	M.Sc. 2 <sup>nd</sup> Semeste	SARDAR PATEL U r (Surface Coating To	יואי ech	nology) (CBCS) Examination	
			tra di Cara de Maria de Ser	Thursday, 13 <sup>h</sup> A	pri	l. 2017	
	PS	302CS	CT02: Chemistry & T	echnology of Organ	ic F	Pigments, High Performance Pigme	nts,
			) am to 1:00 pm	Additives & So	olv	ents and a second se	
	N.B.	1) Mar	ks allotted to the ques	tion are on its RHS		Mari	ks: 70
		2) Illus	trate your answer who	ereas necessary with the	he I	nelp of heat sketches and chemical equ	ation
	Q.1	Cho	ose the correct Ans	wer from the Followi	nas	3.	<del></del>
						of the dispersing additives is due to	F0.43
			n) Nonionic Charge			Electro Charge	[01]
		C	) Anionic Charge			Electrostatic repulsion	
	2.		ers in a paint surface	can occur due to	ω,	Licotrostatic repulsion	F0.41
			) Poor Dispersion		h)	Auxiliary Drier	[01]
1 - 2			) Over spray			High viscosity	
	3.		· · · ·	igh performance pigm	u, ent	?	F0.47
		а	) Naphthol red AS	Owle an addition bigit		Pyrazolone orange	[01]
		C				Copper ferrocynide violet	
	4.	In the		nnoloav. Driers were	u) nre	***	FO 43
		octoa		37, 2110.0 11010	Pic	pare with other than	[01]
		. a	) Vanadates		h)	Oxides	
		c)	Naphthanates		145	Urethane	
4 1	5.		•	t has highest viscosity		orcularie	FO 47
			Paraffins	· ······ · ···························		Naphthenes	[01]
		c)	Aromatics			ketones	
	6.	Which	n of the following is vio		u)	Retories	FO.43
			Complex Napthol		h)	Diketa Purrala Purral (DDD)	[01]
		c)	Dioxazine		200	Diketo Pyrrolo Pyrrol (DPP) Azo Bona Pigment	
	7.		,			es of active drier	FO 43
			Solubility			Precipitation	[01]
		c)	Viscosity			Conjucation	
e de la Aug	8.	Which	solvents have most	poor hydrogen bondin	a?	Conjucation	F0.43
			Ketones		_	Esters	[01]
Artist a			Alcohols			Hydrocarbons	
	Q.2	Answ	er <u>any Seven</u> of the		ω,	Trydrocarboris	P.4. 43
				irement of drier to per	forr	n as drier?	[14]
				instability of pigment			
		C.	What is "Loss of Dry	"? Write Primary caus	68.	for Loss of Dry	
		· d.	Explain Intercoat adi	nesion with suitable fig	ıure	3.	
			4		,		

しょうし きんかん				
SEAT	No.	• •	- 7	
3 H A I	IVI			
V.S. 11 E.S.	4 T V *.	_	 •	 _

No of printed pages: 2

Marks: 70

### SARDAR PATEL UNIVERSITY

# M.Sc. 2<sup>nd</sup> Semester (Surface Coating Technology) (CBCS) Examination Monday, 17<sup>th</sup> April, 2017

PS02CSCT03: Coating Properties & Analysis of Coating Time: 10:00 am to 1:00 pm

	2) Illustrate your answer whereas necessary v	vith the h	elp of heat sketches and chemical equ	ation
<b>Q.1</b>	Choose the correct Answer from the Foll	owings:		-
1.	In cross-cut test 0 B =% area of re	moved		[01]
	a) 15 – 35 %	b)	less than 5%	
	c) 35 – 65 %	d)	None of them	
2.	Skinning phenomena is seen in	The Marian Section 1995		[01]
	a) Oxidative cured coating	b)	Baked alkyd amino coating	
	c) Non-convertible coating	d)	Latex paint	
3.	Which is the Surface related test?			[01]
	a) Dew Point	b)	Soluble Salts test	
	c) Wind Speed	d)	Relative Humidity	
4.	Readings at gloss head is related	l to sheer		[01]
	a) 20°	b)	85°	
	c) 60°	d)	None of them	
5.	Which of the force are not operated in adhes	sion of co	pating to mild steel substrate?	[01]
	a) Ionic	<b>b</b> )	Debey	
	e) London	d)	Keesom	
6.	Settling is not observed in			[01]
	a) Varnish	b)	Enamel	
	c) Sealer	d)	Primer	1
7.	Flocculation is in context to			[01]
	a). Breaking of emulsion	b)	Viscosity increases	
	c) Poor wetting of pigment	d)	Gloss	
8	Pick the odd one with respect to testing of co	oating.		[01]
	a) Density	b)	Cross-cut test	V Paris
	c) Viscosity	d)	% Solid	
).2	Answer Any Seven of the followings:			[14]
	1. Write about alkyd-amino stoving system	1?		
	2. What will be the theoretical WFT and DI	FT of a p	igmented coating which has	
	coverage of 20 m <sup>2</sup> /lit? (NVV <sub>x</sub> = 50%)			

How the results of cross-cut adhesion test are interpreted for 5B and 4B. Give the main six causes of the Coating failures. Give the classification of different Viscometer. What is Dew point? Explain its importance in coating application. What is shear thickening and shear thinning? What will be the effect of pigment dispersion on paint properties? List the surface temperature measurement instrument and explain any one. Explain the film formation in water based paint, stoving enamels and air drying [06]Q.3 (a) system by giving suitable example. [06]Explain in detail Cone and Plate viscometer. What is the cause and remedy of viscosity increases and poor drying phenomenon [06][06]Write about CIE theory of color measurement. (a) What is the difference between flexibility & elasticity? List the factor affecting [06](b) flexibility and how it is checked? [06]Enlist formulation related coating defect and explain any six. How solution for salt spray is prepared as per IS standard and discuss about working [06]of salt spray test. (b) What is the important of the gloss in coating and explain different gloss head use in [06]coating industry. What is the importance of the Q-Fog whetherometer in coating? Explain in detail. [06](b) Give the failure appearance, cause of failure and remedy for settling and gelling in [06]solvent base paints. (b) Give the remedy and cause for the following film defects: [06]Brush Mark, Ceasing, Fish Eye, Poor Adhesion, Wrinkling, Blisters (b) Enlist the different hardness test and explain in detail pendulum hardness test. [06] Time: 10:00 am to 1:00 pm

Marks: 70

### [43]

### SARDAR PATEL UNIVERSITY

## M.Sc 2<sup>nd</sup> Semester (Surface Coating Technology) (CBCS) Examination Wednesday, 19<sup>th</sup> April, 2017

PS02ESCT01: Chemical Engineering Operations

N.B.	<ol> <li>Marks allotted to the question are on its RHS</li> <li>Illustrate your answer whereas necessary with</li> </ol>	the help of heat sketches and chemical equatio	า
~ .	Cl. A savior from the Follow	inge.	
Q.1	Choose the correct Answer from the Follow	industries for handling paints and high	[01]
1.	The pumps are commonly employed i	if illidustries for nandring paints and mga	[~~]
	viscosity liquids.	b) centrifugal	
	a) diaphragm	, –	
	c) piston	d) gear	[01]
2.		t pressures from 2 atm. to several thousand	[ -1
5 E	atmospheres.	b) Blowers	
	a) Fans	d) None of these	
	c) Compressor Filters that remove small amounts of solids to	produce sparkling clear liquid are referred	[01]
- 3.		produce sparking cross require	
	as	b) clarifying filter	
4.	a) cake filter	d) both b & c	
	<ul> <li>c) deep bed filter</li> <li>The separation of liquid mixture is possible for</li> </ul>		[01]
4.	The separation of figure mixture is possible to	b) less than 1	
	a) greater than 1	d) none of these	
	c) equal to 1	d) Rone of Meso	[01]
<b>5.</b>	In vacuum distillation, substance boils at  a) its exact boiling point temperature	b) temperature slightly above its	
	a) his exact boiling point temperature	boiling point	
	c) a temperature below its boiling	d) under high pressures	
	point are machines employed for reduction of	of solids into definite shape & size.	[01]
0.	a) Crushers	b) Grinders	
	c) Ultrafine grinders	d) Cutters	
7	A plate and frame filter press is		[01]
	a) a continuous vacuum filter	b) a batch pressure filter	
	c) a continuous pressure filter	d) none of these	
Q	Which type of heat transfer is involved in co		[01]
. 0.	a) Conduction & Convection	b) Conduction	
	c) Radiation & Conduction	d) None of these	100
12 F.	Control of the contro		
	18 G. Amerikan di Karamatan Baran Bara Baran Baran Ba		
	O. C. Pile followings		[14]
Q.2	Answer Any Seven of the followings:  1. Why priming is required in centrifugal properties.	umn?	. ,
		uring selection of nump.	
	<ol> <li>Enlist various factors to be considered at</li> <li>Why Blake Jaw crusher is commercially</li> </ol>	widely used in industry?	
		duction operation.	:
1. Sec. 19	and the contract of the contra	no the rate of filtration.	e figure i
	7. Write signification of drying operation.	tion	
	8. Define conduction, convection and radia	uon.	

	• .		
1 1 2 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2			
Q.3	(a) (b)	Write in brief principle, construction and operation of ball mill. Explain principle, construction and working of Jaw crusher.	[06] [06]
per leder Maria and ex		$\mathbf{OR}$	ro 63
	(b)	Explain with neat diagram the working principle and industrial application of Gyratory crusher.	[06]
			1061
Q.4	(a) (b)	How pumps are classified? Write in detail about the centrifugal pumps.  Write about construction and working of reciprocating pumps.	[06] [06]
		OR	1073
	(b)	Write a note Diaphragm pump.	[06]
	(-)		
			ragi
Q.5	(a)	Write a note on rotary drum filter. What is drying? Explain typical rate of drying curve under constant drying condition.	[06] [06]
offsegger Alle Kort (1997) English	<b>(b)</b>	What is drying? Explain typical rate of drying curve under company.	
		OR	
	(1-)	Write a note on Plate & Frame filter press.	[06]
	(b)		
	en de la companya de		
0.6	(a)	Write a note on Azeotropic distillation.	[06]
	(b)	Derive the equation for heat flow through cylinder by conduction.	[06]
		OR	10.61
	 (b)	Explain in brief classification and flow patterns of impellers.	[06]
	(b)	Explain in other enables and the second seco	