POST GRADUATE COMMON ENTRANCE TEST-2016

DATE and TIME	1	COURS	E	POLYMER SCIENCE & TECHNOLOGY	
03-07-2016 2.30 p.m. to 4.30 p.m.	co	J/UVCE/U	red by		
MAXIMUM MARKS	TOTAL D	TOTAL DURATION		M TIME FOR ANSWERING	
100	150 Mi	inutes	120 Minutes		
MENTION YOUR PG	CET NO.	0	BOOKLET DETAILS		
		VERSION	CODE	SERIAL NUMBER	
		A -	1	210006	

DOs:

- Check whether the PGCET No. has been entered and shaded in the respective circles on the OMR answer sheet.
- Ensure whether the circles corresponding to course and the specific branch have been shaded on the OMR
- This Question Booklet is issued to you by the invigilator after the 2nd Bell i.e., after 2.25 p.m.
- The Serial Number of this question booklet should be entered and the respective circles should also be shaded completely on the OMR answer sheet.
- The Version Code of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely on the OMR answer sheet.
- Compulsorily sign at the bottom portion of the OMR answer sheet in the space provided.

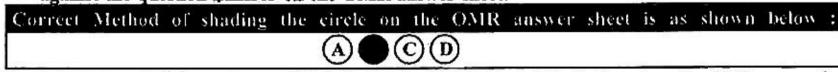
- THE TIMING AND MARKS PRINTED ON THE OMR ANSWER SHEET SHOULD NOT BE DAMAGED/MUTILATED/SPOILED.
- The 3rd Bell rings at 2.30 p.m., till then;

 Do not remove the paper seal / polythene bag of this question booklet.
 - Do not look inside this question booklet.
 - Do not start answering on the OMR answer sheet.

IMPORTANT INSTRUCTIONS TO CANDIDATES

- This question booklet contains 75 (items) questions and each question will have one statement and four answers.
- (Four different options / responses.)
 After the 3rd Bell is rung at 2.30 p.m., remove the paper seal / polythene bag of this question booklet and check that this booklet does not have any unprinted or torn or missing pages or items etc., if so, get it replaced by a complete test booklet. Read each item and start answering on the OMR answer sheet.

 During the subsequent 120 minutes:
- - Read each question (item) carefully.
 - Choose one correct answer from out of the four available responses (options / choices) given under each question / item. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose only one response for each item.
 - Completely darken / shade the relevant circle with a BLUE OR BLACK INK BALL POINT PEN against the question number on the OMR answer sheet.



- Use the space provided on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
- After the last Bell is rung at 4.30 pm, stop marking on the OMR answer sheet and affix your left hand thumb impression on the OMR answer sheet as per the instructions.
- Handover the OMR ANSWER SHEET to the room invigilator as it is.
- After separating the top sheet (KEA copy), the invigilator will return the bottom sheet replica (Candidate's copy) to you to carry home for self-evaluation.
- Preserve the replica of the OMR answer sheet for a minimum period of ONE year.
- Only Non-programmable calculators are allowed.

Marks Distribution

50 QUESTIONS CARRY ONE MARK EACH (1 TO 50) 25 QUESTIONS CARRY TWO MARKS EACH (51 TO 75)







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POLYMER SCIENCE AND TECHNOLOGY PART-1

Each question carries one mark. $(50 \times 1 = 50)$

property?	variable?
(A) Pressure	(A) Work
(B) Mass	(B) Temperature
(C) Volume	(C) Pressure
(D) None of these	(D) Both (B) & (C)
 2. The process in which the pressure of system remains constant (A) Isothermal (B) Isochoric (C) Adiabatic (D) Isobaric 	5. No work is done by the system when the reaction occurs at constant (A) Volume (B) Temperature (C) Pressure (D) None of these
3. The SI unit of pressure is	6. An open system exchanges with the surroundings.
(A) Pascal	(A) Mass
(B) Newton	(B) Energy
(C) Joule	(C) Both (A) & (B)
(D) All the three	(D) None of these



7.	XLPE is the trade name of Individual heat transfer					
	(A)	Low density polyethylene				
	(B)	High density polyethylene				
	(C)	Linear low density polyethylene				
	(D)	Crosslinked polyethylene				
8.	CH ₃	$CH = CH_2$				
	(A)	Isomer				
	(B)	Oligomer				
	(C)	Monomer				

- (D) Dimer In forced convection, the heat transfer 9. depends on (A) Re, Pr (B) Re, Gr (C) Mainly Gr (D) Re only
- 10. Flow of heat associated with the movement of fluid is _____. (A) Conduction Convection Radiation (C) (D) None of these A system in which there may be 11.
 - exchange of energy but not mass is known as
 - (A) Open system
 - Closed system
 - Isolated system
 - (D) Insulated system
- Internal energy of a system depends 12. upon
 - (A) Quantity of substance
 - Its chemical nature
 - Temperature, pressure and volume
 - All of these

13.	A sta	ate function is		
	(A)	Internal energy		
	(B)	Free energy		

(C) Pressure

(D) All of these

- 14. Thermodynamics can be used
 - (A) To predict the feasibility of a particular process
 - (B) To provide the information regarding the time taken to reach equilibrium
 - (C) To study the rate at which a given process may proceed
 - (D) All of these
- 15. Study of fluid motion with the forces causing the flow is known as
 - (A) Kinematics of fluid flow
 - (B) Dynamics of fluid flow
 - (C) Statics of fluid flow
 - (D) None of these

- 16. A flow is said to be laminar when
 - (A) The fluid particles moves in a zig-zag way
 - (B) The Reynolds number is high
 - (C) The fluid particles moves in layers parallel to the boundary
 - (D) None of these
- 17. Fluid statics deals with
 - (A) Viscous and pressure forces
 - (B) Viscous and gravity forces
 - (C) Gravity and pressure forces
 - (D) Surface tension and gravity forces

18. 1 bar is equal to	
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- (A) 10^5 N/m^2
- (B) 1000 N/m^2
- (C) 100 Pascal
- (D) 10³ Pascal

Space For Rough Work



PO

19.	Pasca	al's law states that pressure at a	lymer is nothing but		
poin		nt is equal in all directions		(A)	Physical mixture of two
	(A)	In a liquid at rest			monomers
	(B)	In a fluid at rest		(B)	Chemical mixture of two monomers
	(C)	In a laminar flow		(C)	Physical mixture of monomer
	(D)	In a turbulent flow	į		and initiator
				(D)	None of these
20.	Kine	matic viscosity is equal to			
	(4)	Dimomio vigascity v dancity	23.	Exa	mple for hetero polymers
	(A)	Dynamic viscosity × density		(A)	PC
	(B)			(B)	PPS
	(C)			(C)	PEEK
	(D)	Pressure × density		(D)	All the three
21.	Geo	metric isomerism is obtained in	24.	On	addition of solute in the solvent,
	poly	mers is due to the presence of		the	of the solution
	(A)	C = C in polymer backbone		deci	reases.
	(D)			(A)	Boiling point
	(B)	Hetero atom in polymer backbone		(B)	Freezing point
	(C)	Asymmetric carbon atom		(C)	Vapour pressure
	(D)	Symmetric carbon atom		(D)	Both (B) and (C)
		Space For I	Rough	Work	



- 25. The amount of steam required per unit quantity of distillate in case of steam distillation will be reduced by
 - (A) Raising the temperature
 - (B) Lowering the total pressure
 - (C) Both (A) and (B)
 - (D) Neither (A) nor (B)
- 26. Total reflux in a distillation column requires minimum
 - (A) Reboiler load
 - (B) Number of plates
 - (C) Condenser load
 - (D) None of these
- 27. Fenske's equation determines the
 - (A) Maximum number of ideal plates
 - (B) Height of the distillation column
 - (C) Minimum number of theoretical plates
 - (D) Optimum reflux ratio

- 28. High pressure process uses oxygen as catalyst in the manufacture of
 - (A) LDPE
 - (B) HDPE
 - (C) LLDPE
 - (D) Both (A) & (B)
- 29. Vinyl chloride monomer content in PVC is a measure of
 - (A) Molecular weight
 - (B) Toxicity
 - (C) Morphology
 - (D) Heat stability
- 30. Functionality of styrene is
 - (A) 3
 - **(B)** 1
 - (C) 2
 - (D) 4

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31.	For a spontaneous process, free energy	34.	Polyesterification reaction	
	(A) Is zero		polymerization.	
	(B) Increases		(A) Addition	
	CA CONC. CO. Service to the state of the sta		(B) Condensation	
	(C) Decreases whereas entropy		(C) Poly addition	
	increases		(D) Both (B) & (C)	
	(D) None of these			
		35.	The unit of rate of first order reaction	
32.	Entropy is a measure of the		is	
	of a system.		(A) moles/lt	
	(A) Disorder		(B) moles. lt. s	
	(B) Orderly behaviour		(C) moles/lt. s	
	(C) Temperature change only		(D) None of these	
	(D) None of these	36.	In free radical polymerization, the rate	
			of polymer formation is proportional	
22	2 7		to	
33.			(A) First power of monomer	
	reaction.		concentration	
	(A) Unimolecular		(B) Square root of initial	
	(B) Bimolecular		concentration	
	(C) Termolecular		(C) Both (A) & (B)	
	(D) None of these		(D) Cannot be predicted	

37.	Which of the following requires predrying before injection molding? (A) PE (B) PP (C) PC (D) None of these	 40. Crow's feet is related process. (A) Injection molding (B) Transfer molding (C) Compression molding (D) None of these
38.	Warpage occurs in molded plastic parts due to (A) Non-uniform wall thickness (B) Less cooling time (C) Both (A) & (B) (D) None of these	 41. Which of the following is produced by extrusion process? (A) Tumbler mats (B) Insulated cables (C) Floor mats (D) None of these
39.	A process in which a preform is heated and blown to final shape is known as (A) Extrusion blow molding (B) Intermittent extrusion blow molding (C) Injection blow molding (D) None of these	42 process generates greater amount of scrap. (A) Injection molding (B) Blow molding (C) Compression molding (D) Thermoforming



43.	In compression molding
	type gives flash free products.

- (A) Positive
- (B) Semi-positive
- (C) Both (A) & (B)
- (D) None of these

44. Polyethylene terephthalate is

- (A) Terelyne
- (B) Decron
- (C) Both (A) & (B)
- (D) None of these

45. An addition polymer is

- (A) Polypropylene
- (B) Polyvinyl chloride
- (C) Polystyrene
- (D) All of these
- 46. Metals are good conductors of heat, because
 - (A) Of free electrons present
 - (B) Their atoms are relatively far apart
 - (C) Their atoms collide frequently
 - (D) All of these

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- 47. With increase in temperature, thermal conductivity of solid metals
 - (A) Increases
 - (B) Decreases
 - (C) Their atoms collide frequently
 - (D) Depend on other factors

48. Mass transfer operations are used for

- (A) Separation of products from its by-products
- (B) Purification of raw materials
- (C) Both (A) and (B)
- (D) None of these

49. The unit of diffusion coefficient is

- (A) m^2/s
- (B) m/s
- (C) mole/m²s
- (D) None of these

50. Blow molding is a process to produce

- (A) Hollow articles
- (B) Bottles
- (C) Both (A) & (B)
- (D) None of these

 $(25\times 2=50)$

- 51. The group of polymers consisting of PC, PEO, PPO, PPS and Nylons are best categorized as
 - (A) Engineering polymers
 - (B) Natural polymers
 - (C) Biodegradable polymers
 - (D) Commodity polymers
- 52. Examples for ring opening polymerization
 - (A) Epoxy group
 - (B) Caprolactum
 - (C) Lactide
 - (D) All of these
- 53. A gas at 0 °C is cooled at constant pressure until its volume becomes half the original volume. The temperature of the gas at this state will be
 - (A) −136.5 °C
 - (B) -136.5 K
 - (C) −273 °C
 - (D) 0 °C

- 54. Which of the following polymer produced by condensation polymerization?
 - (A) PU
 - (B) Polycarbonate
 - (C) EVA
 - (D) PMMA
- 55. What is the degree of freedom for a system comprising of liquid water equilibrium with its vapour?
 - (A) Zero
 - (B) One
 - (C) Two
 - (D) Three
- 56. The repeat unit in polyurethane is
 - (A) $-NH-CO-NH(CH_2)_5-$
 - (B) $-CO (CH_2)_5 NH -$
 - (C) $-CO (CH_2)_5 NH_2 -$
 - (D) $-COO (CH_2)_5 NH -$

57.	N ₂ content in urea sample is 42%.	60.	In a solut
	What is the urea content of the sample		solute ar
	(MW of urea is 60)?		molality
	(A) 80%		(A) 0.5
	(B) 90%		(B) 0.6
	(C) 95%		(C) 2 (D) 1
	(D) 98%		(2)
		61.	The w
58.	One Newton equals to		polymeri
	dynes.		mixture
	(A) 10^2		extent of (A) 10
	(B) 10^3		(B) 19
	(C) 10^4	1	(C) 19
	(D) 10^5		(D) 10
59.	CaCO ₃ contains	62.	Which o
	percentage of Ca by weight.	ļ	for crys
	■ CONTRACTOR AND CONTRACTOR CONT		respectiv
	(A) 40		(A) Iso
	(B) 48		(B) Iso
	(C) 96		(C) PS
	(D) 12		(D) PS
_			

tion containing 0.3 k mole of nd 600 kg of solvent, the

eight average degree of ization for an equimolar of a diacid and glycol at an f reaction 0.99 is _____.

- 0
- .9

of the following is an example stalline and amorphous polymer vely?

- otactic PP & HDPE
- otactic PP & PS
- S and HDPE
- S & PF



- 63. Which of the following group belongs to polyester, polyamide and polyether family respectively?
 - (A) PET, Nylon & PEO
 - (B) PET, Kevlar & DGEBA
 - (C) PET, Nylon & PF
 - (D) PET, PU & PEG
- 64. 1 g mol of methane contains
 - (A) 6.02×10^{23} atoms of hydrogen
 - (B) 4 g mol of hydrogen
 - (C) 3.01×10^{23} molecules of methane
 - (D) 3 g of carbon

- 65. Which of the following statement is not true for addition polymerization?
 - (A) Elemental composition of reactant and product are same.
 - (B) Polymerization occurs without byproducts.
 - (C) New functional group forms after polymerization.
 - (D) Is a single step polymerization.
- 66. Which of the following statement is not true with respect to Nylon 6,6?
 - (A) Obtained from condensation polymerization
 - (B) Fiber forming polymer
 - (C) Sensitive to moisture
 - (D) Chemically inert & flame retardant

67.	Chain polymerization is also known as	70.	-	is example for natural
	(A) Vinyl polymerization		polyr	ner.
	(B) Poly addition polymerization		(A)	Chitosan
	(C) Condensation polymerization		(B)	Starch
	(D) Insertion polymerization		(C)	Celiulose
68.	Functionality of acetylene and butadiene is		(D)	All the three
	(A) 4 & 4			
	(B) 2 & 2	71.		n extruder, the compression zone
	(C) 2 & 4		can	be identified by
	(D) 4 & 2		(A)	Gradual increase in root dia and decrease in flight depth of screw
69.	If the degree of polymerization of PP		(B)	Gradual decrease in root dia and
	is 500, the molecular weight of PP is			increase in flight depth of screw
			(C)	Gradual decrease in root dia and
	(A) 21,000		(0)	decrease in flight depth of screw
	(B) 23,000			doctome in mg. v dep in a constant
	(C) 42,000		(D)	
	(D) 22,000			increase in flight depth of screw



72.	In	plug-assist	forming	process,	the
	plu	ig is used to			

- (A) Eject the part
- (B) Force the material into the mold cavity
- (C) Heat the material
- (D) None of these

73.	Rotomolding process is used to make
	hollow articles.

- (A) Very large
- (B) Seamless
- (C) Both (A) & (B)
- (D) None of these

(A)
$$R_i - R_t$$

(B)
$$R_i + R_t$$

(C)
$$R_p = R_t$$

(D)
$$R_p + R_t$$

75. The rate constant of a first order reaction is
$$3.5 \times 10^{-2}$$
 min⁻¹. The half life of the reaction is _____.

- (A) 19.8 sec
- (B) 19.8 min
- (C) 198 min
- (D) 1980 min

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