



# POST GRADUATE COMMON ENTRANCE TEST – 2018

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| <b>PS</b>                             | <b>COURSE</b>  | <b>SUBJECT</b>                            | <b>301009</b><br><b>QUESTION BOOKLET SERIAL NUMBER</b> |
|                                       | M.E./M.Tech./<br>M.Arch./Courses<br>offered by VTU/UVCE/<br>UBDTCE | <b>POLYMER SCIENCE<br/>AND TECHNOLOGY</b> |  |
| <b>MAXIMUM MARKS</b>                  | <b>TOTAL DURATION</b>  | <b>TIME</b>                               |  |
| <b>100</b>                            | <b>150 Minutes</b>   | <b>2.30 p.m. to 4.30 p.m.</b>             |  |
| <b>MAXIMUM TIME FOR<br/>ANSWERING</b> | <b>MENTION YOUR PG CET NUMBER</b>                                  |   |  |
| <b>120 Minutes</b>                    |  |   |  |

## DOs :

- Candidate must verify that the PG CET number and Name printed on the OMR Answer Sheet is tallying with the PG CET number and Name printed on the Admission Ticket. Discrepancy if any, report to invigilator.
- This question booklet is issued to you by the invigilator after the 2<sup>nd</sup> bell i.e., after 02.25 p.m.
- The Version Code of this Question Booklet should be entered on the OMR Answer Sheet and the respective circle should also be shaded completely.
- The Version Code and Serial Number of this question booklet should be entered on the Nominal Roll without any mistakes.
- Compulsorily sign at the bottom portion of the OMR answer sheet in the space provided.

## DON'Ts :

- THE TIMING AND MARKS PRINTED ON THE OMR ANSWER SHEET SHOULD NOT BE DAMAGED / MUTILATED / SPOILED.
- The 3<sup>rd</sup> Bell rings at 2.30 p.m., till then;
  - Do not remove the seal present on the right hand side 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 3<sup>rd</sup> Bell is rung at 2.30 p.m., remove the paper seal on the right hand side 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 ballpoint pen** against the question number on the OMR answer sheet.

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|--------------------------------------|------------------------------------|
| ಸರಿಯಾದ ಕ್ರಮ<br><b>CORRECT METHOD</b> | ತಪ್ಪು ಕ್ರಮಗಳು <b>WRONG METHODS</b> |
|                                      |                                    |

- 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 p.m., stop marking on the OMR answer sheet and affix your left hand thumb impression on the OMR answer sheet as per the instructions.
- Hand over 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

PART – 1 : 50 QUESTIONS CARRY ONE MARK EACH (1 TO 50)  
PART – 2 : 25 QUESTIONS CARRY TWO MARKS EACH (51 TO 75)

[P.T.O.]

DO NOT WRITE HERE

301002





PART – 1

1. The process of heat transfer from one particle of the body to another without the actual motion of the particle, is called as  
(A) Conduction (B) Convection (C) Radiation (D) Distillation
2. If the rate of heat transfer is constant, it is known as  
(A) Steady state heat transfer (B) Unsteady state heat transfer  
(C) Uniform heat transfer (D) Non-uniform heat transfer
3. Multiple pass heat exchanger is used to  
(A) Increase rate of heat transfer (B) Increase pressure drop  
(C) Decrease pressure drop (D) Decrease vibrations
4. Raoult's law is applicable to  
(A) Non-volatile solute (B) Real solution  
(C) Ideal solution (D) Mixture of water and alcohol
5. A mixture of acetone and chloroform can be separated by  
(A) Flash distillation (B) Vacuum distillation  
(C) Steam distillation (D) Azeotropic distillation
6. Flash distillation is used at a large scale in  
(A) Phenol-formaldehyde resin synthesis (B) Petroleum refining  
(C) Ammonia synthesis (D) Sulphuric acid synthesis
7. The total entropy change for a system and its surroundings increases if the process is  
(A) Endothermic (B) Irreversible  
(C) Exothermic (D) Reversible
8. Entropy change of a system is zero in  
(A) Reversible process (B) Isothermal process  
(C) Adiabatic process (D) Reversible adiabatic process

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SPACE FOR ROUGH WORK

[P.T.O.]



9. For a process to be spontaneous in isolated system, entropy should be  
(A) Zero (B) Negative (C) Constant (D) Positive
10. In PV diagram of isotherms as given by equation of state, for the isotherm  $T > T_c$ , with increasing V, pressure decreases  
(A) Slowly (B) Rapidly (C) Monotonically (D) To zero
11. In a reversible adiabatic compression  
(A) Temperature remains constant (B) Heating takes place  
(C) Pressure remains constant (D) Cooling takes place
12. The enthalpy (H) of any system is defined by  
(A)  $H = W - PV$  (B)  $H = V + PW$  (C)  $H = W + PV$  (D)  $H = W + RT$
13. In a turbulent flow in a pipe  
(A) Raynolds number is greater than 10,000  
(B) Fluid particles move in straight lines  
(C) Head loss varies linearly with flow rate  
(D) Shear stress varies linearly with radius
14. For measuring flow by a venturimeter, it should be installed in  
(A) In any direction and in any location (B) Horizontal line  
(C) Inclined line with upward flow (D) Vertical line
15. Pitot tube is used to measure the velocity head of  
(A) Laminar flow (B) Flowing fluid (C) Still fluid (D) Turbulent flow
16. Capillarity is due to  
(A) Cohesion (B) Adhesion  
(C) Adhesion and cohesion (D) Gravity
17. Friction drag is generally larger than the pressure drag in  
(A) Flow past a cylinder (B) Flow past a sphere  
(C) Flow past an airfoil (D) Flow past a thin sheet

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18. A large Raynold number is related to  
(A) Smooth and stream line flow (B) Highly turbulent flow  
(C) Laminar flow (D) Steady flow
19. SI unit of mass flux is  
(A)  $\text{kg/m}^2.\text{s}$  (B)  $\text{l/m}^2.\text{h}$  (C)  $\text{g/m}^2.\text{s}$  (D)  $\text{lb/m.s}$
20. A sample of sea water contains  $35 \times 10^3$  ppm solids. The concentration of solids in weight percentage is  
(A) 0.3% (B) 0.35% (C) 35% (D) 3.5%
21. The average molecular weight of air assuming 79% of  $\text{N}_2$  and 21% of oxygen is  
(A) 18.4 (B) 23.6 (C) 28.8 (D) 10.6
22. Mole fraction of methanol in a mixture of 7 moles of water, 10 moles of ethanol and 13 moles of methanol is  
(A) 0.24 (B) 0.43 (C) 0.32 (D) 0.86
23. If the repeat units are joined in a 3-dimensional array, the resulting polymer will be  
(A) Linear polymer (B) Branched polymer  
(C) Cross linked polymer (D) Block copolymer
24. Which of the following is optically transparent engineering polymer ?  
(A) LDPE (B) Nylon 66  
(C)  $\text{TiO}_2$  filled PMMA (D) Poly carbonate
25. Polymers are also known as  
(A) Sub-macromolecules (B) Macromolecules  
(C) Oligomers (D) Micromolecules
26. Block copolymers are generally produced by  
(A) Free radical polymerization (B) Anionic polymerization  
(C) Cationic polymerization (D) Coordination polymerization

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[P.T.O.]



27. Coordination polymerization is also known as  
(A) Insertion polymerization  
(B) Poly condensation polymerization  
(C) Interfacial polymerization  
(D) Poly addition polymerization
28. Mark-Houwink equation is related to the following physical properties  
(A) Melting  
(B) Crystallinity  
(C) Elasticity  
(D) Viscosity
29. The most chemically inert polymer, used in non-sticking kitchen ware is  
(A) Melamine resin (B) Teflon (C) PC (D) PVC
30. The chain carrier in case of cationic polymerization are  
(A) Carbonium ion (B) Hydroxyl ion  
(C) Carbanion (D) Carbonyl ions
31. The technique which produces polymers of highest purity is \_\_\_\_\_  
(A) Emulsion polymerization (B) Solution polymerization  
(C) Bulk polymerization (D) Suspension polymerization
32. \_\_\_\_\_ is an example for free radical initiator.  
(A) AIBN (B) Lewis acid (C) DDM (D) TMTD
33. Disposable cups are produced by  
(A) Extrusion (B) Injection molding  
(C) Compression molding (D) Thermoforming
34. Example for open-molding process is  
(A) Extrusion (B) Injection molding  
(C) Hand lay up (D) Pressure bag molding
35. The kinetic chain length of a polymer is expressed as  
(A)  $R_p / R_i$  (B)  $R_i / R_p$  (C)  $R_t / R_p$  (D)  $R_i / R_t$

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SPACE FOR ROUGH WORK





36. In cationic polymerization, the overall polymerization rate is directly proportional to
- (A) First power of monomer concentration
  - (B) Second power of monomer concentration
  - (C) Third power of monomer concentration
  - (D) Not related to monomer concentration
37. Nylon 6 is prepared by
- (A) Condensation polymerization
  - (B) Ring opening polymerization
  - (C) Addition polymerization
  - (D) Poly addition polymerization
38. The role of sodium chloride in emulsion polymerization is
- (A) Initiator
  - (B) Emulsifier
  - (C) Coagulant
  - (D) Suspending agent
39. Melt flow index of a polymer is inversely proportional to
- (A) Density
  - (B) Molecular weight
  - (C) Crystallinity
  - (D) Tacticity
40. The functionality of acetylene monomer is
- (A) Two
  - (B) Three
  - (C) Four
  - (D) Five
41. Polyether Ether Ketone (PEEK) is a
- (A) Homopolymer
  - (B) Heteropolymer
  - (C) Copolymer
  - (D) Crystalline polymer
42. TGA can be used to measure
- (A) Thermal stability
  - (B)  $T_g$
  - (C) Crystallinity
  - (D) Degree of polymerization

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SPACE FOR ROUGH WORK

[P.T.O.]



43. HDPE is produced by  
(A) Low pressure process (B) Unipol process  
(C) Solid phase polymerization (D) Photo polymerization
44. Polystyrene produced from suspension polymerization is in the form of  
(A) Solution (B) Latex  
(C) Beads (D) Powder
45. Blow molding process is used to produce  
(A) Sheets (B) Rods  
(C) Fibers (D) Bottles
46. Long fiber reinforced product obtained by  
(A) Compression molding (B) Blow molding  
(C) Pultrusion (D) Vacuum bag molding
47. In thermoforming process, preheating of a sheet is usually carried out by  
(A) Infra red radiant electrical heater  
(B) Hot air  
(C) Steam  
(D) Microwave irradiation
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48. Compounding of thermoplastics can be carried out using  
(A) Extrusion (B) Blow molding  
(C) Injection molding (D) Compression molding
49. Which of the following polymer is moisture sensitive ?  
(A) Polyethylene (B) Polyamide  
(C) Polypropylene (D) Polybutadiene
50. \_\_\_\_\_ is an example for inorganic polymer.  
(A) Natural rubber (B) Polyester resin  
(C) Silicone rubber (D) Polystyrene

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SPACE FOR ROUGH WORK





PART – 2

51. In pipes larger than 25 mm, carrying water, the laminar flow  
(A) Very often exists (B) Generally exists  
(C) Rarely exists (D) Unpredicted
52. Bernoulli's theorem deals with conversion of  
(A) Mass (B) Force (C) Momentum (D) Energy
53. If the Mach number of a flow is 3, the flow is known as  
(A) Super super sonic (B) Super sonic  
(C) Sonic (D) Subsonic
54. If the Froude number in open channel flow is equal to 1.0, the flow is  
(A) Laminar flow (B) Turbulent flow (C) Shooting flow (D) Streaming flow
55. According to first law of thermodynamics, the change in internal energy ( $\Delta E$ ) accompanying a process, performing work ( $W$ ) and involving absorption of heat ( $Q$ ) is given by the relation  
(A)  $\Delta E = Q - W$  (B)  $\Delta E = Q + W$   
(C)  $\Delta E = \Delta Q + \Delta W$  (D)  $\Delta E = \Delta Q - \Delta W$
56. When a gas expands spontaneously from a region of high pressure to a region of low pressure, then the entropy of the gas  
(A) Remains constant (B) Decreases  
(C) Increases (D) Is zero
57. During isothermal expansion of an ideal gas, its  
(A) Internal energy increases (B) Enthalpy remains unaffected  
(C) Enthalpy decreases (D) Enthalpy reduces to zero
58. If the viscosity of air is  $24.5 \times 10^{-6} \text{ NS/m}^2$  and its specific heat capacity is  $1 \text{ kJ/kg.K}$  and thermal conductivity is  $0.12 \text{ W/mK}$ . Then Prandtl number value will be  
(A) 0.30 (B) 0.15  
(C) 0.20 (D) 0.25

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[P.T.O.]



59. How much acid solution will be produced having  $\text{H}_2\text{SO}_4$  concentration of 20% from weak acid of  $\text{H}_2\text{SO}_4$  concentration of 14% by adding 500 kg  $\text{H}_2\text{SO}_4$  of concentration 80% ?  
(A) 5500 kg (B) 5000 kg (C) 5010 kg (D) 5030 kg
60. Expressing 100 kg/h of water flow rate in terms of kmol/s of water gives value as  
(A)  $1.54 \times 10^{-3}$  (B)  $154 \times 10^{-2}$  (C) 1.54 (D) 1500
61. If a container holds 2 pounds of NaOH, how many pound moles of NaOH does it contains ?  
(A) 5 (B) 0.05 (C) 50 (D) 0.5
62. A saturated gas means  
(A) 0% humidity (B) 100% humidity  
(C) Infinite humidity (D) Between 0 and 100% humidity
63. Which of the following polymer pair shows tacticity ?  
(A) PP + PE (B) PP + PS (C) PE + NR (D) PP + SAN
64. Which of the following are symmetrical polymers ?  
(A) PP + PTFE (B) PE + PS (C) HDPE + PTFE (D) PP + PVC
65. SAN, nylon 6 and EPDM are  
(A) Copolymer, thermoplastic and rubber (B) Thermoset, rubber and monomer  
(C) Thermoplastic, thermoset and rubber (D) Thermoset, thermoplastic and rubber
66. Diol is one of the reactant for the following pair of polymers  
(A) PET and PU (B) PVC and PET (C) PAN and PET (D) Nylon 6 and PU
67. Examples for ring opening polymers  
(A) Nylon 6 and PU (B) Nylon 6 and PEO  
(C) Nylon 66 and PET (D) Nylon 66 and epoxy
68. Functionality of ethylene glycol and adipic acid is  
(A) 2 and 2 (B) 1 and 2 (C) 2 and 4 (D) 2 and 0

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69. Tg of polymers can be measured using  
(A) DSC and DMA (B) DSC and TGA  
(C) DMA and TGA (D) DMA and UTM
70.  $\bar{M}_n$  of polymers can be measured by  
(A) Vapour pressure osmometry and end group analysis  
(B) Viscometric and end group analysis  
(C) Viscometric and vapour pressure osmometry  
(D) Viscometric and light scattering method
71. If the molecular weight of HDPE is 28,000, the degree of polymerization is  
(A) 100 (B) 500 (C) 1000 (D) 10000
72. Which of the following are natural polymers ?  
(A) Starch and chitosan (B) Chitosan and polyamide  
(C) Chitosan and polyester resin (D) Starch and polyolefines
73. Which of the following statement is not true with respect to PTFE ?  
(A) Obtained from addition polymerization  
(B) Chemically inert  
(C) Flame retardant  
(D) Sensitive to moisture
74. Pipes and sheets can be produced by  
(A) Extrusion process (B) Blow molding  
(C) Rotomolding (D) Injection molding
75. Increase in the number of aromatic groups along the backbone of the polymer chains is known to  
(A) Increases the flexibility and  $T_m$   
(B) Increases the rigidity and  $T_m$   
(C) Increases the hardness and reduces  $T_m$   
(D) Reduces the rigidity and increases  $T_m$

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