POST GRADUATE COMMON ENTRANCE TEST – 2018

PS	COURSE	SUBJECT
	M.E./M.Tech./ M.Arch./Courses offered by VTU/UVCE/ UBDTCE	POLYMER SCIENCE AND TECHNOLOGY

MAXIMUM MARKS	TOTAL DURATION	TIME
100	150 Minutes	2.30 p.m. to 4.30 p.m.

MAXIMUM TIME FOR ANSWERING	MENTION YOUR PGCET NUMBER				
120 Minutes					

QUESTION BOOKLET SERIAL NUMBER

3010009

DOs :

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

DON'Ts :

1. **THE TIMING AND MARKS PRINTED ON THE OMR ANSWER SHEET SHOULD NOT BE DAMAGED / MUTILATED / SPOILED.**
2. The **3rd 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

1. This question booklet contains 75 (items) questions and each question will have one statement and four answers. (Four different options / responses.)
2. After the **3rd 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.
3. 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.**

ಸರಿಯಾದ ಕ್ರಮ CORRECT METHOD	ತಪ್ಪು ಕ್ರಮಗಳು WRONG METHODS
(A) ● (C) (D)	(X) (B) (C) (D) (A) (B) (C) (✓) (A) ● ● (D) (▲) (B) (C) (D) (A) ◉ (C) (D)

4. Use the space provided on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
5. 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.
6. Hand over the **OMR answer sheet** to the room invigilator as it is.
7. 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.
8. Preserve the replica of the OMR answer sheet for a minimum period of **ONE year.**
9. 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.

301003

DO NOT WRITE HERE

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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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) $kg/m^2.s$
    (B) $l/m^2.h$
    (C) $g/m^2.s$
    (D) $lb/m.s$

20. A sample of sea water contains 35×10^3 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 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) 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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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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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) Tg
    (C) Crystallinity
    (D) Degree of polymerization

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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 radient electrical heater
    (B) Hot air
    (C) Steam
    (D) Microwave irradiation

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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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 (Δ 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 24.5×10^{-6} NS/m^2 and its specific heat capacity is 1 kJ/kg.K and thermal conductivity is 0.12W/mK. Then Prandtl number value will be
(A) 0.30
(B) 0.15
(C) 0.20
(D) 0.25

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59. How much acid solution will be produced having H_2SO_4 concentration of 20% from weak acid of H_2SO_4 concentration of 14% by adding 500 kg H_2SO_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) 1.54×10^{-3} (B) 154×10^{-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 Tm
    (B) Increases the rigidity and Tm
    (C) Increases the hardness and reduces Tm
    (D) Reduces the rigidity and increases Tm

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