



ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ ਜਲੰਧਰ

PUNJAB TECHNICAL UNIVERSITY JALANDHAR

Max. Marks: 90

Time: 90 Mins.

Entrance Test for Enrollment in Ph.D. Programme

Important Instructions

- Fill all the information in various columns, in capital letters, with blue/black ball point pen.
- Use of calculators is not allowed.
- All questions are compulsory. No negative marking for wrong answers.
- Each question has only one right answer.
- Questions attempted with two or more options/answers will not be evaluated.

Stream (Engg./Arch./Pharm./Mgmt./App.Sci./Life Sci.)

ENGINEERING

Discipline / Branch

TEXTILE ENGINEERING

Name

Father's Name

Roll No.

Date: 19-11-2011

Signature of Candidate

Signature of Invigilator

Q. 1 Which of the following reagents is used for diazotization of feebly basic amines

- (a) Conc. HCl/NaNO₂
- (b) Conc. HCl/NaNO₃
- (c) Conc. HCl/*n*-BuNO₂
- (d) Conc. H₂SO₄/NaNO₂

Q. 2 A monoazo dye with the following coupler shall resist color change upon pH variation

- (a) *p*-Coupled phenol
- (b) *o*-Coupled phenol
- (c) BON acid
- (d) *p*-Coupled aniline

Q. 3 Stilbene based chromophores are mostly used in the following application class of dyes

- (a) Direct dyes
- (b) Pigments
- (c) Solvent dyes
- (d) Acid dyes

Q. 4 Most of the thioindigoids cater to the

- (a) Blue sector
- (b) Red sector
- (c) Green sector
- (d) Orange sector

Q. 5 Acridine cationic dyes predominantly represent

- (a) Orange colour sector
- (b) Red colour sector
- (c) Crimson colour sector
- (d) Bright red colour sector

Q. 6 Fluorescent whiteners are used to

- (a) Enhance reflectance in the UV region
- (b) Enhance absorption in the visible region
- (c) Enhance reflectance in the visible region
- (d) Enhance scattering of light in the UV region

Q. 7 The Romans used Shellfish called Murex to dye their cloths to

- (a) Golden colour
- (b) Bright Red colour
- (c) Purple colour
- (d) Green colour

Q. 8 Acid dyes are converted into pigments by

- (a) Precipitation with complex acids
- (b) Precipitation with Heavy metals
- (c) Solvent Grinding process
- (d) Dry milling process

Q. 9 Upon converting vat dyes into pigments, the Principal hue of the resulting pigment generally

- (a) Remains the same
- (b) Turns bathochromic
- (c) Turns hypsochromic
- (d) Turns dull

Q. 10 A typical composition CdS, ZnS furnishes

- (a) Orange pigments
- (b) Red pigments
- (c) Maroon pigments
- (d) Primrose pigments

Q. 11 Which of the following Vat dyes shows the highest times of half-reduction

- (a) Flavanthrone
- (b) Pyranthrone
- (c) 16,17-Dichloroviolanthrone
- (d) 4,4'-Dimethyl-6,6'-dichlorothioindigo

Q. 12 For a common coupling component, which of the following diazo components shall furnish the most substantive monoazo dye

- (a) Sulphanilic acid
- (b) Naphthylamine
- (c) Aniline
- (d) *p*-Aminobenzoic acid

Q. 13 For a common diazo component, which of the following coupler shall furnish the most substantive dye

- (a) H-acid
- (b) Naphthionic acid
- (c) R- acid
- (d) Chromotropic acid

Q. 14 The correct order of an auxochrome to make hydrogen bonding with a polyamide fibre is

- (a) $\text{ArOH} > \text{ArNHCOCH}_3 > \text{ArNH}_2 > \text{AlkOH}$
- (b) $\text{ArNHCOCH}_3 > \text{ArNH}_2 > \text{ArOH} > \text{AlkOH}$
- (c) $\text{AlkOH} > \text{ArNHCOCH}_3 > \text{ArNH}_2 > \text{ArOH}$
- (d) $\text{ArNHCOCH}_3 > \text{ArNH}_2 > \text{AlkOH} > \text{ArOH}$

Q. 15 Which of the following substituent shall enhance exhaustion of a monoazo dye on wool

- (a) 2-Hydroxyethyl
- (b) Hexatriene
- (c) Phenyl
- (d) Cyclohexyl

Q. 16 The diffusion coefficient of 1-anilinoanthraquinone in polypropylene compared to cellulose acetate is high, yet the saturation value is low, because

- (a) of lower tensile strength
- (b) of synthetic nature
- (c) of poor affinity
- (d) of rigidity

Q. 17 As the basicity of a monoazo acid dye increase, water solubility increases and

- (a) Migration also increases
- (b) Migration decreases
- (c) Migration remains the same
- (d) Both affinity and migration increases

Q. 18 While in dyeing of wool with chrome dyes, we use Cr(VI) salts, for similar dyeing of silk, Cr(III) is required, because

- (a) Cr(VI) is insoluble in dye bath
- (b) Cr(III) is cheaper
- (c) Silk is delicate
- (d) Silk lacks reducing amino acid residues

Q. 19 Compared to a chemical processing, biotechnological processing is

- (a) Cost-effective
- (b) Energy efficient
- (c) Rigorous
- (d) Harsh

Q. 20 Out of dichloro-s-triazine, monochloro-s-triazine and monoalkoxy monochloro-s-triazine based reactive dyes

- (a) Monoalkoxy, monochloro-s-triazine dyes are most reactive towards alkali
- (b) Monochloro-s-triazine dyes are most reactive towards alkali
- (c) Dichloro-s-triazine dyes are most inert towards alkali
- (d) Monoalkoxy monochloro-s-triazine dyes are inert towards alkali

Q. 21 Which of the following amino acid of wool is optically inactive

- (a) Tyrosine
- (b) Iso-leucine
- (c) Glycine
- (d) Leucine

Q. 22 The strongest of the forces that stabilize wool protein molecules is

- (a) Ionic interaction
- (b) Zwitterionic interactions
- (c) Hydrophobic interactions
- (d) Disulfide bond

Q. 23 Chitosan used in textile printing is a copolymer of

- (a) N-Acetyl glucosamine and glucose
- (b) N-Acetyl glucosamine and galactose
- (c) N-Acetyl glucosamine and glucosamine
- (d) N-Acetyl glucosamine and fructose

Q. 24 Spin finishes generally

- (a) increases fibre friction
- (b) decreases fibre friction
- (c) Both (a) and (b)
- (d) Neither increases nor decreases fibre friction

Q. 25 Crosslinking finish is generally applied to cotton or its blends for

- (a) Easy care finish
- (b) Wrinkle-resistant finish
- (c) Improving wet fastness
- (d) All of the above

Q. 26 Dimethylolethylene Urea (DMEU) type auxiliaries are usually used for

- (a) Flame-retardant finishes
- (b) Cross-linking applications
- (c) Softness
- (d) Improving dye exhaustion

Q. 27 One of the most lignin rich natural cellulosic fibre is

- (a) Hemp
- (b) Ramie
- (c) Jute
- (d) Coir

Q. 28 The degree of crystallinity and orientation is highest in

- (a) Cotton
- (b) Viscose rayon
- (c) Banana fibres
- (d) Bast fibres

Q. 29 N-Methylmorpholine-N-oxide is generally used for producing Lyocell because

- (a) it has very good solubility
- (b) of its high recycling rate
- (c) it is very cheap
- (d) it is more polar than water

Q. 30 Alpaca can be best defined as

- (a) Animal hair fibre
- (b) Vegetable fibre
- (c) Specialty hair fibre
- (d) Animal secretion fibre

Q. 31 The moisture regain of wool at 65% relative humidity at 21 °C is approximately

- (a) 12-15%
- (b) 8-9%
- (c) 30-40%
- (d) 0.1-0.9%

Q. 32 Recent research for developing descaling methods of wool are based on the use of

- (a) Lipases
- (b) Glycosidases
- (c) Esterases
- (d) Proteases

Q. 33 The distinction between natural silk and cultivated silk is based on

- (a) Lusture
- (b) Strength
- (c) Amino acid composition
- (d) Fineness of the filament

Q. 34 The degree of orientation of typical polyester fibre is dependent predominantly on

- (a) Draw ratio
- (b) Monomers used
- (c) Degree of polymerization
- (d) Ethylene glycol content during polymerization

Q. 35 The moisture regain of polyester at 100 % relative humidity is

- (a) 30%
- (b) 1.0%
- (c) 10%
- (d) 15%

Q. 36 Biopolyesters are best characterized by

- (a) High tensile strength
- (b) High moisture regain
- (c) High water absorbency
- (d) High water repellency

Q. 37 Catalases were first introduced in textile processing for

- (a) Fixation of reactive dyes
- (b) Decomposition of hydrogen peroxide
- (c) Enhancing the rate of Desizing
- (d) Removal of metal ions

Q. 38 Biological oxygen demand of a textile effluent can be best lowered by

- (a) Ultrafiltration
- (b) Nanofiltration
- (c) Coagulation
- (d) Reverse Osmosis

Q. 39 In biomedical application, one of the fibres used in artificial kidney are based on

- (a) Polysaccharide
- (b) Polymethylmethacrylate
- (c) Silicone
- (d) Carbon fibres

Q. 40 The best synthetic material used in Clean rooms of electronic industry is

- (a) Nylon
- (b) Decaron
- (c) Tencil
- (d) Polyester

Q. 41 Shin-gosen is a term used for fibres that are

- (a) Super fibres
- (b) High-tech fibres
- (c) Semi-synthetic fibres
- (d) Extremely delicate and weak fibres

Q. 42 Poly-*p*-phenylenebisoxazole (PBO) fibres are formed from Diaminoresorcinol dichloride and

- (a) Isophthalic acid
- (b) Terephthalic acid
- (c) Phthalic acid
- (d) Phthalic anhydride

Q. 43 The requirements on 21st century fibres are

- (a) Super-fineness
- (b) Super-biomimetic ability
- (c) Super capillary action
- (d) Super moisture-permeable

Q. 44 The active species during bleaching of wool with hypochlorite solution at pH 2.0 is

- (a) Chlorine
- (b) Hypochlorous acid
- (c) Chlorate ion
- (d) Perchloric acid

Q. 45 Preparing a carded sliver for wool spinning entails

- (a) Fibre alignment, doubling etc.
- (b) Disentangling, mixing etc.
- (c) Removing vegetable matter
- (d) Forming slub

Q. 46 During combing of 100 Kg of sliver, if noil removed is 2Kg, the Noil% would be

- (a) 1%
- (b) 2%
- (c) 0.5%
- (d) 4%

Q. 47 If pairing twist factor during spinning of wool is 20, the Added twist factor would be

- (a) 800
- (b) 860
- (c) 880
- (d) 900

Q. 48 Glauber salt is used in wool dyeing as

- (a) Exhausting agent
- (b) Wetting agent
- (c) Retarding agent
- (d) Softening agent

Q. 49 Common salt is used in cotton dyeing as

- (a) Exhausting agent
- (b) Wetting agent
- (c) Retarding agent
- (d) Softening agent

Q. 50 The brightest dyes of the following classes is

- (a) Cationic dyes
- (b) Direct dyes
- (c) disperse dyes
- (d) Vat dyes

Q. 51 The lowest substantive vat dyes are represented by

- (a) IK dyes
- (b) IW dyes
- (c) IN dyes
- (d) IN special dyes

Q. 52 A prepigmentation process for Vat dyes entails

- (a) Processes preceding pigmentation process
- (b) Reduction for obtaining leuco dye
- (c) Application in non-substantive insoluble form
- (d) Application in substantive insoluble form

Q. 53 Beta-Sulphatoethylsulphone.....dyes.....react through

- (a) Nucleophilic substitution
- (b) Nucleophilic addition
- (c) Nucleophilic elimination
- (d) Nucleophilic isomerization

Q. 54 The self-levelling direct dyes are classified as

- (a) Class A dyes
- (b) Class C dyes
- (c) Salt controllable dyes
- (d) Temperature controllable dyes

Q. 55 The typical illumination level of average overcast daylight in UK is

- (a) 44 000 K
- (b) 5500 K
- (c) 6500 K
- (d) 3300 K

Q. 56 The units of Radiance are

- (a) W/sr/m²
- (b) W/m²
- (c) Cd/m²
- (d) lux s

Q. 57 Spectral Power Distribution of High-pressure mercury lamp shows most prominent emission in the

- (a) Visible region
- (b) Near Infrared region
- (c) Far infrared region
- (d) UV region

Q. 58 Colour rendering index is highest for

- (a) Xenon lamp
- (b) Three band (TL 84)
- (c) Tungsten-halogen lamp
- (d) Sodium vapour lamp

Q. 59 Detection and assessment of photochromism is done by

- (a) A03 test
- (b) B03 test
- (c) P04 test
- (d) B05 test

Q. 60 Spectraflash 500 spectrophotometer is a

- (a) Tristimulus Colorimeter
- (b) Dual beam Spectrophotometer
- (c) Single-beam Spectrophotometer
- (d) Fluorescence Spectrophotometer

Q. 61 A colour represented in CIELAB a*b* diagram with a* = 30, b* = 90 shall be

- (a) Sensibly Yellowish orange
- (b) Sensibly Orange
- (c) Sensibly Reddish yellow
- (d) Light yellow

Q. 62 A Subtractive combination of Magenta and Cyan would be

- (a) Yellow
- (b) Green
- (c) Blue
- (d) Red

Q. 63 In the Chromaticity diagram non-spectral

colours are represented by

- (a) Dominant wavelength
- (b) Spectrum locus
- (c) Illuminant
- (d) Complementary wavelength

Q. 64 1964 Supplementary standard observer is

(a) used where more accurate correlation with visual colour matching is required

(b) used where visual colour matching is not possible

(c) used for universal applications

(d) used for fluorescent brightening agent treated colours

Q. 65 Light emitted due to a transition from singlet excited state to ground state is called

(a) Phosphorescence

(b) Fluorescence

(c) Internal conversion

(d) Inter system crossing

Q. 66 In the high-tech application of dyes e.g. in organic field-effect transistors, the chief advantage is

(a) Very high charge-mobility

(b) Very high on/off ratios

(c) Flexibility

(d) high efficiency

Q. 67 In dye sensitized solar cells, the dye

(a) must have appropriate HOMO-LUMO gap

(b) Must be soluble in water

(c) Must be insoluble in water

(d) Must be hypsochromic

Q. 68 The machine employing highest mass to liquor ratio is

(a) Jig dyeing machine

(b) Soft-flow machine

(c) Dyeing winch

(d) Package dyeing machine

Q. 69 Open width dyeing can be achieved by

(a) Pad mangle

(b) Winch

(c) Jet dyeing

(d) Soft-flow dyeing

Q. 70 Soft-flow dyeing is based on the principle of

(a) material stationary-liquor flow

(b) Liquor stationary-material flow

(c) Both liquor as well as material flow

(d) Dyeing at extremely low MLR

Q. 71 The German ban doesn't allow the use of

(a) All aromatic amines

(b) Heterocyclic amines

(c) Benzidine

(d) 3,3'-disubstituted benzidine

Q. 72 One of the prominent problem of Tencel is

(a) Pilling

(b) Fibrillation

(c) Strength

(d) Whiteness

Q. 73 Absorption characteristics of a dye can be evaluated from

(a) a plot of reflectance versus wavelength

(b) a plot of absorbance versus frequency

(c) a plot of concentration versus wavelength

(d) Saturation curve

Q. 74 The colour attributes of Munsell color order system are

(a) $L^* a^* b^*$

(b) L, C, H

(c) V, C, H

(d) $L^* C^* H^*$

Q. 75 Excellent levelness on acrylic can be obtained by the use of

(a) Cationic dyes

(b) Anionic dyes

(c) Non-ionic dyes

(d) Vat dyes

Q. 76 The degradation products of dyes during dyeing are generally

(a) Hypsochromic

(b) Bathochromic

(c) Hyperchromic

(d) Hypochromic

Q. 77 The dye-cellulose linkage of a aminochlorotriazine dye is

- (a) less stable under alkaline conditions
- (b) more stable under acidic conditions
- (c) less stable than the link of a dichlorotriazine dye
- (d) more stable than the link of a dichlorotriazine dye

Q. 78 Dyes with absorption bands at wavelength longer than 700 nm are called

- (a) Far-IR absorbing dyes
- (b) NIR absorbing dyes
- (c) Fluorescent dyes
- (d) Laser dyes

Q. 79 Second order non-linear optical dyes are used

- (a) for frequency doubling
- (b) for frequency tripling
- (c) for frequency halving
- (d) for frequency attenuation

Q. 80 The natural dye Cochineal gives

- (a) Purple colour
- (b) Yellow colour
- (c) Red colour
- (d) Black colour

Q. 81 As the conjugation in a chromophore is increased

- (a) The dye turns more bathochromic
- (b) The dye observes blue shift in its absorbance
- (c) The absorption bands show hyperchromic shift
- (d) The reflectance of the dye increases

Q. 82 Mass spectrum of a dye informs us about

- (a) the arrangement of atoms/groups in the dye
- (b) the number of carbon atoms in the dye
- (c) molecular mass of the dye
- (d) Relative molecular mass of the dye

Q. 83 The dye class that delivers the maximum colour to the effluent is

- (a) Reactive dye
- (b) Direct dye
- (c) Disperse dye
- (d) Acid dye

Q. 84 Kaycelon range of reactive dyes represent

- (a) Heat sensitive reactive dyes
- (b) Special reactive dyes
- (c) Acidic pH fixing dyes
- (d) Neutral fixing dyes

Q. 85 2:1 Metal complex dyes are conveniently dyed at pH

- (a) 2-3
- (b) 6-8
- (c) 4-5
- (d) alkaline pH

Q. 86 In case of dyeing of acetate fibres with disperse dyes, dyes with

- (a) high partition coefficient depict more saturation value
- (b) low partition coefficient depict more saturation value
- (c) Partition coefficient doesn't play any role
- (d) higher molecular mass depict more saturation value

Q. 87 Affinity of acid dyes increases by

- (a) decreasing water solubility
- (b) increasing water solubility
- (c) Decreasing relative molecular mass
- (d) increasing polarity of the dye

Q. 88 More negative is the reduction potential of a vat dye

- (a) It oxidizes with difficulty
- (b) it reduces with difficulty
- (c) it is easily reduced
- (d) it becomes more water soluble

Q. 89 Cibacron C range of bifunctional dyes contain a combination of

- (a) two aliphatic vinyl sulphones
- (b) an aliphatic vinyl sulphone and a fluorotriazinyl group
- (c) an aromatic vinyl sulphone and a fluorotriazinyl group
- (d) A monoaminotriazine and a monochlorotriazine

Q. 90 An additive combination of R G and B gives

- (a) Black
- (b) Cyan
- (c) white
- (d) Magenta