

CERAMICS TECHNOLOGY

Group code: CR

Max Marks: 100

UNIT 1: Applied geology.

1x08=08 Marks

Definition of geology, Branches of geology. Definition of petrology, types of rocks, such as igneous, sedimentary & metamorphic rocks. Study of important physical properties & uses of igneous, sedimentary & metamorphic rocks. Types of weathering, definition, parts & types of folds, faults, & joints. Definition of minerals & crystals. Important mineral properties & application of cleavages, colors, streak, hardness, specific gravity, habit & magnetic properties.

UNIT 2: White Wares.

1x10=10 Marks

Definition of ceramics, history developments of ceramics, classification of wares with examples, utility of the products, how if they differ from conventional metallic wares of products. Terracotta, Majolica, stoneware, earthen wares . Chemical resistant wares, soft paste porcelains each wares properties & applications. Manufacturing raw material selection, processing & forming techniques, drying, finishing, glazing, firing techniques.

UNIT 3: Refractories.

1x10=10 Marks

Definition, classification with examples, Acid, Basic & Neutral refractory. Raw materials, forming techniques, drying, firing, firing properties of refractories. Testing of refractories. Abrasives, definition, types & uses

UNIT 4: Ceramics processing technology.

1x06=06Marks

Ceramics processing & ceramic products, surface chemistry, powder processing by chemical methods, liquids & wetting agents, deflocculates & coagulants, flocculants, binders & bonds, plasticizers, foaming & anti foaming agents, lubricants & preservatives, particle packing characteristics , rheological behavior of slurries & paste, pressing, plastic forming processes, casting processes, molecular polymerization forming, drying, surface processing, firing processing.

UNIT 5: Glass technology.

1x10=10 Marks

Definition, classification of glass, soda lime, potash lime, potash lead & common glass, with utility aspects various types of glass, properties & uses, raw materials selection, purification, glass batch preparation, melting, refining, fabrication, methods, moulds, feeding devices, annealing, defects in glass, testing of glass wares.

UNIT 6: Cement technology.

1x10=10Marks

Definition, classification, types utilities, various raw materials, properties & applications, manufacturing process of O.P. cement, dry & wet methods, crushing, grinding, firing, rotary kiln, varieties of cements properties & uses.

UNIT 7: Furnace technology.

1x08=08 Marks

Definition of fuels, classification, types of fuels, with examples, properties & application of solid, liquid & gaseous fuels. Combustion of fuels, calorific value of fuels. Types of furnaces, designs, refractories selection, construction, economy in firing, oxidation, reducing atmosphere in kiln with their impacts. Types of pyrometers, optical, radiation pyrometer principles

UNIT 8: Coating technology.

1x10=10 Marks

Definition, classification of glazes, glaze raw materials, preparation of glazes, glaze applications, glaze defects & their remedies definition of stain, various types of stains, definition of decoration, decoration by in glaze, over & under glaze methods. Enamel definition, difference with respect to organic enamels & inorganic enamels, raw materials, composition, processing, frit, colors, properties & application of enamels, surface cleaning, pickling, polishing, application by screen printing, stenciling coating methods, firing, defects in enamel.

UNIT 9: Ceramics machinery.

1x08=08Marks

Definition of size reduction, crushing & grinding, types of crushers, such as jaw crusher, roller crusher, gyrator crusher etc., Size separators, types of separators, such as screens & separators, working principles. Definition of mining, dry, wet & plastic mixing . Types of presses & types of drier, working principles

UNIT 10: Advanced ceramics.

1x10=10Marks

Classification of advanced ceramics. Electronic ceramics, such as conductors, semi conductors insulators, ceramic capacitors & sensors. Types, properties, Raw materials & uses. Application of piezo electric ceramics, magnetic ceramics, such as hard & soft ferrite. Properties & applications. Alumina cutting tools, ceramic spark plug & honey comb. Definition of porous & vitrified ceramic tiles. Manufacturing process of ceramic tiles. Raw materials, mixing grinding, pressing & firing, glazing process. Defects in ceramic tiles.

UNIT 11: Raw materials technology.

1x10=10Marks

Clay: definition, formation, classification. Impurities in clays, purification of clays, properties of clays. Auxiliary raw materials: definition, properties of various auxiliary raw materials like water, binders, lubricants & coloring agents. Carbides: definition preparation, properties & uses of SiC , B_4C , WC & Ca_2C . Nitrides: definition of nitrides, preparation, properties & uses of Si_3N_4 , BN , TiN & AlN . Borides definition, preparation, properties & uses of MgB_2 & TiB_2 . Silicides definition, properties & uses of $MgSi_2$, $PtSi_2$, WSi_2 & $MoSi_2$. Special synthetic raw materials spinal ceramics, $SiAlON$, ceramets, foresterites , cordite, industrial diamond & zirconia.