Important Instruction to Examiners:-

1) The answers should be examined by key words & not as word to word as given in the model answers scheme.

2) The model answers & answers written by the candidate may vary but the examiner may try to access the understanding level of the candidate.

3) The language errors such as grammatical, spelling errors should not be given more importance.

4) While assessing figures, examiners, may give credit for principle components indicated in the figure. The figures drawn by candidate & model answer may vary. The examiner may give credit for any equivalent figure drawn.

5) Credit may be given step wise for numerical problems. In some cases, the assumed contact values may vary and there may be some difference in the candidate's answers and model answer.

6) In case of some questions credit may be given by judgment on part of examiner of relevant answer based on candidates understanding.

7) For programming language papers, credit may be given to any other programme based on equivalent concept.

Important notes to examiner

Q .NO	SOLUTION	MARKS
Q No.1	**Attempt Any Ten of the following:**	**20 M**
a)	**Give broad classification of materials.**	**02 M**
	Materials can be classified into following types: 1) Natural materials 2) Artificial materials 3) Special materials 4) Finishing materials 5) Recycled materials	**½ M Each give any four**
b)	**State the role of civil engineering in human life.**	**02 M**
	1) Civil engineering is very important at the starting of work as surveying is done to start the work. 2) Estimation and valuation is also carried during work progress and after completion respectively. 3) Civil engineering is important for mechanical engineers to provide proper foundation for machines and electrical engineers for providing electrical poles. 4) Transportation facilities like roads and railways are possible only because of civil engineering. 5) Construction of dams, harbours, airports etc. is civil engineering activity. 6) Water supply and drainage facility also comes under civil engineering. This way civil engineering is important in human life.	**1M for each give any two points**
c)	**What is mean by the term 'dressing of stone'?**	**02 M**
	The process of giving required shape and size to the quarry stone to improve the appearance of stone surface with the help of tools is called dressing of stone.	**02 M**
d)	**State the characteristics of good timber.**	**02 M**
	1) Colour of timber should be dark and uniform. 2) Odour should be pleasant when freshly cut. 3) Clear ringing sound indicates good timber. 4) Texture of good timber is fine and even. 5) Higher the density, stronger is the timber. 6) Timber should be capable to offer resistance to shock due to vibration. 7) Dense wood offers good fire resistance. 8) Timber should be strong to take loads.	**1 M Each give any TWO**
e)	**Define bitumen.**	**02 M**
	Bitumen is a non-crystalline solid or viscous material derived from petroleum, by natural or refinery process. It is black or brown in colour and it is soluble in carbon disulphide. It is asphalt in solid state and mineral tar in semi fluid state.	**02 M**
f)	**Enlist the common field tests conducted on the bricks.**	**02 M**
	1) Strength and durability or crushing strength. 2) Shape and size or dimensional stability. 3) Colour test 4) Soundness test. 5) Hardness test. 6) Water absorption test. 7) Porosity. 8) Efflorescence test. 9) Impact test.	**1/2 M each Write any four**

g)	**Define cement.**	**02 M**
	Cement is a fine grey powder which forms a paste with addition of water .With due time it sets and becomes hard. It is mixture of calcareous, argillaceous or siliceous material burnt in a furnace which forms stone like mass. It is then grinded to fine powder called cement.	**02 M**
h)	**Give any two properties of plywood.**	**02 M**
	1) It is light in weight and many times stronger than solid wood of same thickness. 2) It is resistant to cracking, warping, splitting, and has uniform strength In all directions. 3) It is available in many sizes and variety of decorative finishes. 4) It is defect free and easy to cut and bend. 5) Movement due to changes in moisture is negligible.	**1M each Write any TWO**
i)	**Enlist two brand names of water proofing and damp proofing material.**	**02 M**
	1) Dr. fixit 2) Algahard-x 3) Ridex flexifil 4) Polysil C 5) Conpro WP-2 6) Hydroproof-IWL 7) BASF India ltd 8) Impermo 9) Waterseal 10) Sunanda chemicals 11) Krishna conchem ***NOTE-Students can write any two names as waterproofing brand and two names as damp proofing brand.***	**½ each Write any Four**
j)	**List any two types of fibers used as construction material.**	**02 M**
	1) Steel fibers 2) Carbon fibers 3) Glass fibers 4) Plastic fibers 5) Asbestos fibers 6) Jute fibers 7) Coir fibers	**1M each Write any two**
k)	**State any two properties of cladding material.**	**02 M**
	1) The cladding material used should be strong and weather resistant. 2) It should be pleasing in appearance and should give decorative effect for a longer time. 3) It should provide thermal and sound insulation. 4) It should be easily available and workable.	**1M each Write any two**
l)	**Give the two uses of rice husk as construction material.**	**02 M**
	1) The rice husk ash has pozzolonic properties so it can be used as alternative to cement. 2) Rice husk ash is used in manufacturing of refractory bricks because of its insulating property. 3) It can be used with cement as stabilizing agent for improving residual soil properties. 4) It can be mixed with hydrated lime or cement and can be used as binder for masonry, foundation or concreting.	**1M each Write any two**

Q No.2	Attempt ANY FOUR of the following.	16 M
a)	**State any four criteria for selection of construction material.**	
	1) **Load taking capacity or design load**:- Material must be selected for their ability to support the loads imposed on them. 2) **Serviceability of material**:- The material selected should be useful till the life of the structure. 3) **Aesthetically pleasing**:- Material selected should increase appearance of structure. 4) **Economy and availability of material**:- Material to be selected should be economical for purchase, maintenance, replacement, demolition and disposal. It should be easily available. 5) **Environmental friendly material**:- Material selected should not be harmful to environment and occupants of structure.	**1 each Write any four**
b)	**State one example of the following of construction material. 1) Natural 2) Recycled construction material**	**04 M**
	1) Natural construction material- a) **Stone-** stone is naturally available from rocks by quarrying process. It is dressed to be used for foundation, walls, floorings, kitchen otta etc. It is most strong and durable material. b) **Timber-** timber is used worldwide as construction material. It is useful for formwork, centering, scaffolding, doors and window frames, shutters, for furniture, as roofing materials, for making railway sleepers, temporary bridges. c) **Bituminous materials and mixtures:-** asphalt, bitumen and tar are widely used materials. They are obtained from petroleum and used in road construction and for water proofing. They can be used in the form of emulsion, cutback, mastics, sheet rolls etc. d) **Lime-** lime is obtained from limestone by process of calcination in which carbon dioxide and moisture is removed. $CaCo3 \longrightarrow CaO+CO2$ e) **Soil-** soil is naturally obtained from disintegration of rocks when they are exposed to atmosphere by weathering agents like sun, wind, rain, frost etc. Soil is used as construction and foundation material. It is used for making earthen dams, canals, embankments. WBM roads. Clay is used in manufacturing of bricks and tiles. Sand is used in filter bed. **2) Recycled construction material-** a) **Rice husk-** it is a natural hard coating over rice grain. Rice husk is difficult to burn. The ash has insulating property. It has pozzolonic properties so it is used in manufacturing of bricks and alternative to cement for mortar, foundation and concreting. b) **Bagasse-**it is fibrous residue left after sugarcane stalks are crushed to extract juice. It is rich in alumina, iron and silica and possesses pozzolonic property. The ash can is mixed in cement or concrete. Bagasse is used in manufacturing of boards, bricks, bio fuels, papers etc. c) **Coir Fibers-**It is obtained from coconut husk which are present in covering of fruit. There may be green, white or brown coir fibers. It is mixed with cement mortar as it increases impact and tensile strength. d) **Straw**-It is agricultural by product .It is dry stalk of cereal plants like rice, wheat and barley etc. after the grains and chaff is removed. It can be used to bind clay and concrete, for insulation purpose and for roofing.	**02 M For any One Point** **02 M For any One Point**

b) Cont...	**e) Fly ash-**Fly ash is produced during combustion of coal generally in power plants. It comprises of very fine particles. It posses pozzolonic property so it is used in construction as alternative to cement. It is also used in brick manufacturing and soil stabilization. **f) Construction waste-**It is obtained at construction site after completion of site and after demolition of old structures. It is used in pavement filling, plinth filling and to prepare low grade concrete.	
c)	**State the requirement of good building stone.(any four)**	**04 M**
	1) It should have high crushing strength more than 100 N/mm2. 2) It should have high durability. 3) Hardness should be more than 14. 4) It should have pleasing appearance and should retain its colour for longer time. 5) Water absorption should be less than 0.6% by weight after 24 hours. 6) It should be easy for cutting and dressing. 7) It should have good fire resistance. 8) Specific gravity should be more than 2.7. 9) It should be economical and easily available. 10) It should have good weathering resistance. 11) It should have high impact value and high toughness index.	**1M For Each Write Any four**
d)	**State any four properties of good timber.**	**04 M**
	1) Colour- Colour of timber should be dark and uniform. 2) Odour- Odour should be pleasant when freshly cut. 3) Soundness- Clear ringing sound indicates good timber. 4) Texture- Texture of good timber is fine and even. 5) Density- Higher the density, stronger is the timber. 6) Timber should be capable to offer resistance to shock due to vibration. 7) Fire resistance-Dense wood offers good fire resistance. 8) Strength- Timber should be strong to take loads.	**1M For Each Write Any four**
e)	**Enlist any four defects in timber.**	**04 M**
	1) Defects due to natural forces: a) Knots b) Shakes c) Wind cracks d) Upsets e) Twisted fibers f) Rindgall g) Checks h) Rupture **2) Defects due to seasoning:** a) Warping b) Cupping c) Bowing d) Twisting	

e) Cont...	3) Defects due to conversion: a) Radial shakes b) Case hardening c) Twisting and bowing d) Honeycombing 4) Defects due to fungi: fungi cause rotting of wood and stains on wood. 5) Defects due to insects: beetles, marine borers, termites, eat wood and weaken wood.	
f)	**State any four characteristics of stone.**	**04M**
	1) **Appearance**- the stone should have fine compact texture and light color as dark color may fade in due course of time. 2) **Structure**- it should be free from cavities, cracks and patches of loose and soft materials. Stratifications should not be visible to naked eye. 3) **Strength**- the stone should be strong and durable. Compressive strength should be 60-200 N/mm2. 4) **Weight**- it is indication of porosity and density. For dams and retaining walls heavy stones are used and for arches and domes light stones are used. 5) **Hardness**- this property is important for floors, pavements and bridges. It is resistance to scratching. 6) **Toughness**- the measure of impact that a stone can withstand is defined as toughness. The stone should be tough for vibratory or moving loads. 7) **Porosity and water absorption-**Porous stones disintegrate easily and cause cracking. Water absorption should not be more than 0.6% by weight after 24 hrs. 8) **Seasoning-**The stone should be well seasoned. 9) **Workability**-The stone should be easy in cutting and dressing. **10) Specific gravity-**Specific gravity of most of the stones lies between 2.3 to 2.5. **11) Weathering-**The stone should offer resistance to wear and tear due to natural agencies like sun, wind, rain etc. 12) **Toughness**- the measure of impact that a stone can withstand is defined as toughness. The stone should be tough for vibratory or moving loads. 13) **Porosity and water absorption-**Porous stones disintegrate easily and cause cracking. Water absorption should not be more than 0.6% by weight after 24 hrs. 14) **Seasoning-**The stone should be well seasoned. 15) **Workability-**The stone should be easy in cutting and dressing. **16) Specific gravity-**Specific gravity of most of the stones lies between 2.3 to 2.5. **17) Weathering-**The stone should offer resistance to wear and tear due to natural agencies like sun, wind, rain etc.	**1M For Each Write Any four**

Q No.3	Attempt ANY FOUR of the following.	16 M
a)	**Define asphalt and state any three properties of asphalt**	**4 M**
	Definition: asphalt is a natural or artificial mixture in which bitumen is associated with inert mineral matter. In fact, it is the native mixture of hydrocarbons-a product of the decomposition of animal a vegetable substances. **Properties:** ➢ It is black or brownish black in colour. ➢ At temperature between 50-100 C it is in liquid state. Whereas at temp. Less than 50-100 C it remains in solid state. ➢ It is thermoplastic material. ➢ It softens as it is heated. ➢ It hardens as it is cooled. ➢ It is the tough and durable material. ➢ It is a waterproof material and can be easily cleaned. ➢ It is the good insulator of electricity, heat & sound. ➢ It a non inflammable and non absorbent. ➢ It is affected by acids and is safe against vermin. ➢ It is resilient and reasonably elastic.	**1M** **1M mark for each properties**
b)	**State the various types of tar used in civil engineering work and state their two uses**	**4M**
	➢ **Coal tar:** it is obtain by product in the destructive distillation of coal, or in the manufacture of coal gas. It is heavy, black and strong smelling liquid. ➢ **Wood tar:** it is obtain by the destructive distillation of pine or resinous wood. It contains creosote and as such is very strong preservative ➢ **Mineral tar:** it is obtain by the distillation of bituminous shale's. It contains less volatile matter e.g. Tarmac, tar paving and tar macadam. **Uses:** ➢ For surface painting under exceptionally cold weather conditions and on hill roads. ➢ Standard surface painting under normal Indian climatic condition. ➢ Surface paintings, renewal coats, premixing chips for top course. ➢ Premixing tar macadam in base course. ➢ For grouting.	**1M for each type** **½ M for each Write any two uses**
c)	**How lime is slaked?**	**4 M**
	➢ When lime is added to water in process called "slaking'' calcium hydroxide traditionally called slacked lime ➢ Quick lime heaped on a masonry or wooden platform ➢ Water is gradually sprinkled over it till lime is slaked and reduce to powder form ➢ During sprinkling of water, the heap is turned over and over again till no more water is to be added then require for the lime to convert in to the powder form ➢ The slaked lime is then screened through IS sieve 3.35 mm and the residue if any is rejected ➢ The final product is slaked lime. ➢ The chemical formula is $Ca(OH)_2$	**4 M**

d)	**State the characteristics of good flooring tiles**	**4M**
	➢ It should be free from any cracks. ➢ It should be regular in shape and size. ➢ It should be sound, hard and durable. ➢ It should have uniform texture and colour. ➢ It should have low water absorption i.e. less 15% ➢ It should have sufficient resistance to atmosphere and dampness. ➢ It should have pleasing appearance. ➢ It should be leak proof. ➢ It should have sufficient capacity to resist the load.	**½ M for each Write any Eight**
e)	**State four brands name of cement commonly available in market.**	**4M**
	Following are the brand names of cement are commonly available in market ➢ Ambuja cement ➢ ultratech cement ➢ ACC ltd. ➢ Binani cement ➢ Jk cement ➢ Mayur cement ➢ Reliance cement ➢ India cement ➢ Concrete pluse cement ➢ Shree cement ➢ Ramco cement ➢ Prism cement ➢ Dalmia cement ➢ Orient cement ➢ Birla corp **Note-: Student may write any other Brand name than above mentioned names. So accordingly credit to be given**	**1 M for each**
f)	**State any four characteristics of good brick**	**4M**
	➢ It should have uniform colour, shape and size. ➢ It should be well burnt. ➢ It should be free from cracks. ➢ It should produce a good metallic ringing sound when two bricks are struck with each other. ➢ It should not absorb water more than 20% of its dry weight, when immersed in water. ➢ It should be sufficiently strong. ➢ It should be fire resistance	**1 M for each Write any Four**

Q No.4	Attempt any four of the following	16 M
a)	**Suggest the type of glass used for the following work**	**4 M**
	i) Making panel of partition wall:- Soda lime glass, sheet glass ii) **Cashier cabin:-** Soda lime glass, laminated glass **iii) Sky light:-** Lead glass, **iv) Door shutter:-** Soda lime glass, tempered glass	**1 M for each**
b)	**State any four advantages of artificial sand.**	**4M**
	➢ Artificial sand is produced by proper machines, it can be a better substitute to river sand ➢ Artificial sand can reduces quantity of cement when fine particles are in proper proportion so that the sand will have fewer voids ➢ Artificial sand can be produce within a short period of time where as natural sand takes millions of years to form. ➢ The transportation cost will be minimum as artificial sand can be produce within a city. ➢ The sand of required size particles can be produced as per the demand of builder ➢ All the sand particles have higher crushing strength. ➢ Artificial sand has free from organic impurities. ➢ Artificial sand widely used as fine aggregate for concrete.	**1M for each**
c)	**Write any two properties of particle board and veneers**	**4M**
	Properties of particle board:- ➢ These boards provide dimensional stability. ➢ They have reasonable strength. ➢ It gives smooth uniform surface and no difficulty in nailing. ➢ They have high density. **Properties of veneers:-** ➢ The thickness of veneers varies from 0.4 to 0.6 mm ➢ Veneers are thin sheets or slices of wood of superior quality ➢ Raw veneer has no backing and can be glued on either side	**2M** **2M**
d)	**Define aggregate and state different types.**	**4M**
	Definition: aggregates are the materials basically used as filler with binding material in the production of mortar and concrete. They are derived from igneous, sedimentary and metamorphic rocks or manufactured from blast furnace slag. **Different type of aggregate:-** **1. On the basis of geological origin** a. Natural aggregate b. Artificial aggregate **2. On the basis of size** a. Coarse aggregate b. All in aggregate c. Graded aggregate d. Fine aggregate **3. On the basis of shape** a. Rounded aggregate b. Irregular aggregate c. Angular aggregate d. Flaky aggregate	**1M for definition** **1M for each type**

	4. Based on unit weight a. Normal weight b. Heavy weight c. Light weight	
e)	**Enlist any four field test conducted on cement**	**4 M**
	➢ Open the bag and take a good look at the cement. There should not be any visible lumps. The colour of the cement should normally be greenish grey. ➢ Thrust your hand into the cement bag. It must give you a cool feeling. ➢ Take a pinch of cement and feel between the fingers. It should give a smooth and not a gritty feeling. ➢ Take a hand full of cement and throw it on a bucket full of water, the particles should float for some time before they sink ➢ Take about 100 gms of cement and small quantity of water and make it stiff paste. From the stiff paste, pat a cake with sharp edges. Put it on a glass plate and slowly take it under water in bucket. See that the shape of the cake is not disturbed while taking it down to the bottom of the bucket. After 24 hr the cake should retain its original shape and the same time it should also set and attain some strength.	**1M for each**
f)	**State any two properties and two uses of precast concrete product**	**4 M**
	Properties of precast concrete product:- ➢ Precast concrete offers durable, flexible solution for floors and walls. ➢ It has good appearance i.e. and almost end variety shapes, colours, texture and finishes is available for precast concrete ➢ It is high sound insulation ➢ It is high thermal insulation ➢ It has good fire resistance properties **Uses of precast concrete product:-** ➢ For construction of all building components e.g. slab, partition walls, columns, beams etc. ➢ For construction of bridge ➢ It can be used architectural concrete accents ➢ It can be used for making traffic barriers and retaining walls.	**1M for each i.e. 2M for properties** **1M for each i.e. 2M for Uses**

Q No.5	Attempt ANY FOUR of the following	16 M
a)	**Explain the procedure of manufacturing of burnt brick.**	**4 M**
	Manufacturing of Burnt Clay Brick consists of a) Preparation of clay. B) Moulding c) Drying d) Burning. **a)Preparation of Clay:** • Unsoiling of clay consists of removal or vegetations and organic matter. • Clay is manually excavated or mechanically up to certain height above ground level. • For obtaining better quality of bricks additions of chalk and sand is done. • The heap of clay is exposed to atmospheric agent and bacteria for at least a month. • A homogenous mass of clay is prepared with uniform consistency. **b)Moulding: -** • The clay is either hand moulded or machine moulded. • In hand moulding a mould of wood or iron are used. • Hand moulding is used in case of soft clay and is done on ground on the table. • In table moulding the bricks are laid on pallete board and the brick are prepared. **c) Drying: -** • In drying the moisture is removed from bricks without damaging the bricks. • Bricks are dried by natural drying or by artificial drying. • **Natural drying: -** Wet bricks are arranged in rows on ground on open air keeping space in between bricks for circulation of air. • **Artificial Drying: -** It is used when large quantities of bricks are required in shortest time. In artificial drying special furnace are built or hot flue gases from cooling chamber are used **d) Burning:-** • Burning is done to remove water from clay and to impart hardness and strength in bricks. • Due to burning of the density of bricks is increased and water absorption capacity of bricks is decreased. • Burning can be done in two ways a) Clamps b) Kilns. • A) Clamps: -In clamps, bricks and fuel are placed in alternate layers in open air and good quality of bricks are obtained. • B) Kilns: - the bricks are stacked without any fuel and burnt from fire places and produces better quality of bricks.	**½ M for each any two points** **½ M each for any two points** **½ M each for any two points** **½ M each for any two points.**

b)	**State the properties of thermal insulating material. (any four)**	**4 M**
	• Thermal insulating should be bio resistant and dry. • Thermal resistant should be chemically resistant and fire proof. • Thermal resisting material should have bulk density below 600Kg/m^3. • Thermal insulating material should have more pores as the entrapped air or any other gases within the pores decreases the thermal conductivity of material. • The pores in thermal insulating material should be closed so that water vapor does not enter in the material. • With increase in the moisture content in the material, the coefficient of thermal conductivity rises greatly.	**1M each for any four points.**
c)	**State any two properties and situations where sound insulating material is used.**	**4 M**
	Properties of Sound Insulating Material: - **a) i)** They are pores structure and are shaped in form of slabs, mats, rolls, strips etc. ii) Sound proofing material are used in building construction in non compressed form or in suspended state. iii) The sound proofing material are used in form of liners and layers in floors, walls so that noise transmitted through floors or vibrations can be made minimum. **b)Situations of Different Sound Insulating Material:-** 1. Glass, Mineral wool mats, Slabs or Synthetic Binder are used as Sound Insulator as solid Inner Layer underneath floors. 2. Plastic Slab is made from plasticized polystyrene foamed plastic. They provide sound proofing of reinforced concrete floor. 3. Wire fibre boards: - They are used as sub floor to insulate impact noise. 4. Mineral Wood Boards: - They are subjected to thermal and moisture curing in special chamber. 5. Gypsum Plaster Boards: - They are used along with mineral wool and glass fibre for facing walls and ceilings. 6. Wood Fibre and asbestos slab are used as strip lining in floors.	**1M each for any two** **1M each for any two**
d)	**Enlist the four uses of asbestos fibre in construction.**	
	• Asbestos fibres are used in tapes, boards, high voltage machine. • Asbestos acts as fibrous filler in number of plastic with organic binder. • Asbestos is used for resistance to fire or heat. • Asbestos are mixed with cement to make fibre cement. • Asbestos fibres are woven into fabric or mats.	**1M each for any four points.**

e)	**State the properties and uses of geosynthetic material.**	**4 M**
	Properties of Geosynthetic Material: - • Woven geotextile have high tensile strength and low strain. • Geo grids have low strength but takes heavy loads. • Geo textile, Geogrids, Geocells are porous to allow water to filters through them. • Geo membranes have low permeability and are used to control fluid moments. **Uses of Geosynthetic Material: -** • Geo synthetic are used to improve level grade soil situations such as roads, valley. • They are used to improve slope grade situations such as banks, hill side. • Geosynthetic control water pressure allowing flow in the plane of material such as foundation walls. • Geosynthetic material prevents soil movements.	**1M each for any two points** **1M each for any two points**.
f)	**Name the two termite proofing materials and their two uses.**	**4 M**
	Termite proofing materials: **i. EPS sandwich panels** **Uses:** a. Interior and exterior partition on steel or concrete b. For various buildings like banks, offices, hospitals, schools, hotels, etc. **ii. Termite resistance wood plastic composite floor** **Uses:** a. Used for outside walls b. Used for decking board **iii. Taixi wood** **Uses:** a. Used in offices, hotels, public buildings b. Used in commercial places **iv. Termotar:** **uses :** A.Termortar used in framed construction. b. Used for Load bearing construction.	**2M each for any two materials**

Q No.6	Attempt ANY FOUR of the following	16 M
a)	**Enlist constituent of plaster of Paris and state the two uses of plaster of Paris.**	4 M
	Constituents of Plaster of Paris: - A process which involves exposing the gypsum to very high temperature to create calcium sulphate and then grinding it into a fine white powder is known as plaster of Paris. **Uses of Plaster of Paris:-** • It is used as architectural decoration for formation of columns, and other decorative features in interior finish. • It is used by orthopaedic surgeon for setting bones. • It is used for wall plaster, wall boards, structural tiles, statue etc. • It is used for metal filling etc.	2M 1M each for any two points.
b)	**State the constituent of cement mortar and their proportions.**	4 M
	Constituents of Cement Mortar: - • In cement mortar cement is used as a binding material with sand and water in proportion 1:2 to 1:6 or more by volume or by weight. • The proportion of cement and sand should be taken depending upon the durability and working condition. • In construction when high strength and water resisting properties are required cement mortar is used. **Uses of Cement Mortar:-** • Cement mortar has high strength. • Cement mortar is water proof. • Cement mortar has high fire resistant capacity. • For underground constructions and for saturated soil cement mortar is used. • It provides an impermeable surface on walls and protects them against moisture.	1M each for any two points 1M each for any two points.
c)	**State any two properties and two uses of paints.**	4 M
	Properties of Paints: - • Paint should have enough resisting power. • It should be durable, should not crack, and should not shrink. • The film produce by paint must be washable. • Paint should be able to resist atmospheric condition to which it is exposed. • The paint should produce glossy film. **Uses of Paints:-** • Paints are hard, durable for furniture and interior use. • Flexible types of paints are used for fabrics. • Paints should be durable as they are used for painting automobiles. • Paints are water resistant as they are provided at internal and external parts of building.	1M for any two points 1M each for any two points.

d)	**Enlist four properties of coir fibres.**	**4 M**
	• It is light in weight and strong and elastic. • It has low light resistance and high durability. • It had high tensile strength around 140Mpa to 150Mpa. • Its thermal conductivity is low. • Its elongation under the effect of load is 15% to 17% • Its density is about 1.5kg/m^3.	**1M each for any four properties**
e)	**State properties of bagasse and two uses of bagasse construction material.**	**4 M**
	Properties of Bagasse: - • It is chemically stable compound. • It is rich in alumina, iron and silica. • Bagasse has good pozzolonic properties. • When bagasse is mixed with cement, concrete is good in flexure and compression. **Uses of Bagasse:-** • When bagasse is mixed with lime it acts as chemical stabilizer in compacted soil blocks. • When bagasse is mixed with cement, the mortar prepared is good making concrete pavers and roof tiles. • Sugarcane bagasse can replace cement in concrete as sugarcane bagasse had excellent binding property. • Sugarcane bagasse improves quality of material.	**½ M each** **1M each for any two uses.**
f)	**Enlist two properties of plastic and polymers**	**4 M**
	Properties of Plastic and Polymers:- **<u>Plastic Properties:-</u>** • Plastic softens on heating without any evolution of gas. • Plastic when softened have good binding property. • Plastic roads show superior smoothness and uniformity. • Plastic roads are water resistant's. **<u>Polymers Properties:-</u>** • Polymers soften on heating without any evolution of gas. • Polymers when softened have good binding property. • Polymers are water resistant.	**1M each for any two properties** **1M each for any two properties**