



WINTER – 14 EXAMINATION
Model Answer

Subject Code:17209

Page No: 1/12

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 assess 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 program based on equivalent concept.



WINTER – 14 EXAMINATION

Subject Code:17209

Model Answer

Page No: 2/12

.NO	SOLUTION	MARKS								
1.	Attempt any ten.	(20)								
a.	<p>State any two applications of construction management.</p> <ol style="list-style-type: none"> 1. Project management & systematically completion of a construction work. 2. Maximization and optimization of material, labour, money & time required for construction. 3. Use of modern methods or techniques & construction machines. 4. Use of smart & alternative materials of construction. 5. Achieving good quality of work and economy, efficiency and factor of safety as guiding principles. 6. Scheduling and phasing of works for managing the operations and stages involved in the construction. 	<p>1 mark for each point (any 2)</p>								
b.	<p>State different types of materials.</p> <ol style="list-style-type: none"> 1. Natural materials. 2. Artificial materials. 3. Special materials. 4. Finishing materials. 5. Recycled materials. 	<p>½ mark for each point (any 4)</p>								
c.	<p>What are the sources of silt?</p> <p>Silt may occur as a soil or as suspended sediment in a surface water body. It may also exist as soil deposited at the bottom of a water body.</p>	<p>2 marks</p>								
d.	<p>Distinguish between stone and rock.</p> <table border="1" data-bbox="256 1440 1343 1736"> <thead> <tr> <th data-bbox="256 1440 802 1478">Stone</th> <th data-bbox="802 1440 1343 1478">Rock</th> </tr> </thead> <tbody> <tr> <td data-bbox="256 1478 802 1570">1. Stone is obtained from rock, which is solid portion of Earth's crust.</td> <td data-bbox="802 1478 1343 1570">1. Rocks are formed due to cooling of exposed magma.</td> </tr> <tr> <td data-bbox="256 1570 802 1640">2. Stones are smaller in size than rocks.</td> <td data-bbox="802 1570 1343 1640">2. Rocks are larger in size than stones.</td> </tr> <tr> <td data-bbox="256 1640 802 1736">3. Stones are hard material & not at all soft.</td> <td data-bbox="802 1640 1343 1736">3. Rocks can be both hard & soft.</td> </tr> </tbody> </table>	Stone	Rock	1. Stone is obtained from rock, which is solid portion of Earth's crust.	1. Rocks are formed due to cooling of exposed magma.	2. Stones are smaller in size than rocks.	2. Rocks are larger in size than stones.	3. Stones are hard material & not at all soft.	3. Rocks can be both hard & soft.	<p>1 mark for each point (any 2)</p>
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e.	<p>State different forms of bitumen.</p> <ol style="list-style-type: none"> 1. Straight run bitumen 2. Blown bitumen 3. Cutback bitumen 4. Plastic bitumen 5. Bitumen emulsion. 	<p>½ mark for each point (any 4)</p>								



WINTER – 14 EXAMINATION

Subject Code:17209

Model Answer

Page No: 3/12

f.	State any four types of cement. 1. Portland cement 2. Natural cement 3. Pozzolanic cement 4. High alumina cement 5. Super sulphate cement 6. Special sulphate cement.	½ mark for each point (any 4)
g.	List four types of flooring. 1. Hollow clay tiles. 2. Structural Hollow clay floor tiles. 3. PVC floor tiles. 4. Ceramic unglazed tiles. 5. Glazed earthenware tiles. 6. Cement Flooring 7. Concrete Flooring 8. Mud Flooring	½ mark for each point (any 4)
h.	What is coir? 1. Coir is the fibrous material found between the hard, internal shell & the outer coat of coconut. 2. Depending upon the method of extraction fibres are classified as white, green or brown fibres. 3. It is light in weight, strong and elastic. 4. Used in vertical load bearing walls, floors, roofing. 5. Thermal Conductivity	2 marks
i.	State the packing in which waterproofing materials are available. 1. Most of the waterproofing materials are available in liquid and powder form. 2. Integral liquid waterproofing compounds are available in plastic bottles of different sizes while integral powder waterproofing compounds are available in waterproof boxes or polyethylene bags.	½ mark for each point (any 4)
j.	Give the name of chemical used for anti-termite treatment. 1. Chloropyrifos 2. Heptachlor 3. Chlordane 4. DDT 5. BHC 6. Aldrin	½ mark for each point (any 4)
k.	Enumerate two field tests to which bricks are generally subjected. 1. Shape and size 2. Color 3. Structure 4. Soundness 5. Hardness 6. Water absorption	1 mark for each point (any 2)
l.	What is blast furnace slag? It is a non-metallic by-product produced in the process of iron making in a blast furnace. It consists of silicates, alumina silicates and calcium alumina silicates.	2 marks
2.	Attempt any four.	(16)



WINTER – 14 EXAMINATION

Subject Code:17209

Model Answer

Page No: 4/12

<p>a.</p>	<p>What are the requirements of construction materials?</p> <p>1. Loading: The material should have sufficient strength to carry the prescribed loads.</p> <p>2. Serviceability: serviceability refers to the conditions under which building is still considered useful. For that the material used should not produce large deflection, more vibrations, cracks etc.</p> <p>3. Appearance: The material to be used for construction should give aesthetically pleasing appearance.</p> <p>4. Economy: The construction material should be economical.</p> <p>5. Environmental effect: The construction material should not produce pollution or affect human beings during their use. It should be environmental friendly.</p>	<p>1 mark for each point (any 4)</p>
<p>b.</p>	<p>List out the works which are executed by a Civil Engineer.</p> <p>1. Water Supply Work: - The construction of network of pipes, water treatment plant and other different water supply work are done by civil engineering.</p> <p>2. Transportation work: - The construction of roads, railway tracks, airports etc. is done by civil engineers.</p> <p>3. Hydraulic Structure: - The construction of dams, canals and other related structures are constructed by civil engineers.</p> <p>4. The buildings like residential, public, commercial and sky scrapers are constructed by civil engineers.</p>	<p>4 marks</p>
<p>c.</p>	<p>State various methods employed for quarrying of stone and explain any one in brief.</p> <p>1. Digging. 2. Heating. 3. Wedging. 4. Blasting</p> <p>1. Digging: This method is adopted when the quarry consists of small and soft pieces of stones, then digging method is preferably used to remove the stones.</p> <p>2. Heating: when the natural rock bed is horizontal and small in thickness, then rocks are splitted up into small pieces by the process of heating.</p> <p>3. Wedging: When the hard rock consist of natural fissures, cracks, then Wedging method is used to remove the stones from the hard rock.</p> <p>4. Blasting: when the rocks are much hard, compact and fissure less, then it is very difficult to remove the stones by the method of heating and wedging, that time blasting method is used.</p>	<p>1 mark for each point (any 4)</p>



WINTER – 14 EXAMINATION

Subject Code:17209

Model Answer

Page No: 6/12

a)	What is silt? State any two uses of silt.	4M
Ans.	Silt : Silt is a granular material of a size somewhere between sand and clay whose mineral origin is quartz and feldspar. Silt may occur as a soil or as suspended sediment in a surface water body. It may also exist as soil deposited at the bottom of water body Uses of silt: 1. Silt is used to build bricks, grow crops, and form sedimentary rocks. 2. Clay: a stiff, sticky fine-grained earth, typically yellow, red, or bluish-gray in colour and often forming an impermeable layer in the soil.	2M 1M 1M
b)	State the various types of clays with their suitability.	4M
Ans.	Refractory clays: These clays are very disperse and very plastic. These have high content of alumina and low content of impurities. These are used for manufacturing refractory bricks. High melting clays: These clays have high refractoriness and contain small amount of impurities such as quartz, feldspar, mica, calcium carbonate and magnesium carbonate. These are used for manufacturing of facing bricks, floor tiles, sewer pipes. Low melting clays: These clays have refractoriness less than 1350°C and have varying compositions. These are used for manufacturing bricks, blocks, tiles etc. Kaolin clay: These are formed from the decay of underlying rocks. These are used for making pottery.	1M 1M 1M 1M
c)	State any four properties of hydraulic lime.	4M
Ans.	properties of hydraulic lime: 1. Sets under water 2. Colour is not perfectly white 3. Forms a thin paste with water and does not dissolve in water 4. Its binding property improves if its fine powder is mixed with sand and kept in the form of heap for a week, before using.	



WINTER – 14EXAMINATION

Subject Code:17209

Model Answer

Page No: 7/12

<p>d) Ans.</p>	<p>State and give function of any four constituents of a good brick earth.</p> <p>1) Alumina: 1. It is the chief ingredient of every clay. 2. Alumina absorbs more water and imparts plasticity to the clay. Therefore brick can be easily mouldable.</p> <p>2) Silica: 1. Silica is added to clay in appropriate quantities if not present sufficiently. 2. It prevents cracking, shrinking and warping of raw bricks.</p> <p>3) Lime: 1. Small quantity of lime in brick earth is desirable. 2. It prevents the raw brick from shrinkage.</p> <p>4) Magnesia: 1. It also acts as flux during burning. 2. Excess of magnesia (more than 1%) causes brick to decay.</p>		<p>4M 1M 1M 1M 1M</p>																		
<p>e) Ans.</p>	<p>State different types of tiles with their suitability.</p> <p>1.Drain tiles: these types of tiles are laid in the water logged areas and allow the subsoil water to drain.</p> <p>2. floor or paving tiles: these tiles are suitable for flooring and paving.</p> <p>3. Roof Tiles: these tiles are mostly used for covering the pitched roof or slopy roof.</p> <p>4.Encaustic tiles: these tiles are mainly used for decorative purpose</p> <p>5.Clay tiles: These tiles are made from good clay of even texture made in various shape and sizes according to their uses. Used for roofing and flooring purposes.</p> <p>6. Quarry Tiles : -a) Made from Clay b) Made in different colours and mosaic. C) Suitable for flooring in residential and public and industrial building where floor comes in contact with acid or alkalies.</p> <p>7. Glazed earth ware Tiles : a) Earth ware covered by a glazed b) Used in finishing floor and walls of kitchen bathroom water closet etc.</p> <p>8. Cement Tiles: -a) Made from cement b) Uniform Texture c) High Strength good water resistant property and water tightness. D) Used for roofing and flooring purposes.</p>		<p>4M 1M 1M 1M 1M</p>																		
<p>f) Ans.</p>	<p>Differentiate between conventional bricks and standard bricks.</p> <table border="1" data-bbox="256 1444 1219 2032"> <thead> <tr> <th data-bbox="256 1444 375 1486">Sr.No.</th> <th data-bbox="380 1444 808 1486">conventional bricks</th> <th data-bbox="813 1444 1219 1486">standard bricks</th> </tr> </thead> <tbody> <tr> <td data-bbox="256 1493 375 1556">1.</td> <td data-bbox="380 1493 808 1556">Size of conventional brick is 23×11.4×7.5cm</td> <td data-bbox="813 1493 1219 1556">Size of standard bricks is 19×9×9cm</td> </tr> <tr> <td data-bbox="256 1562 375 1709">2.</td> <td data-bbox="380 1562 808 1709">Conventional bricks are not classified based on their strength</td> <td data-bbox="813 1562 1219 1709">Standard bricks are classified based on their strength like class-I, class-II etc.</td> </tr> <tr> <td data-bbox="256 1715 375 1820">3.</td> <td data-bbox="380 1715 808 1820">conventional bricks are not easy to install and dismantle compare to Standard</td> <td data-bbox="813 1715 1219 1820">Standard bricks are easy to install and dismantle compare to conventional</td> </tr> <tr> <td data-bbox="256 1827 375 1967">4.</td> <td data-bbox="380 1827 808 1967">Wastage material collected after constructing a wall by using conventional brick is more.</td> <td data-bbox="813 1827 1219 1967">Wastage material collected after constructing a wall by using standard brick is less.</td> </tr> <tr> <td data-bbox="256 1974 375 2032">5.</td> <td data-bbox="380 1974 808 2032">Conventional bricks size get varies place to place in india</td> <td data-bbox="813 1974 1219 2032">Standard bricks size is fixed all over the india</td> </tr> </tbody> </table>		Sr.No.	conventional bricks	standard bricks	1.	Size of conventional brick is 23×11.4×7.5cm	Size of standard bricks is 19×9×9cm	2.	Conventional bricks are not classified based on their strength	Standard bricks are classified based on their strength like class-I, class-II etc.	3.	conventional bricks are not easy to install and dismantle compare to Standard	Standard bricks are easy to install and dismantle compare to conventional	4.	Wastage material collected after constructing a wall by using conventional brick is more.	Wastage material collected after constructing a wall by using standard brick is less.	5.	Conventional bricks size get varies place to place in india	Standard bricks size is fixed all over the india	<p>4M 1M (ANY FOUR)</p>
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WINTER – 14 EXAMINATION

Subject Code:17209

Model Answer

Page No: 8/12

Q.4)	Attempt any <u>four</u> of the following:	16M																								
a)	Write any four uses of plywood.	4M																								
Ans.	<ol style="list-style-type: none">1. For false ceiling for interior designing,2. For manufacturing door ,shutters3. For making chairs,tables and other kitchen furniture.4. For partition between rooms5. For paneling of walls.6. For packing cases.7. Formwork	1M 1M 1M 1M (any four)																								
b)	Write any two advantages and disadvantages of glass cladding.	4M																								
Ans.	Advantages of glass cladding: <ol style="list-style-type: none">1. Glass cladding in building fulfill functional requirement of lighting, heat retention and energy saving.2. Glass is an excellent material for thermal insulation, water proofing and energy conservation.3. Glass is bad conductor of heat; it saves energy in air conditioning of building. Disadvantages of glass cladding: <ol style="list-style-type: none">1. As glass is very costly material, it may increase the budgeted cost of construction work.2. Use of glass also enhances the cost of security. Its use in hilly area and desert may cause more maintenance cost.	1M 1M (any two) 1M 1M (any two)																								
c)	Name the chemical ingredients of cement with their proportions.	4M																								
Ans.	<table border="1"><thead><tr><th>Sr. No.</th><th>chemical ingredients of cement</th><th>formula</th><th>Proportions(%)</th></tr></thead><tbody><tr><td>1.</td><td>lime</td><td>CaO</td><td>60-67</td></tr><tr><td>2.</td><td>Silica</td><td>SiO₂</td><td>17-25</td></tr><tr><td>3.</td><td>Alumina</td><td>Al₂O₃</td><td>3-8</td></tr><tr><td>4.</td><td>Iron Oxide</td><td>Fe₂O₃</td><td>0.5-6</td></tr><tr><td>5.</td><td>Magnesia</td><td>MgO</td><td>0.1-4</td></tr></tbody></table>	Sr. No.	chemical ingredients of cement	formula	Proportions(%)	1.	lime	CaO	60-67	2.	Silica	SiO ₂	17-25	3.	Alumina	Al ₂ O ₃	3-8	4.	Iron Oxide	Fe ₂ O ₃	0.5-6	5.	Magnesia	MgO	0.1-4	2M (each) (ANY TWO)
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WINTER – 14 EXAMINATION

Model Answer

Subject Code:17209

Page No: 9/12

d)	What are the advantages of artificial sand?	4M
Ans.	Advantages of artificial sand: 1. sand is not removed from rivers, which is good from environmental point of view 2. Transportation cost can be saved by manufacturing and locally. 3. cost is less as compared to natural sand 4. The sand of required size particles can be produced as per demand of builders.	1M 1M 1M 1M
e)	What are the different properties of glass?	4M
Ans.	1. Viscosity: the viscosity of glass changes continuously with temperature without a critical point. 2. Thermal expansion: coefficient of expansion mainly depends on the composition of glass. 3. Thermal conductivity. 4. Optical properties.	1M 1M 1M 1M
f)	Give two advantages and two disadvantages for pre-cast concrete product.	4M
Ans.	Advantages for pre-cast concrete product: 1. The concrete of superior quality is produced by strict quality control. 2. It is not necessary to provide joints in the pre-cast construction. Disadvantages for pre-cast concrete product: 1. If not properly handled, the pre-cast concrete may be damaged during transport. 2. It becomes difficult to produce satisfactory connections between the pre-cast members.	1M (each)
Q5.	Solution	16Marks
a)	Properties of Carbon Fibres: - 1. Carbon fibres have good tensile strength. 2. They have low coefficient of thermal expansion. 3. They are corrosion resistant and chemical stable. 4. They have high strength to weight ratio. Uses: - 1. They are used in construction of roads. 2. They are used for manufacturing sports equipment. 3. They are used in machines, equipments, and apparatus.	1M each For any two 1M each for any two



WINTER – 14EXAMINATION

Subject Code:17209

Model Answer

Page No: 10/12

b)	<p>Uses of Asbestos Fibres: -</p> <ol style="list-style-type: none">1. They are used in making bricks.2. They are used for floor tiles.3. They are used for manufacturing insulating cement.4. They are used for manufacturing insulating concrete block.5. They are used for making textile material.	1M each for any four uses
c)	<p>Fibres: -</p> <ol style="list-style-type: none">a) The fibre is a filament or thread like piece of any material.b) Fiber is a small piece of reinforcing material possessing certain characteristic properties.c) It is long and thin material can be circular or flat. <p>1.Steel Fiber: - Steel Fiber is wire of low carbon steel having high tensile strength and is elastic and ductile in nature. Steel fibers are used in pre-cast pipes, concrete blocks.</p> <p>2. Carbon Fiber: - Carbon fiber is extremely strong and light. Carbon fibers are generally composite material. Fiber reinforced polymer contains carbon fiber. Carbon fiber is generally used for strengthening of concrete, masonry steel, cast iron and timber structure.</p> <p>3. Glass Fibers: - They are softened and drawn mechanically into threads or glass wool that is finer than silk. They are generally used for construction of furniture, bathroom fittings, lamp shades etc.</p> <p>4.Asbestos fiber:- Asbestos Fiber are used in manufacturing insulating concrete blocks.</p>	2M for any two 2M for any Two uses.
d)	<p>Properties of Water Proofing Material: -</p> <ol style="list-style-type: none">a) Dr. Fixit :- <ol style="list-style-type: none">1. It withstands temperature variation and prevents formation of cracks.2. It gets easily mixed with cement, sand, aggregates to form a homogenous paste. <p>Uses: -</p> <ol style="list-style-type: none">1) Water proofing for building toilets, water tank and swimming pools.2) Renovation of concrete against corrosion. <ol style="list-style-type: none">b) Ridex AP: - <ol style="list-style-type: none">1. It is durable.2. It is impervious <p>Uses: -</p> <ol style="list-style-type: none">1. Corrosive resistant coat on re bar.2. On glazed china chips for crack sealing.	2M 2M
e)	<p>Damp Proofing: -</p> <p>Damp Proofing is a treatment of a surface to stop the rise water by capillary of action.</p> <p>Classification of Damp Proof Material: -</p> <ol style="list-style-type: none">1) Flexible Material: - Material like bitumen and felts and plastic sheeting.2) Semi Rigid Materials: - Like mastic asphalts, materials like of materials or layers.3) Rigid Material: - Material like first class brick stones, cement concrete etc.4) Grout Material : - Grout consists of cement slurry and acrylic based chemical or polymers.	1M each for any two 1M each for any two



WINTER – 14EXAMINATION

Subject Code:17209

Model Answer

Page No: 11/12

f)	Suitability of Different Sound Insulating Material:- <ol style="list-style-type: none">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 any four
Q.6	Attempt any Four	16M
a)	Types of Special Mortar and their Uses: - <ol style="list-style-type: none">1. Fire Resistant Mortar : - It is used in fire bricks for lining furnace, fire places, ovens, etc.2. Light Weight Mortar: - This mortar is used in sound proof and heat proof construction.3. Sound Absorbing Mortar: - To reduce the noise level the sound absorbing plaster is formed with the help of sound absorbing mortar.4. X-ray Shielding Mortar: - This type of mortar is used for providing the plastering coat to walls and ceiling of X-ray cabinets.	1M each
b)	Properties of P.O.P: - <ol style="list-style-type: none">1. It is light in weight.2. It is fire resistant and does not allow heat to pass easily.3. It shows good adhesion to fibrous material.4. It is not affected by bacteria.5. It sets with negligible shrinkage on drying.	1M each any four
c)	Situations where Lime mortar and is used along with its proportion: - <ol style="list-style-type: none">1. Construction work in water logged areas and exposed position: - 1:32. Partitions Walls and Parapet Walls : - 1:1.3. Stone Masonry : - 1:2.4. Joints in Brick Work: - 1:3	1M each
d)	<ol style="list-style-type: none">1. Rice Husk: - The outer most layer of paddy grain is called as rice husk. It is separated from brown rice in rice mill. It has high silica content. Rice Husk is highly resistant to moisture penetration and fungal decomposition.2. Straw: - The Dry stalks of cereal plants, after the grain and chaff have been removed are called as straw. Straw are inherently inflammable. Straw have excellent thermal insulating property.3. Fly Ash: - Fly Ash is residue from the combustion of pulverized coal collected by mechanical or electrostatic separators from the flue gases or power plants. Long term pozzolanic action of fly ash decreases permeability of concrete. Fly ash are generally used for manufacturing of bricks.4. Blast Furnace Slag: -Blast Furnace Slag is a bi product obtained while melting iron ore from blast furnace. It content sulphur in small amount and possess cementing property. Blast Furnace slag have high absorption value and is used for roads bases.	1M each



WINTER – 14EXAMINATION

Subject Code:17209

Model Answer

Page No: 12/12

e)	<p>Uses of Construction Waste: -</p> <ol style="list-style-type: none">1. Waste generated from construction should be recycled and reused.2. The pieces of bricks, hardened mortar and concrete can be used in manufacturing of concrete block.3. Waste from the timber such as saw dust can be used for making light weight concrete.4. Metal pieces can be recycled and send to metal industries for manufacturing of new product.5. Plastic pieces can be recycled and send to plastic industries for manufacturing of new product.	1M each any four
f)	<p>Uses of Saw Dust : -</p> <ol style="list-style-type: none">1. Saw dust is used for making concrete block.2. Saw dust ash is used for fine aggregate in concrete.3. Saw dust is used to make light weight mortar.4. It is used in manufacturing of light weight aggregates. <p>Uses of Polymers: -</p> <ol style="list-style-type: none">1. Polymers are used for insulation and packing.2. Polymers are used for cladding panels, sinks, surfaces, coating.3. Polymers are used as glazing sealants.4. Polymers are used for making polymer concrete.	1M each for any two 1M each for any two