



Important Instructions to examiners:

- 1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
- 2) The model answer and the answer written by 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. (Not applicable for subject English and Communication Skills.)
- 4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by the candidate and those in the model answer may vary. The examiner may give credit for any equivalent figure drawn.
- 5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and the model answer.
- 6) In case of some questions credit may be given by judgment on part of examiner of relevant answer based on candidate's understanding.
- 7) For programming language papers, credit may be given to any other program based on equivalent concept.

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q. 1	a)	Attempt any <u>THREE</u> of the following :		(12)
	(i)	Draw standard organization chart of PWD.		
	Ans.	<pre> graph TD G[Government (PWD)] --> SG[Secretary to Government] SG --> CE[Chief Engineer] CE --> SE1[Superintending Engineer(S.E) Circle-1] CE --> SE2[Superintending Engineer(S.E) Circle-2] CE --> SE3[Superintending Engineer(S.E) Circle-3] CE --> SE4[Superintending Engineer(S.E) Circle-4] SE2 --> EE[Executive Engineer] EE --> AEE[Assistant Executive Engineer] AEE --> SDE[Sub Divisional Engineer(Assistant Engineer)] SDE --> JE[junior Engineer (Sectional officer)] JE --> SA[Supervisors (Technical Assistant)] SA --> SW[Skilled Workers] SA --> SSW[Semiskilled Workers] SA --> UW[Unskilled Workers] </pre>	1	
			1	
			1	4



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks												
Q. 1	ii)	Define tender and state necessity of tender.														
	Ans.	<u>Definition of Tender:</u> Tender is an offer, in writing from a contractor to execute some specified work or supply material/s for certain amount of money <u>Necessity of Tender:</u> 1. To execute work as per specification and drawing. 2. To complete the work within specified time. 3. To supply materials and labours. 4. For transportation of materials.	1	4												
	iii)	Describe in brief 'Schedule A'.														
	Ans.	<u>Schedule A:</u> It is a statement showing the list of materials to be supplied by the department (PWD) to the contractor and the rate at which the materials are to be charged. The materials mentioned in the schedule are issued to the contractor from time to time as per requirement to keep the progress of work. The particulars commonly shown in schedule A are as follows. 1. Description of material/s to be supplied. 2. Approximate quantity. 3. The rate at which material will be charged. 4. Place of delivery of the material. Schedule A	2	4												
			<table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Particulars of Materials</th> <th>Approximate Quantity</th> <th>Issue Rate</th> <th>Unit</th> <th>Place of Delivery</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Sr. No.	Particulars of Materials	Approximate Quantity	Issue Rate	Unit	Place of Delivery							2
Sr. No.	Particulars of Materials	Approximate Quantity	Issue Rate	Unit	Place of Delivery											
iv)	State the requirements of valid contract.															
Ans.	Following are the requirements of valid contract: i. Contract should be in writing and should be signed by both the parties i.e. owner and contractor. ii. The subject matter of agreement must be legal and definite. iii. If situation arises the contract can be enforced in court of law. iv. Parties should be competent enough to carry out work. v. Both parties must give their free consent to do work. vi. Contract should be attested by responsible officer/witness.	1 each (any four)	4													
v)	Explain in brief cost plus fixed fee contract.															
Ans.	Cost plus fixed fee contract: In this type of contract owner agrees to pay contractor the actual cost of work plus a certain fixed amount as his fee. Contractor receives fixed fee irrespective of the cost of work. The fee is paid to cover his overhead charges and profit.	2														



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.1		<p>It has following advantages:</p> <ol style="list-style-type: none">1. Early completion of work2. Quality of work is assured3. Extra item dispute can be eliminated4. Contractor will be paid a fixed amount he will not try to produce fictitious bills. <p>It has following disadvantages:</p> <ol style="list-style-type: none">1. No incentive to contractor for early and economic completion of work.2. Total cost is not known till completion of work3. Not suitable for government work4. Employment of large staff for keeping accounts	<p>$\frac{1}{2}$ each (any two)</p> <p>$\frac{1}{2}$ each (any two)</p>	<p>4</p>
	b)	<p>Attempt any <u>ONE</u> of the following:</p>		<p>(6)</p>
	i)	<p>Describe in brief rate day's work method and piece work method for carrying out works of PWD.</p>		
	Ans.	<p>Day's work method:</p> <ol style="list-style-type: none">1. There are certain works of special nature which cannot be measured hence their valuation is made on basis of actual material and labour used. For e.g. decorative plaster work2. In such cases day work method is adopted for valuation of above items on the basis of actual material used and number and class of labour employed and tools and plants required for work.3. In this method contractor has to maintain day to day account of material consumed, the labour, types of labour, and the hours for which each labour is employed is filled in day work sheet.4. Contractor is paid on the basis of net cost of various material required and wages paid to the labour plus 20- 25 % as his profit. <p>Piece work method:</p> <ol style="list-style-type: none">1. This method is suitable for maintenance and repair work.2. Piece work is the agreement which involves the payment for work done at agreed rate without reference to total quantity of work to be done or time of completion.3. Agreement contains only description of item to be executed.4. Form shall be invited from piece worker. The agreement is made on A₁ form for percentage basis and A₂ form for item rate basis.5. The piece worker has to arrange all material and labour required for carrying out work.	<p>3</p> <p>3</p>	<p>6</p>



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Q. 1	ii) Ans.	<p>Explain in brief NMR. Draw standard format of NMR.</p> <p>NMR: The muster roll which is maintained to keep the record of works being done by a labour employed on each day and to mark the attendance of the labour employed on daily wage basis ,employed departmentally is called as Nominal Muster NMR has two parts</p> <p>Part I: Nominal roll used to mark daily of labour with his name, designation, date of attendance, rates, total amount due ,signature of person taking attendance and signature of officer making payment.</p> <p>Part II: The details of measurement of the work done are recorded in measurement book and item wise abstract is prepared and this abstract is recorded in this part.</p> <p style="text-align: center;">Form No. 21 – Muster Roll Cash book voucher No. ...Date Name of work ... Part I – Nominal Roll</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Category of labour</th> <th rowspan="2">Sl. No</th> <th rowspan="2">Name</th> <th rowspan="2">Father's name</th> <th colspan="6">Date ... Month</th> <th rowspan="2">Total</th> <th rowspan="2">Rate Rs. P.</th> <th rowspan="2">Amount Rs. P.</th> <th rowspan="2">Dated initial of paying officer</th> </tr> <tr> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> </tr> </thead> <tbody> <tr> <td colspan="4">Daily Total ...</td> <td></td><td></td><td></td><td></td><td></td><td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="4">Initial of person making daily attendance</td> <td></td><td></td><td></td><td></td><td></td><td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="4">Initial of inspecting officer</td> <td></td><td></td><td></td><td></td><td></td><td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p style="text-align: center;">Passed for Rs. (Rupees ...)</p> <p style="text-align: right;">Signature ... Rank ...</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td>Grand total of muster roll ...</td> <td style="text-align: right;">Rs.</td> <td style="text-align: right;">P.</td> </tr> <tr> <td>Deduct – payment not made as per details</td> <td style="text-align: right;">...</td> <td style="text-align: right;">...</td> </tr> <tr> <td>Transferred to register of arrears ...</td> <td style="text-align: right;">...</td> <td style="text-align: right;">...</td> </tr> <tr> <td>Total amount paid in words rupees</td> <td style="text-align: right;">...</td> <td style="text-align: right;">...</td> </tr> </table> <p>Date Signature ... Rank ...</p>	Category of labour	Sl. No	Name	Father's name	Date ... Month						Total	Rate Rs. P.	Amount Rs. P.	Dated initial of paying officer	1	2	3	4	5	6	Daily Total ...														Initial of person making daily attendance														Initial of inspecting officer														Grand total of muster roll ...	Rs.	P.	Deduct – payment not made as per details	Transferred to register of arrears	Total amount paid in words rupees	<p>1</p> <p>1</p> <p>1</p> <p>3</p>	<p>6</p> <p>(16)</p>
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Q. 2	a) Ans.	<p>Attempt any <u>FOUR</u> of the following:</p> <p>Describe in brief administrative approval and technical sanction.</p> <p>Administrative approval: For any work, it is necessary to take formal acceptance with respect to cost and work is called as administrative approval. For this the department sends a proposal to government for taking up the work. After considering all aspects like feasibility of project, financial aspect, government accepts proposal is called administrative approval.</p> <p>Technical sanction: Technical sanction means the sanction of the detailed estimate, design, rates and cost of work. It is sanctioned by competent authority. The work is taken for the execution only after the technical sanction. If the estimated amount exceed 10% of administratively approved amount technical sanction is granted only after obtaining revised administrative approval for work technical sanction once given remains valid for 5 years.</p>	<p>2</p> <p>2</p>	<p>4</p>																																																																										



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.2	b) Ans.	<p>Describe in brief rate list method of construction used in PWD to carry out the work.</p> <p>1. This method is suitable for petty work costing 3000/ or below. As the cost work is small the contracting firms are not interested in carrying out work and advertisement in newspaper is not justified for work of small magnitude.</p> <p>2. For such petty work list of petty workers are kept in the office of executive Engineer. When such work is to be executed the petty workers are informed and asked to submit the rate list based on approximate quantity of each item and specifications supplied to them.</p> <p>3. No of petty workers may be employed on one work at the same time provided that the Cost of any individual work to be executed does not exceed Rs. 3000/-</p> <p>4. The petty workers will quote rate and submit in sealed cover, the lowest offer is accepted.</p>	4	4
	c) Ans.	<p>Enlist various documents required for registration of contractor in PWD.</p> <p>The applicant has to submit the following documents along with his application:</p> <p>i. Latest income tax clearance certificate.</p> <p>ii. Proof of financial status.</p> <p>iii. Solvency certificate.</p> <p>iv. List of machinery with their condition.</p> <p>v. List of technical staff employed along with qualification and experience.</p> <p>vi. Professional capacity and experience certificate.</p> <p>vii. Attested copies of partnership deed, if any.</p> <p>viii. Registration fee.</p>	$\frac{1}{2}$ mark each	4



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q. 2	d)	State limitations of BOT Project. Give two examples of BOT project.		
	Ans.	Limitations: 1. Problem of land acquisition. 2. Private firms may have monopoly in operating the project. 3. Toll to be collected by private financial body, may be revised every year which may be an extra burden to the public. 4. Private builder may not maintain the project in good condition and hence Government or Public may have to take help of court of law. 5. Risk after construction: Nonpayment of toll by user, chances of tax structure currency fluctuation may affect the project. 6. Chances of drying up of finance during construction. Examples: i) Mumbai – Pune express highway. ii) Baroda – Ahmadabad highway (NH8). iii) Nagpur Express highway (NH50).	$\frac{1}{2}$ each	4
	e)	State necessity of interim payment made to contractor.		
	Ans.	Necessity of Interim Payment: It is an advance payment made to the contractor, when the work is in progress and the contractor is paid for the work executed by him at some intermediate stages of the work. 1. In case of large project the contractor has to invest large amount for longer duration, this may not be suitable to the contractor. The progress of work may get affected to lack of funds with the contractor. In such cases interim payment is necessary. 2. To have rolling money with the contractor so that the progress of work is maintained. 3. It indicates approximate value of the work done by the contractor. 4. It is an amount disbursed to the contractor at an interval as running account payment, secured advance or advance payment.	$\frac{1}{2}$ each (any two)	4



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q. 2	f) Ans.	<p>Describe in brief mobilization advance.</p> <p>Mobilization Advance:</p> <ol style="list-style-type: none">1. Before starting any Civil Engineering project, certain establishments like approach roads, labour huts, place for storage of materials, site office, water supply and electrical facilities etc are required to be established.2. These establishments ensure the proper use of the resources and efficient and smooth working with safety on the project, This is called mobilization3. The amount of money given for above establishment by the department to the Contractor is called Mobilization advance.4. This advance is given to the contractor when he asks to the department in writing .It is paid only after payment of security deposit by contractor to the department.	4	4
Q. 3	a) Ans.	<p>Attempt any <u>FOUR</u> of the following:</p> <p>Describe in brief defect and liability clause of conditions of contract.</p> <p>If any work is completed with defective material and poor workmanship and any defects are observed.</p> <p>It is responsibility of contractor to rectify those defects at his own expenses and if he is unable to rectify those defects he has been penalized by engineer in charge or it may be rectified by inviting another contractor at the cost and risk of previous contractor.</p>	4	4
	b) Ans.	<p>Enlist the points to be observed by contractor while filling tender.</p> <p>Following points are observed by contractor while filling tender:</p> <ol style="list-style-type: none">1. The contractor should study the tender document carefully.2. The contractor visits the site.3. The contractor calculates the expenditure to be incurred for unremunerated work such as temporary store, office, approach road and water supply etc.4. The contractor works out the probable time period required for completing the works.5. The tender is signed; a cheque for deposit is enclosed and put into a sealed cover.	1 each (any four)	4
	c) Ans.	<p>Describe in brief unbalanced tender.</p> <p>In case of unit price contract the contractor has to quote his rate for each item. If these rates quoted by contractor are reasonable, the tender is known as balance tender. But sometimes the contractor puts up higher rates for certain items and lower rates for other items so that the total amount of tender remains practically unaffected, such a tender is known as unbalanced tender. The contractor quotes higher rates for those items which are to be completed in the early part of work so that he gets slightly excessive payment from which he can build up working capital.</p>	2	



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Q. 3		<p>Following is the example of unbalanced tender:</p> <table border="1"> <thead> <tr> <th rowspan="2">Item No.</th> <th rowspan="2">Particulars of Item</th> <th rowspan="2">Quantity</th> <th colspan="3">Tendered Rates in (Rs.)</th> </tr> <tr> <th>P</th> <th>Q</th> <th>R</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Excavation in soft soil</td> <td>500 m³</td> <td>40/- m³</td> <td>12/- m³</td> <td>30/- m³</td> </tr> <tr> <td>2</td> <td>Excavation in soft</td> <td>300 m³</td> <td>40/- m³</td> <td>25/- m³</td> <td>60/- m³</td> </tr> <tr> <td>3</td> <td>Excavation in hard</td> <td>200 m³</td> <td>40/- m³</td> <td>80/- m³</td> <td>100/- m³</td> </tr> <tr> <td>4</td> <td>Cement Concrete 1:4:8</td> <td>100 m³</td> <td>400/- m³</td> <td>500/- m³</td> <td>300/- m³</td> </tr> <tr> <td>5</td> <td>Plastering in C:M 1:4</td> <td>800 m²</td> <td>10/- m²</td> <td>20/- m²</td> <td>8/- m²</td> </tr> <tr> <td>6</td> <td>Oil painting</td> <td>500 m²</td> <td>10/- m²</td> <td>10/- m²</td> <td>5/- m²</td> </tr> <tr> <td></td> <td>Total (Rs.)</td> <td></td> <td>Rs.95000/-</td> <td>Rs.100500/-</td> <td>Rs.111900/-</td> </tr> <tr> <td></td> <td>Remarks</td> <td></td> <td>Lower</td> <td>Second</td> <td>Third</td> </tr> </tbody> </table> <p>Here the contractor P has quoted very high for item no. 1 and very low rate for item no 3. He expects by his judgment after visiting the site and by his experience.</p> <p>Suppose on the basis of lowest tender, the contract is awarded to contractor P But the actual quantities are 900 m³:50 m³: 50 m³ respectively The total amount payable to him is Rs. 40,000 but if it is given to Q The total amount payable to Q is Rs.16,050.</p> <p>Instead of awarding the contract to P if the contract was awarded to Q the department would have saved Rs. 23,950. Another point to be noted here is that contractor P is not at all giving any chance to the site engineer for classification of soil.</p> <p>d) State any two advantages and disadvantages of Lump sum contract.</p> <p>Advantages of lump sum contract:</p> <ol style="list-style-type: none"> 1. Total cost of project is known before completion of work. 2. Progress of work is fast. 3. Owner need not require to appoint staff to maintain accounts. 4. Contractor can derive more profit by proper planning. 5. Detailed measurement of work is not required except in case of addition and alteration. <p>Disadvantages of lump sum contract:</p> <ol style="list-style-type: none"> 1. This method is suitable for small work. 2. For extra items contractor may demand higher rates. 3. Extra item can be cause of dispute between owner and contractor. 4. Quality of work is not assured. 5. Contractor may quote higher rate and thus higher tendering is possible. 	Item No.	Particulars of Item	Quantity	Tendered Rates in (Rs.)			P	Q	R	1	Excavation in soft soil	500 m ³	40/- m ³	12/- m ³	30/- m ³	2	Excavation in soft	300 m ³	40/- m ³	25/- m ³	60/- m ³	3	Excavation in hard	200 m ³	40/- m ³	80/- m ³	100/- m ³	4	Cement Concrete 1:4:8	100 m ³	400/- m ³	500/- m ³	300/- m ³	5	Plastering in C:M 1:4	800 m ²	10/- m ²	20/- m ²	8/- m ²	6	Oil painting	500 m ²	10/- m ²	10/- m ²	5/- m ²		Total (Rs.)		Rs.95000/-	Rs.100500/-	Rs.111900/-		Remarks		Lower	Second	Third	<p>1</p> <p>1</p> <p>1 each (any two)</p> <p>1 each (any two)</p>	4
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Q. 3	e)	Differentiate between Item rate contract and Percentage rate contract.																							
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Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q. 4	a) (i) Ans.	<p>Attempt any <u>THREE</u> of the following :</p> <p>Define and state use of indent and invoice.</p> <p>Indent: Materials from the stock are issued on demand in a proper form no.7 is termed as Indent which is prepared by Sub Divisional Officer or Assistant Engineer. Indent form is in triplicate consist of counter foil, indent and invoice; and is kept in a book serially numbered.</p> <p>Invoice: The counter foil and indent are filled by intending officer and along with invoice, it is sent to issuing officer. The issuing officer issues the material available in stores and then fills the invoice as actual goods issued. He then returns the invoice to intending officer who signs and returns the same to issuing officer as a token of acknowledgement of the receipt of goods.</p>	2	(12)
	(ii) Ans.	<p>Describe the procedure of scrutiny of tender.</p> <p>Following points should be kept in mind while scrutiny of tender:</p> <ol style="list-style-type: none">1. The tenders which are far below the estimated cost of the work should not be accepted.2. The person opening the tender shall initial against the name of tenderer entered in the register to tender forms issued.3. A complete list of tenders received with the details of deposit cheques (towards earnest money) should be prepared.4. If any rate quoted by the contractor is not clear or doubtful, the tender may be considered as invalid.5. The person scrutinizing the tenders shall read out the rates (quoted in the tender) to the tenderer or their agents who are present.6. After scrutinizing the tenders received, a comparative statement of all the tenders should be prepared with the lowest tendered amount placed first and highest tendered amount at the last.	1 each (any four)	4
	(iii) Ans.	<p>Work out sinking fund installment per year for collecting sinking fund of Rs. 2,00,000/- in total 50 years of life of building at a rate of interest of 4% per annum.</p> <p>S = Amount of sinking fund = Rs. 2, 00,000/-</p> <p>$I = \text{Rate of interest} = 4\% = \frac{4}{100} = 0.04$</p> <p>n = Number of years required to create sinking = 50 years</p> <p>I = Annual installment of sinking fund required = ?</p>	1	



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q. 4	(iii)	<p>Step 1 : Expression for finding annual installment of sinking fund.</p> $I = \frac{S \times i}{(1 + i)^n - 1}$	1	
		<p>Step 2 : To find sinking fund installment per year :</p> $I = \frac{200000 \times 0.04}{(1 + 0.04)^{50} - 1}$ $= \frac{8000}{(1.04)^{49}} = 1170.72 \approx 1170$ <p>∴ I = Rs. 1170/-</p>	1	4
	(iv)	<p>State points to be observed in framing specifications.</p>		
Ans.		<p>Following are the various important points to be observed in framing the specifications:</p> <ol style="list-style-type: none">1. Clear facts of the quality of material and workmanship mentioned in the specification should be observed.2. Specification depends upon the site conditions; hence it is to be observed the nature of work and purpose for which the work is carried out.3. Well-known or familiar abbreviations in building industry are to be used without giving information.4. Proper and suitable words with required meaning should only be used. Unfamiliar works should not be used in specification.5. Prepare the specification by observing the rules of grammar.6. The information about quality of the material and procedure of workmanship to be adopted should be complete and accurate.7. Avoid cross-references.8. The specification should state looking to view that what the contractor shall or shall not do and not what the contractor should or should not do.9. The subject matter mentioned in the specification should relate to the information required when the contract is given to the contractor.10. Unfair specifications are not desirable, meaning that throwing all the possible risks on the shoulders of contractors is unfair and hence such specification should not be mentioned.11. The sentences of the specification should be simple and short so as to avoid the risk of legal difficulties and allegations.12. Specifications of various items should be framed by keeping the practical limitations of materials and workmanship in mind.	1 each (any four)	4



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks																						
Q. 4	b)	Attempt any <u>ONE</u> of the following:		6																						
	i)	1) State any four objectives of BOT project.																								
	Ans.	<p>a) To encourage private investment.</p> <p>b) To promote foreign investment, techniques and technology.</p> <p>c) To ensure quality of work and speed of work.</p> <p>d) To release burden on public budget.</p>	1 each																							
		2) Write any two disadvantages of BOT project.																								
		<p>a) Problem in land acquisition.</p> <p>b) Political risk.</p> <p>c) Risk after construction such as nonpayment of toll by user, changes in tax structure, currency fluctuation may affect the project.</p> <p>d) Toll puts burden on public.</p>	1 each (any two)	6																						
	ii)	State the precautions to be taken while making entries in measurement book. Also run out format of a Measurement Book.																								
	Ans.	<p>Following precautions to be taken while making entries in Measurement Book:</p> <p>1. Entries are made by J.E. and certified by S.D.O or A.E</p> <p>2. All entries are recorded in ink directly in M.B.</p> <p>3. No entry is allowed to be erased.</p> <p>4. If any correction is required, it must be initialed by the officer who made the measurement.</p> <p>5. Measurements are taken in the presence of contractor, and his signature is taken in M.B.</p> <p>6. Entries should be recorded continuously and no blank pages left or turn off. Any pages left blank should be cancelled by diagonal lines and signed by authority.</p> <p>7. The M.B. contains name of work, name of contractor, date of measurement, location, date of work order, and number of measurements.</p>	1 each (any four)																							
		Measurement Book: (Form No. 23)																								
		<table border="1"> <thead> <tr> <th rowspan="2">Particulars</th> <th colspan="4">Detail of actual measurement</th> <th rowspan="2">Contents of area</th> </tr> <tr> <th>No.</th> <th>L</th> <th>B</th> <th>D</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Particulars	Detail of actual measurement				Contents of area	No.	L	B	D													2	6
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Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q. 5	a)	Attempt any <u>TWO</u> of the following: A building is constructed at a cost of Rs 1000000/- on a plot of 100 m². Fix monthly rent of this property from following data. i) Rate of land = 100/m² ii) Return expected on land and building = 6% iii) Life of building = 60 yrs iv) Scrap value = 10% of construction cost v) Other outgoings = 20% of gross rent		(16)
	Ans.	Cost of land = 100 x 100 = Rs. 10000/- Cost of construction = Rs. 1000000/- Total cost of land and building = Rs. 1010000/- Return expected on land and building = $\frac{6}{100} \times 1010000$ = Rs. 60600/- Let x be the gross rent per annum Other outgoings = 20% of gross rent = $(\frac{20}{100}) \times x$ = 0.2 x Gross Income or rent = Outgoings + Net return X = 0.2 x + 60600 X = Rs. 75750/- Rent per month = $(\frac{75750}{12})$ = Rs. 6312.50/-	1 1 1 1 1 1 1	8
	b)	A property gives monthly rent of Rs. 4000. The outgoings are : Sinking fund installment = Rs. 1000 per annum Repairs cost = Rs. 10000/- Other outgoings = 20 % of gross income Calculate capitalized value if rate of interest of bank is 9%.		
	Ans.	Monthly rent = Rs. 4000 Annual income from rent = Rs. 48000/- Net income = Gross income – outgoings Outgoings are Sinking fund installment = Rs. 1000 per annum Repairs cost = Rs. 10000/- Other outgoings = 20 % of gross income Net income = 48000 – 1000 – 10000 – 0.2 x 48000 = Rs. 27,400/-	1 1 1 2	



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks												
Q. 5		<p>Y.P. = $1/I = 1/0.09$ = 11.11</p> <p>Capitalized value = Y.P. x Net annual income = 11.11 x 27400 = Rs. 3,04,414 /-</p>	1 1 1	8												
	c)	<p>Draft a tender notice for construction of library building of polytechnic college costing Rs 2 crore. Assume all necessary information.</p>														
	Ans.	<p style="text-align: center;">Tender Notice</p> <p>Tender No: _____ Date: 19/11/2018</p> <p>Sealed item rate tenders are invited from by secretary, XYZ Institute from appropriate Class contractors registered with PWD for the work mentioned below:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Sr. No.</th> <th>Name of work</th> <th>Estimated cost</th> <th>Earnest money</th> <th>Security deposit</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Construction of Ladies Hostel</td> <td>Rs. 2crore</td> <td>4,00,000/-</td> <td>20,00,000/</td> <td>24 Months (including monsoon)</td> </tr> </tbody> </table> <p>Blank tender form at non-refundable cost of Rs. 1000/- (Rs. 1100/- If required by post) can be obtained from the office secretary, XYZ Polytechnic, 10.00 a.m. to 5.00 p.m. during working hours of all working days (Except Sundays & Holidays) From 20/11/2018 to 30/11/2018. Tenders will be received in office of secretary up to 3.00 pm. On 2/12/2018 and shall be opened on the same day at 4.00 p.m. in presence of contractors who may like to attend.</p> <p>The authorities reserve the right to reject any or all tenders without assigning any reason.</p> <p style="text-align: right;">Sd/- Secretary XYZ Polytechnic</p>	Sr. No.	Name of work	Estimated cost	Earnest money	Security deposit	Time	1	Construction of Ladies Hostel	Rs. 2crore	4,00,000/-	20,00,000/	24 Months (including monsoon)	2 2	8
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		<p style="text-align: right;">Sd/- Secretary XYZ Polytechnic</p>	1													
		<p>(Note: Percentage may vary for earnest money (1% to 5 %) and security deposit (5% to 10%). Accordingly it should be considered.)</p>														



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q. 6	a) Ans.	<p>Attempt any <u>FOUR</u> of the following :</p> <p>Enlist the types of specifications and explain any one in brief.</p> <p>Following are the various types of specification:</p> <ol style="list-style-type: none">Brief specificationDetailed specificationStandard specificationManufacturers specification <p>Brief specification: The general specification used for estimating the project is the brief specifications. The specification which gives the brief description of various items of work, specifying the materials, quantities, proportion of materials and gives general idea about the whole work.</p> <p style="text-align: center;">OR</p> <p>Detailed specification: The specification in which detailed information of the various quantities of materials, procedure of workmanship to be adopted, nature and class of work is mentioned. The details specification describes the item of work in details, accurately and complete in all respects in relation to the drawings of the work.</p> <p style="text-align: center;">OR</p> <p>Standard specification: Detailed specifications for various works are drawn up by an engineering department and these specifications are printed and used as a standard specification. Hence most of the items in works are made to standardized specifications.</p> <p style="text-align: center;">OR</p> <p>Manufacturer's specifications: This type of specifications in which the properties of products such as strength, thickness, depth, elasticity, chemical composition etc. are mentioned.</p>	2	(16)
	b) Ans.	<p>Describe in brief legal aspect of specification.</p> <ol style="list-style-type: none">1. Specification of various items becomes the important documents as per as legal aspect like contract and agreements are concerned. Hence the drawing and specifications are two important contract documents considered as legal documents.2. The tender documents and agreements towards legal aspect are incomplete and invalid without specifications.3. Specifications have more legal strength and hence most of the contract state that in case of discrepancy between the drawings and specifications, the specification act as a legal proof.4. In case of disputes between the owner and the contractor, specifications act as useful legal documents to solve the problem in between two parties.	1 each	4



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.6	c) Ans.	<p>Draft detailed specification for RCC slab 1:2:4.</p> <p>Specification of cement concrete for PCC work includes:</p> <p>(i) Materials:</p> <p>a) Coarse aggregate: Coarse aggregate shall be from hard broken stone of compact basalt or granite or similar stone and shall be free from dust, dirt, oil and other foreign matters. Size of stone shall be 20 mm and down and all sizes of stones shall be retained in a 5 mm square mesh and well graded. Size of stone aggregate depends upon the thickness of concrete and nature of work.</p> <p>b) Fine aggregate: Fine aggregate shall have coarse sand consisting of hard, sharp and angular grains. Sand shall be as per the standard specification. Sand shall be clean and free from dust, dirt, oil and other organic matter.</p> <p>c) Cement : Cement shall be fresh, not old & as per the standard I.S. specification and shall have required compressive strength and fineness.</p> <p>d) Water : Water shall be clean water, free from any impurities and free from alkaline and acid matters; water shall be suitable for drinking purpose.</p> <p>ii) Reinforcement: It shall be of mild steel free from corrosion .All bars shall be made and placed as per bar schedule & design. Proper overlapping shall be provided.</p> <p>iii) Proportion : The proportion of concrete shall be such that it should give strength of at least 20 N/mm² .1:2:4 proportion of cement, sand and coarse aggregate by volume shall be used, unless otherwise specified. All ingredients shall be dry. Bulking of sand allowance shall be made for wet sand.</p> <p>iv) Mixing of concrete:</p> <p>a)Machine Mixing : Cement, sand and coarse aggregate shall be taken into the mixer in required proportion. The mixing time shall not be less than 3 minutes Mixed concrete shall be discharge on a masonry platform or on a flat iron sheet.</p> <p>b)Hand Mixing : Hand mixing is allowed for small work only. Mixing of ingredients shall be done on masonry platform or flat iron sheet. Then water shall be added slowly and gradually and then turning the mix up and</p>	4	4



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q. 6	c)	<p>down at least three times by spade till to obtain a plastic mix of the required workability and water-cement ratio.</p> <p>v) Form work/Centering : Form work and centering shall be used as per the standard specifications Internal surface of formwork shall be applied by oil so as to avoid sticking of concrete during removal of the formwork.</p> <p>vi) Laying of concrete : Concrete shall be laid gently and compacted with rods and tamping with wooden tampers or with mechanical vibrating machine until a dense concrete is obtained. Immersion type vibrators or needle vibrators shall be used for thick concrete or mass concrete. Surface vibrators or form vibrators shall be used for thin concrete. There shall not be over vibration. Concrete shall be laid continuously.</p> <p>(vii) Curing : When concrete is on the point of hardening, after and about two hours laying, then it shall be kept wet by covering with wet gunny bags for 24 hours and then cured by flooding with water. Making mud wall 75 mm high or by covering with wet sand continuously for 15 days.</p> <p>(viii) Measurement : The measurement shall be taken as per the drawing or as per instruction of the engineer. The measurement shall be in cubic meter without deducting volume of steel. The rate of RCC shall be for the complete item which includes shuttering, tools and plants. The measurement shall confirm IS 1200.</p>		
	d) Ans.	<p>Define speculative value and distress value.</p> <p>Speculative value: Some property dealers have their business of purchasing of properties and selling them at profit after some time. The price at which such property is purchased with intention of selling it again at profit is known as speculative value.</p> <p>Distress value: A property is said to have a distress value when it fetches lower value than the market value. It is developed due to various reasons such as</p> <ol style="list-style-type: none">1. Fear of war, riots, earthquake etc.2. Financial difficulties of seller.3. Intention to favour purchaser etc.	2 2	4



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q. 6	e)	Enlist methods of calculating depreciation and explain any one in brief.		
	Ans.	Methods of calculating depreciation: i. Straight line method. ii. Sinking fund method. iii. Constant percentage method or Declining balance method. iv. Quantity survey method. i. Straight line method: Assumption of this method is that the property loses its value by the same amount every year. A fixed amount of the original cost is deducted every year. So that at the end of utility period only the scrap value is left. Annual depreciation (D) = (Original cost - Scrap value) / (Life in years) $D = (C - S) / N$ ii. Sinking fund method: In this method, the depreciation of the property is assumed to be equal to the annual sinking fund plus the interest on the fund for that year, which is supposed to be invested on interest being investment. iii. Constant percentage method: In this method it is assumed that the property will lose its value by a constant percentage of its value at the beginning of every year. $\text{Depreciated factor (D)} = 1 - (S/ C)^{1/n}$ iv. Quantity survey method: In this method, the property is studied in detail and loss in value due to life, wear and tear, decay, obsolescence etc. is worked out. Each and every step is based on some logical ground without any fixed percentage of the cost of property. Only experienced valuer can work out the amount of depreciation.	$\frac{1}{2}$ each 2 (any one)	 4