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.

5) 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

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SUMMER – 16 EXAMINATIONS <u>Model Answer-</u> Estimating and costing

Q.NO	SOLUTION	MAR KS
Q1.	Attempt any three of the	12M
a)	State the meaning of terms estimating and costing. Enlist its purposes.	04M
,	Estimating and costing:-	2M
	• The process of calculating the quantities and cost of various items required in	
	connection with work.	
	• It is prepared by calculating the quantities from the dimension on the drawing for	
	the various items required to complete the project and multiplied by unit cost of an	
	item or rate.	
	Purpose: -	
	• To know the necessary amount required by the owner to complete the proposed	214
	 WOIK. For governments or public work estimates are required for administrative approval 	ZIVI
	allotments of funds and technical sanction	
	 To know the quantities of items required for construction and arranging the 	
	programme for their timely procurement.	
	• To calculate the numbers of labors of different categories require for completion of	
	work within scheduled time.	
	• To fix the completion period from the volume of works involved.	
	• To arrange the funds required according to the construction scheduled programme.	
	To justify benefit cost ratio.	
	• To invite tenders and prepare bills of payment.	
	It is required for valuation of existing property.	
b)	Enlist types of estimates. Mention the situations when supplementary estimate is	04M
	prepared.	214
	Types of Estimate:-	ZIVI
	Approximate Estimate Detailed Estimate	
	Bevised Estimate	
	Supplementary Estimate	2M
	Repair and Maintenance Estimate	241VI
	Situations when supplementary estimate is prenared:	
	• It is detailed estimate for additional work and is prepared when additional works or	
	changes are required to be supplementing the original works, during the execution of	
	the work.	
	• The fresh detailed estimate of additional work is prepared in addition to the original	
	estimate.	
	• The abstract should show the amount of original estimate & the total amount	
	including the supplementary amount, for which sanction is required.	
c)	State mode of measurement for	1M
	1)P.C.C. $(1:2:4) = M^3$ or Cubic meter	For
	2) Manholes and inspection chambers = No	each
	3) Wood work for door frame= M^3 or Cubic meter	measur
	4) 10 cm thick brick wall = M^2 or Sqm	ement.

SUMMER – 16 EXAMINATIONS <u>Model Answer-</u> Estimating and costing

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d)	Explain cubic content method of approximate estimate										
	•	This met	hod is general	lly use	ed for	r multi-st	oreyed buil	dings. It	is more ac	ccurate that	
	the other two methods viz., plinth area method and unit base method. The cost of a										
	structure is calculated approximately as the total cubical contents (Volume of										
	buildings) multiplied by Local Cubic Rate. The volume of building is obtained by										
	Length x breadth x depth or height. The length and breadth are measured out to out										
	of walls excluding the plinth off set.										
	• The cost of string course, cornice, corbelling etc., is neglected.										
	•	The cost	of building =	volun	ne of	building	s x rate/ un	it volum	e.		0.03.6
В	Atte	mpt any	one of follo	owing	5:						08M
a)	Draw	the standa	ard formats of	fmeas	surer	nent she	et, abstrac	t sheet a	ind face sl	heet.	08M
	i)	meas	surement she	et :							
											03M
		ltem	Description	Num	ber	Length	Breadth	Height	Quantit	ty Total	
		number	or					depth		quantity	
			particulars			In m	In m				
			of items					In m			
		1	2	3		4	5	6	7	8	
	ii)	Abst	ract sheet :								
									11.1		
		Sr.	Quantity		Desc	cription	Unit	Rate	Unit of	Amount	0214
		number			or				Tale		03101
					parti	culars		Rs. P.		Rs. P.	
					of ite	ems		-			
		1	2			3	4	5	6	1	
		Eaco	chaoti								
		j race	Sileet.								
	[Sr. No.		F	Parti	culars			Amo	ount	
		••••••		-	•••••				,		02M
		01	Estimated of	cost				Rs	5		
		02	Water supp	ly and	d san	itary cha	rges @ %	∕₀ Rs	5		
				, ,		,	U -				
		03	Electrificati	on ch	arge	s@%		Rs	5		
			Contingent		(3	.0 5 /0]					
		05	Work charg	je esta	ablis	hment @	(1 to 2 %)) Rs	5		
			Total amou	nt							
			In words	I							

b)	Describe the following terms and state purpose of each i. Contingencies ii. Work charged establishment iii. Centage charges	8M
	 Contingencies: It is the incidental expenses of a miscellaneous character which cannot be reasonably predicted during preparation of estimate and to met such unforeseen expenses an additional amount of 3% to 5% of the estimated cost of the works is provided in the total estimate. Work Charged Establishment: During the construction of a project considerable number of skilled supervisors, work assistance, watch men etc., are employed on temporary basis. The salaries of these persons are drawn from the L.S. amount allotted towards the work charged establishment. That is, establishment which is charged directly to work. an L.S.amount of 2% to 2½ of the estimated cost is provided towards the work charged establishment. 	3M 3M
	Centage Charges : When an engineering department executes the work of another department of government or local bodies etc. a percentage amount 10% to 15% of the estimated cost is charged recovery of the cost of establishment, planning, designing, supervision etc. Is called as centage charges.	2M

Q.No.2	Attempt a	any two of following			16M					
a)	Describe	how you will prepare an approxim	ate estimate for a cine	ma theatre of 1000	8 M					
	seats by u	sing service unit method.								
	Service u	nit method :-			6M for					
	_	In service unit method no. of service u	unit is decided for calculat	ing approximate	theoreti					
	estimate.	such as per kilometer for a highway, per	meter of a span for a brid	ge, per classroom for	cal					
	school bu	ilding, per bed for hospital, per liter for v	water tanks, per seats for c	inema theatre etc. so	backgro					
	cinoma th	s problem we have to calculate or assume	e the cost of one seat then st per service unit (i.e. per	approximate cost of	und and					
	service un	it in the structure	st per service unit (i.e per	seat) by the no. of	1M for					
	service un	Approximate estimate $-$ No. of s	service unit x Cost per serv	vice unit	formula					
	Given: (Capacity of cinema theatre = 1000 seats	for vice unit a cost per ser		and 1M					
	Service	unit for cinema theatre= per seat			for					
	Approxi	mate estimate = number of seats $x \text{ Cost}$	per seat		final					
	Assume	cost of one seat = 50000 to 70000 only			answer.					
	Conside	$r \cos t$ of one seat = 70000								
		$= 1000 \times 70000$								
		= 7,00,00,000/-								
L)	In word	is: Ks Seven crore only/-	ilding having plinth ana	agual to 1500 m2	_					
D)	1) Plinth	pproximate estimate of a town name of a contract of a contract of the provided state o	nung naving printi area	equal to 1500 m ² .						
	2) Water	supply and sanitary installation. 5 %	of cost of building							
	3) Electr	ic installation -10% of cost of buildin	or cost of bunding							
	4) Other	services-5% of cost of building	8							
	5) Contin	ngencies – 3% of. overall cost of buildi	ing							
	6) Supervisioncharges-8 % of overall cost of building.									
	Given:-									
	Plinth area = 1500 Sqm									
	Plinth area rate = 4000 per sq.m									
	Approxim	ate estimate = Plinth area x Plinth are	ea rate							
		= 1500 x 4000								
	Cost of	f building = Rs 60,00,000 /	A	1	2M					
	Sr no	Particulars	Calculations	Amount						
	1	Water supply and sanitary	0.05 x 60,00,000	3,00,000/-						
		installation - 5 % of cost of								
		building								
	2	Water supply and sanitary	0.05 x 60,00,000	3,00,000/-						
		installation- 5 % of cost of								
		building			4					
	3	Electric installation – 10% of cost	0.1 x 60,00,000	6,00,000/-						
		of building			_					
	4	Other services-5% of cost of	0.05 x 60,00,000	3,00,000/-						
		building								
	B		Total	Rs 15,00.000/-	2111					
		Overall cost	t of the building=A+B	Rs 75,00,000/-						
	5	Contingencies – 3% of. overall cost of building	0.03 x 75,00,000	2,25,000/-						
	6	Supervision charges-8 % of	6,00,000/-	1						
		overall cost of building.								
	С			8,25,000/-	2M					
		Approximate estimate of a town ha	Ill building = $A+B+C$	Rs 83,25,000/-	2M					
		= 60,00,000	+ 15,00,000 + 8,25,000							
	In words	s= Rs Eighty three lakhs twenty fiv	e thousand only.		7					

SUMMER – 16 EXAMINATIONS Model Answer- Estimating and costing

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Distance	160	200	240	280	320	360	
m							
G.L. m	50.60	50.70	51.20	51.40	51.30	50	
Formation	width= 12	m. Formati	on R.L. of s	tarting chair	nage 160 m i	s 51.20m ha	ving
Civon : For	notion low	U sides slop	$\frac{221}{2}$	0 m			
Falli	ng Gradier	t = 1 to 40 i	e = 1/40	0 111			
Form	nation Wid	th of road (b	(0) = 12m				
Side	Slope $= 1$:	2	,				
Cond	dition of ro	ad surface =	No cross slo	ope			
Denoting dep	oths of cutt	ing by –ve s	igns and heig	ght of emban	kment by +v	e signs.	
Depth of cutt	ing or Heig	$\frac{1}{50}$ so $\frac{1}{50}$	$\mathrm{Ig} = \mathrm{F.L.} - \mathrm{G}$.L.			
At starting po	m = 51.20) - 50.60					
Formation le	vel per cha	inage 40 m	with falling	pradient 1 in	40 is subtrac	ted by 1/40 y	40 =
1m	ver per en	iniuge to m	with fulling a		10 15 540440	ieu og 1710 2	10-
F.L.at next ch	nainage = F	L.at previo	us chainage -	- (Gradient	x Chainage ir	nterval)	
	= 51	.20 – (1/40 x	x 40)				
	= 50	.20 m					
Moon Soati	onal Araa	Mothod					
Wiean Secu	ullal Alea	Methou-					
Chainage	160	200	240	280	320	360	
G.L.	50.60	50.70	51.20	51.40	51.30	50	
F.L.	51.20	50.20	49.20	48.20	47.20	46.20	
D 1	0.6	-0.5	-2.0	-3.2	-4.1	-3.8	
Depth							
Depth (F.LG.L.)							
Depth (F.LG.L.)	fferent cha	inages are c	alculated bel	ow in table			

SUMMER – 16 EXAMINATIONS Model Answer- Estimating and costing

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Chainage	Depth or Height	Area of central Portion BD (m2)	Area of sides Sd2 (m2)	Total Area (Bd + Sd2) (m2)	Mean Sectional Area Am	Length L (m)	Qua (An	uantity (m x L)	
							Cutting (Cum)	Banking (Cum)	
160	0.6	7.2	0.72	7.92					
181.82	0.0	0	0	0	3.96	21.82		86.40	
200	0.5	6.0	0.5	6.5	3.25	18.18	59.08		
240	2	24	8	32	19.25	40	770		
280	3.2	38.4	20.48	58.88	45.44	40	1817.6		
320	4.1	49.2	33.62	82.82	70.85	40	2834		
360	3.8	45.6	28.88	74.48	78.65	40	3146		
	•	•	•	•		Total	8626.68	86.40	

Q.3	Attempt Any Four	16M
a)	State factors affecting process of rate analysis.	4M
	 Factors affecting Rate Analysis:- 1. Major Factors :- a) Material b) Labour 2. Minor Factors: -a) Special Equipment b) Place of work c) Magnitude of work d) Conditions of Contract e) Profit of the contractor f) Specification g) Miscellaneous Major Factor:- 	1M
	 a) Materials: - The material can be calculated by knowing the specification of the items. The price of various materials depends upon market conditions. The cost of material is taken as delivered at site inclusive of transport, local taxes, and other charges. For tools and plants and miscellaneous petty item which cannot be accounted in details lump sum provision is made. It is also necessary to include a certain percentage of waste of all materials to cover breakage, losses, cutting waste etc. b) Labour: - The labour force will be necessary to arrange the materials in proper way so that the items can be completed. The amount of labour force required to carry out a unit of a particular item is decided from past experience or in case of complicated items it is decided by carrying out a sample of that item. The labour force required depends upon the efficiency of labourer hence this force will vary from place to place and also there prices. By knowing the amount of labour force and wages of labour can be calculated 	2M
	 Minor factors:- a) Special equipments: - different types of tools and plants are necessary for execution of work. A good estimator will decide whether purchasing is more economical or hiring the tools and plants is advisable. b) Place of work:- if the site is in remote areas, transportation charges increases similarly labour charges also varies i.e. if site conditions are difficult, cost will be more. c) Magnitude of work: - greater the magnitude of work lesser will be the cost. d) Conditions of Contract:- if the condition of contract is very stiff the rates are high e) Profit of the contractor: - Normally 10% of actual cost of work is considered as contractor profit. f) Specification: - it shows the proportion of material, the method of construction and execution of work. If superior quality material issued rate will be higher. g) Miscellaneous: - time of completion, climatic condition, also affects the rate of item. 	1M
	Marks.)	

b)	Enlist the data required for detail estimate and write Necessicity of each.	4 M
	i) Drawing : The drawing is the basis from which quantities of various items for a	1M
	work are calculated.	
	ii) Specification :	
	a) General specification: In general specification the nature and class of work and the	1M
	names of material to be used are described. It gives a general idea for the project.	
	b) Detailed specification: Detailed specification gives detailed description of every	
	item to be executed, with the qualities, quantities, proportion of materials,	
	workmanship, the method of preparation and execution.	11/
	different categories of labour should be available for preparing estimate	1111
	a The location of work and its distance from the source of materials and the cost	
	of transport should be known	
	b. These rates may be obtained from PWD schedule of rates book or the rates	
	may be worked out the "Analysis of Rate" method.	
	iv) Modes of measurement: Measurement for different items of work is different.	1M
	These consider as per guideline of IS1200.	
c)	Give the Hire charges for Following Machinery/Equipment	
	1. Concrete Mixer:- 2600 Per Day	1M
	2. Truck : - 2000 Per Day	each
	3. Vibrator: - 8500 Per Day	
	4. Rammer : - 700 To 800 Per Day (Depends upon types of rammer)	
d)	(Note:- Rates may differ place to place hence examiner should give proportionate marks)	414
<u>u)</u>	A hooklet containing rates of various engineering items for the preparation of	4171
	detailed estimates such as buildings roads bridges canal etc called as schedule	4M
	of rates	
	 It also gives the rate of materials, daily wages of labour, carriage expenditure. 	
	\succ It is also given with table for quantities of various material required in	
	construction.	
	Schedule of rates vary with region	
	➤ Schedule of rates increases every year by certain percentage of previous year	
	rates.	
	Schedule rates periodically revised	

SUMMER – 16 EXAMINATIONS Model Answer- Estimating and costing

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e)	Calcu shown Excav RCC	late the quantities of foll 1 in Figure No.3 7 ation in soft Murum Ring Beam	lowing	; items o	f work for	a circ	ular co	mmunity	y well as	4M
	Calcu show	late the quantities of fo in figure.	ollowir	ng items	s of work	for a o	circula	r comm	unity well as	
	SR. No.	Description	No.	L	В	н	Unit	Qty	Total Qty	
	1	Excavation in soft Murum								
	i)	a) Excavation upto 1.5m in soft murum		$\frac{\pi}{4}d^2$	$=\frac{\pi}{4}x 5.1^2$	1.5	M ³	30.64		
		b) Excavation from 1.5m to 3.0m in soft murum		$\frac{\pi}{4}d^2$	$=\frac{\pi}{4}x 5.1^2$	1.5	M ³	30.64		
		c) Excavation from 3.0m to 4.5m in soft murum		$\frac{\pi}{4}d^2$	$=\frac{\pi}{4}x 5.1^2$	1.5	M ³	30.64		
		d) Excavation from 4.5m to 6.0 m in soft murum		$\frac{\pi}{4}d^2$	$=\frac{\pi}{4}x 5.1^2$	1.5	M ³	30.64		
		e) Excavation from 6.0 m to 7.5 m in soft murum		$\frac{\pi}{4}d^2$	$=\frac{\pi}{4}x 5.1^2$	1.5	M ³	30.64		
								Total	153.20 m ³	
	2	R.C.C. Ring Beam M20		$\frac{\pi}{4}D$	$^{2}-d^{2}=$	0.3	M ³		1.357	
				$\begin{pmatrix} \frac{\pi}{4} \\ (\frac{\pi}{4}) \end{pmatrix}$	$5.1^2) - x 4.5^2)$					2M 2M
f)	State	the rules for deduction o	of plast	ter as po	er IS1200.			1	1	4 M
	Rules	for deduction for openin	gs as	per IS-1	200 for plas	stering	:			
	i)	No deduction is made soffits, and sills of these of	e for en or oper opening	nds of be ning upto gs.	ams, posts, 0.5 sq. m	rafters . and n	, purlins io additi	s etc. ion is ma	ade for jambs,	1M each
	iv)	For opening more than c No addition for jambs, so For opening above 3 sq. soffits, and sills of shall b	o.5 sq. ffits, ar m. deo e adde	m. and und und sills of duction is d.	these oper s made for b	. deduc nings. poth fac	ction is r	nade for penings a	one face only. and the jambs,	

Q No.4	Workout quantities of any three items of work for figure no. i. Earthwork in excavation										
	ii. U.C.R. masonry in C.M. I : 6 in foundation and plinth										
	iii. Brickwork in C.M. 1 : 5 in superstructure, Thk 30 cm										
	iv. R.C.C. work in roof slab (M20 concrete).										
	Length of Wall Length Number of walls	1M									
	Length of Long Wall (L1)8.1m02										
	Length of Long Wall (L2)4.3m01										
	Length of Short Wall (S1)3.3m05										
	8.1 m 4.3 m 3.1m	1M									

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Item No.	Description or Particular of work	No	Length (m)	Breadth (m)	Depth (m)	Quantity (m ³)	Total Quantity (m ³)
i)	Excavation in foundation						
	LW1 = 8.1 + 0.9 = 9.0	2	9.0	0.9	0.95	15.39	
	LW2 = 4.3 + 0.9 = 5.2m	1	5.2	0.9	0.95	4.446	
	SW1 = 3.3-0.9 = 2.4m	5	2.4	0.9	0.95	10.26	
						Total	30.096
ii)	a) U.C.R Masonry in Foundation (0.6m wide)						
	LW1 = 8.1 + 0.6 = 8.7m	2	8.7	0.6	0.5	5.22	
	LW2 = 4.3 + 0.6 = 4.9m	1	4.9	0.6	0.5	1.47	
	SW1 = 3.3-0.6 = 2.7m	5	2.7	0.6	0.5	4.05	
						Total	10.74
	b) U.C.R Masonry in Foundation (0.4m wide)						
	LW1 = 8.1 + 0.4 = 8.5m	2	8.5	0.4	0.75	5.1	
	LW2 = 4.3 + 0.4 = 4.7m	1	4.7	0.4	0.75	1.41	
	SW1 = 3.3-0.4 = 2.9m	5	2.9	0.4	0.75	4.35	
						Total	10.86
				UCR Ma	asonry gr	and Total	21.6
iii)	BrickWork in Super Structure						
	LW1 = 8.1 + 0.3 = 8.4 m	2	8.4	0.3	3	15.12	
	LW2 = 4.3 + 0.3 = 4.6m	1	4.6	0.3	3	4.14	
	SW1 = 3.3 - 0.3 = 3.0m	5	3.0	0.3	3	13.5	
						Total	32.76
	Deductions						
	1. Doors (D)	1	1.2	0.3	2.1	0.756	
	2. Doors (D1)	2	1.0	0.3	2.1	1.26	
	3. Windows (W)	8	1.2	0.3	1.5	4.32	
						Total	6.336
	Lintel (Size 0.15m x 0.3m)						
	1. Doors (D)	1	1.5	0.3	0.15	0.0675	
	2. Doors (D1)	2	1.3	0.3	0.15	0.117	
	3. Windows	8	1.5	0.3	0.15	0.54	
						Total	0.7245
			Total De	duction= 6.3	336 + 0.7 2	45 = 7.0605	
			Total Bri	ckwork = 3	2.76 - 7.0	605 = 25.699	95m ³
iv)	R.C.C Roof Slab						
	Slab 1		7.1	8.6	0.12	7.3272	
	Slab 2 (deduction)		3.3	3.8	0.12	1.5048	

	_		0.57.5
B)	Attempt a	any one of the following :	06M
a)	Workout o	quantityof6mn\ l0mm and l6mm Q reinforcement for a rectangular beam of size 230	
	x 500 mm.	. The beam is reinforced with 2 No's - 10 mm 0 at top, 2 No's 16 mm ϕ at Bottom,	06M
	2No's- 16r	nm ϕ bent up, 6 mm Q two legged stirrups are provided at 150mmc/c throughout	
	the length	. Length of beam is 4.5 m.	
	Assume C	Clear cover on all side as 25mm.	
	i)	Length main Bar(Straight bar)	
		-	
			3 M for
		$I = T_{t} - 2x$ side cover $\pm 2x$ 94	calculati
		$L = 1L - 2x \text{ Side cover + 2 x } y\psi$ - 4500 - 2x25 + 2x0x16	on of
		$= 4300 - 2\lambda 23 + 2\lambda 3\lambda 10$ = $4729 \text{ mm} = 4.729 \text{ m}$	length
	::)	$- \frac{4}{50} \text{ IIIII.} - \frac{4}{50} \text{ Joint un han}$	
	II)	Length of Main Bar (Bent up bar)	
		$L = T_L - 2 x \text{ side cover} + 2 x 0.42 x d_1 + 2 x 9 \phi$	
		= 4500 - 2 x 25 + 2 x 0.42 x 450 + 2 x 9 x 16	
		= 5116 mm. = 5.116 m.	
	iii)	Length of anchor Bar	
		$L = T_L - 2 x \text{ side cover} + 2 x 9 \phi$	
		$= 4500 - 2 \times 25 + 2 \times 9 \times 10$	
		= 4630 mm. = 4.630 m.	
	iv)	Length of Stirrups	
		P	
		E	
		$A = 230 - 2 \times 25$	
		= 180	
		$B = 500 - 2 \ge 25$	
		= 450	
		L = 2 (A + B) + 24 d	
		$= 2(180 + 450) + 24 \times 6$	
		= 1404 mm. = 1.404 m	
	v)	Number of stirrups = $\frac{TL - 2 \times Clear \text{ cover}}{1 + 1}$	
	.,	Spacing	
		$=\frac{4500-2\times 25}{100}+1$	
		150 - 30 667 say 31 Nos	
		- 50.007 say 51 mus	

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E	Bar E	r Bending Schedule								
	Sr. No.	Description	Shape of Bar	No.	L (m)	Total length (m)	Dia. Of bar (mm)	Wt. kg/m (d ² /162)	Total wt. in kg	3 M for calculati on of BBS
	1	Bottom straight bar	(2	4.73	9 476	16	$\frac{16^2}{162}$ =	14 97	
	2	Bottom bent-up bar 16 mm d		2	5.11	10.23	16	$\frac{16^2}{162}$ = 1.580	16.17	
	3	Top anchor bar 10 mm φ		2	4.63 0	9.26	10	$\frac{10^2}{162}$ = 0.62	5.74	
	4	Length of Stirrups 6 mm ϕ @ 150 c/c		31	1.40 4	43.52 4	6	$\frac{6^2}{162} = 0.222$	9.58	
									46.46 Kg	
			Total qu	ıantit	y of ste	el per di	ia of ba	r:		
		6mm dia = 9	9.58							
		10 mm dia =	= 5.74							
		16 mm dia =	= 31.14	~~~				10 2 -		
) \	Work Out The Quantity of Cement, Sand, Bricks required for 40m ³ brick masonry									
	n cer Vet v	nent mortar	1:0. crete -40 m^3							
Г	Wet volume of concrete = 40 m Dry volume considering (Frog Filling, wastage etc.) -35% of volume of brick masonry									
-	-1 y v	35		5, <i></i> u	stuge et	c .) = 35	/0 01 10		field museling	1 M
		$=\frac{100}{100}$	x 40							
		= 14 1	m ³							
τ	John	ne of comont.	Dry volum	ne	v Con	ent of co	mont in	nronortio	n	
	voiur	ne or cement	Sum of propo	rtion		ient of ce	ment m	i proportio	11	
x	John	ne of cement	$-\frac{14}{1} \ge 1$							
	, 01ul		1+6							1 1/
	Volume of cement = 2 m ³ Number of cement bags = $\frac{\text{Volume of cement}}{\text{Volume of cement bags}}$									
Ν										
N	Number of cement bags = $\frac{8.685}{0.0347}$ = 57.63 say 58 bags									1 M
١	Volume of Sand = $\frac{\text{Dry volume}}{\text{Sum of proportion}} \times \text{Content of sand in proportion}$ Volume of Sand = $\frac{14}{1+6} \times 6$ Volume of Sand = 12 m ³									
V										
x										
	Numl	ber of Bricks	- 1 - 111							
S	Size (of One Brick	with Joint = 20c	m x 2	0cm x	10cm =0	.2m x 0	.2m x 0.1	m	
T		mo of D-1-1-	Total Ve	olume))		40	_ 20		
	v olul	me of Bricks	= Size of one Bric	k witl	n morta	$r = \frac{1}{0.2 x}$	x 0.1 x 0.	$\frac{1}{1} = 20,$	000INO.	
A	Assur	ne 5% Wastag	ge = (20000 x (5/2))	100))	= 1000	No.				2M
	otal	INUITIDEL OI RI	10000 + 1	000 =	- 21000	. INO.				

SUMMER – 16 EXAMINATIONS <u>Model Answer-</u> Estimating and costing

Page No.15/19

a) Prepare rate analysis for U.C.R masonry in C.M 1:5 in a foundation and plinth 8 M A) Calculation of materials Assume, volume of masonry 10 m ³ a) Dry volume of cement mortar = 42 % of volume of masonry = (42/100) × 10 = 4.2 cum % M b) Volume of cement = (4.2/(1-5)) × 10 = 4.2 cum % M c) Volume of cement = (4.2/(1-5)) × 5 = 3.5 cu.m % M c) Volume of sand = (4.2/(1+5)) × 5 = 3.5 cu.m % M d) Volume of stone = 1.25 × volume of masonry % M e) Number of through stone = 2 Nos / cu.m % M Number of stone required = 2 × 10 = 20 Nos % M B) Particulars Quantity Rate Per Amount M e) Number of stone required = 2 × 10 = 20 Nos % M Stone 1.2.5 m ³ 700 00 Cu.m % M Stone 12.5 m ³ 700 00 Cu.m % M Mason 13 Nos. 314 00 Day 4082 00	Q.5	Attempt any <u>TWO</u>	of the follo	wing					16 M			
A) Calculation of materials Assume, volume of cement mortar = 42 % of volume of masonry = (42/100) × 10 = 4.2 cu.m % M a) Dry volume of cement mortar = 42 % of volume of masonry mumber of bags of cement = {4.2/(1+5)} × 1 = 0.7 cu.m % M b) Volume of sand = {4.2/(1+5)} × 5 = 3.5 cu.m % M c) Volume of stone = 1.25 × volume of masonry = 1.25 × 10 = 12.5 cu.m % M d) Volume of stone required = 2 Nos / cu.m % M number of through stone = 2 Nos / cu.m % M Number of stone required = 2 x 10 = 20 Nos % M B) Particulars Quantity Rate Per Amount i. Materials:	a)	Prepare rate analy	sis for U.C.	R mason	ry in C.M 1	:5 in a four	ndation and	plinth	8 M			
Assume, volume of masonry 10 m ³ a) Dry volume of cement mortar = 42 % of volume of masonry = (42/100) x 10 = 4.2 cu.m % M b) Volume of cement = {4.2/(145)} X 1 = 0.7 cu.m % M volume of sags of cement = 0.7/0.035 = 20 bags % M c) Volume of sand = {4.2/(145)} X 1 = 0.7 cu.m % M d) Volume of stone = 1.25 x volume of masonry = 1.25 x 10 = 12.5 cu.m % M e) Number of through stone = 2 Nos / cu.m % M Number of stone required = 2 x 10 = 20 Nos % M B) Particulars Quantity Rate Per Amount i. Materials:		A) Calculation	of materials									
a) Dry volume of cement mortar = 42 % of volume of masonry = (42/103) × 10 = 4.2 cum % M b) Volume of cement = (4.2/(1+5)) × 1 = 0.7 cum % M c) Volume of sand = (4.2/(1+5)) × 1 = 0.7 cum % M c) Volume of sand = (4.2/(1+5)) × 1 = 0.7 cum % M c) Volume of sand = (4.2/(1+5)) × 1 = 0.7 cum % M d) Volume of stone = 1.25 × volume of masonry % M e) Number of through stone = 1.25 × 10 = 12.5 cum % M e) Number of stone required = 2 × 10 = 20 Nos % M B) Particulars Quantity Rate Per Amount i. Materials:		Assume, vol	ume of masc	onry 10 m	1 ³							
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		a) Dry volume of cement mortar = 42 % of volume of masonry $(42/400) \times 10^{-1}$										
b) Volume of cement = {4.2/(1+5)} x 1 = 0.7 cu.m % M c) Volume of sand = {4.2/(1+5)} x 5 = 3.5 cu.m % M d) Volume of stone = 1.25 x volume of masonry % M e) Number of through stone = 2.Nos / cu.m % M Number of stone required = 2 x 10 = 20 Nos % M B) Particulars Quantity Rate Per Amount K M Rs. Ps. Unit Rs. Ps. 1. Materials: Cement 20 Bags 300 00 Bag 6000 00 Sand 3.5 m ³ 800 00 Cu.m 8750 00 Through stone 20 Nos. 38 00 Nos. 760 00 Z Labours: Head Mason ½ Nos. 325 00 Day 162 50 Mason 13 Nos. 314 00 Day 2152 00 Bhisti 1½ Nos. 273 00 Day 409 50 Sundries, T & P L.S L		$= (42/100) \times 10 = 4.2 \text{ cu.m}$										
Number of bags of cement = 0.7/0.035 = 20 bags % M c) Volume of sand = {4.2/[1+5]} x 5 = 3.5 c.u.m % M d) Volume of stone = 1.25 x volume of masonry = 1.25 x volume of masonry = 1.25 x volume of masonry % M e) Number of through stone = 2 Nos / cu.m % M % M e) Number of stone required = 2 x 10 = 12.5 cu.m % M B) Particulars Quantity Rate Per Amount i Rs. Ps. Unit Rs. Ps. 1. Materials:		b) Volume	of cement		= {4.2/(1+5	x = 0.7	cu.m					
c) Volume of stand = (4.2/(1+5)/x) = 3.5 CL.m % M d) Volume of stone = 1.25 x volume of masonny = 1.25 x 10 = 12.5 cum % M e) Number of through stone = 2 Nos / cu.m % M % M e) Number of through stone = 2 Nos / cu.m % M Number of stone required = 2 x 10 = 20 Nos % M iiii Rs. Ps. Unit Rs. Ps. iiiiii Rs. Ps. Unit Rs. Ps. iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii		Number	of bags of ce	ement	= 0.//0.035	= 20 bags			1/2 M			
1) Volume of stone = 1.2.5 x Volume of masonry % M e) Number of through stone = 2 Nos / cu.m % M Number of stone required = 2 x 10 = 20 Nos % M B) Particulars Quantity Rate Per Amount i Rs. Ps. Unit Rs. Ps. 1. Materials: Cement 20 Bags 300 00 Bag 6000 00 Stone 12.5 m ³ 700 00 Cu.m 8750 00 Through stone 20 Nos. 38 00 Nos. 760 00 2. Labours: Head Mason ½ Nos. 325 00 Day 162 50 Mason 13 Nos. 314 00 Day 4082 00 2 M Bhisti 1½ Nos. 273 00 Day 409 50 Sundries, T & P L.S L.S L.S 200 00 Extra < Color		c) Volume	of sand		= {4.2/(1+5)} x 5 = 3.5 (cu.m		1/2 IVI			
= 1.23 x 10 = 12.5 u.in % M e) Number of through stone = 2 Nos / c.u.m Number of stone required = 2 x s / c.u.m Number of stone required = 2 x 10 = 20 Nos B) Particulars Quantity Rs. Ps. Unit Rs. Ps. I. Materials:		d) Volume of stone = 1.25×10^{-12} for 125×10^{-12}										
Number of stone required = 2 x 10 = 20 Nos % M Number of stone required = 2 x 10 = 20 Nos % M Particulars Quantity Rate Per Amount Image: Ima		a) Number	of through a	tono	= 1.25 X 10 = - 2 Noc / cu	= 12.5 CU.III			72 IVI			
B) Particulars Quantity Rate Per Amount Image: Imag		e) Number	e) Number of through stone = 2 Nos / cu.m									
Of Particulars Quantity Rate Per Amount Image: Second Stress Rs. Ps. Unit Rs. Ps. Image: Second Stress Image: Second Stress Ps. Image: Second Stress Image: Second Stres Image: Second S		B)	of stone req	uneu	- 2 X 10 - 20	0 1005			/2 101			
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Image: Materials: Ps. Unit Rs. Ps. Cement 20 Bags 300 00 Bag 6000 00 Sand 3.5 m ³ 800 00 Cu.m 2800 00 Stone 12.5 m ³ 700 00 Cu.m 8750 00 Through stone 20 Nos. 38 00 Nos. 760 00 2. Labours: Head Mason ½ Nos. 325 00 Day 162 50 Mason 13 Nos. 314 00 Day 2152 00 Male Mazdoor 10 Nos. 273 00 Day 2152 00 Bhisti 1½ Nos. 273 00 Day 409 50 Sundries, T & P L.S L.S L.S 200 00 etc Image: Top I 1% of total = 280.46 00 00 1% M ½ M Add contractor's profit @ 10 % of total = 280.480 Grant total		T di ticular s	Quantity		nate		711100					
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I. Materials: 2 M Cement 20 Bags 300 00 Bag 6000 00 Sand 3.5 m ³ 800 00 Cu.m 2800 00 Stone 12.5 m ³ 700 00 Cu.m 8750 00 Through stone 20 Nos. 38 00 Nos. 760 00 2 M Head Mason ½ Nos. 325 00 Day 162 50 Mason 13 Nos. 314 00 Day 2730 00 Female Mazdoor 10 Nos. 273 00 Day 2152 00 Bhisti 1½ Nos. 273 00 Day 409 50 Sundries, T & P L.S L.S S 200 00 etc Image: Imag		A Matariala										
Cement 20 Bags 300 00 Bag 6000 00 Sand 3.5 m³ 800 00 Cu.m 2800 00 Stone 12.5 m³ 700 00 Cu.m 8750 00 Through stone 20 Nos. 38 00 Nos. 760 00 Lead Mason ½ Nos. 325 00 Day 162 50 Mason 13 Nos. 314 00 Day 4082 00 Male Mazdoor 10 Nos. 273 00 Day 2152 00 Bhisti 1½ Nos. 273 00 Day 409 50 Sundries, T & P L.S L.S L.S 200 00 etc I Total 28046 00 % M % M % M O Add contractor's profit @ 10 % of total = 280.46 Contractor's profit @ 10 % of total = 280.46 00 % M % M % M O Add		1. Materials:										
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Stone 12.5 m³ 700 00 Cu.m 8750 00 Through stone 20 Nos. 38 00 Nos. 760 00 2. Labours: Head Mason ½ Nos. 325 00 Day 162 50 Mason 13 Nos. 314 00 Day 4082 00 Male Mazdoor 10 Nos. 273 00 Day 2152 00 Bhisti 1½ Nos. 273 00 Day 409 50 Sundries, T & P L.S L.S L.S 200 00 C) Add water charges @ 1 % of total = 280.46 00 50		Sand	3.5 m ³	800	00	Cu.m	2800	00				
Through stone 20 Nos. 38 00 Nos. 760 00 2. Labours: Head Mason ½ Nos. 325 00 Day 162 50 Mason 13 Nos. 314 00 Day 4082 00 00 Male Mazdoor 10 Nos. 273 00 Day 2152 00 00 Bisti 1½ Nos. 273 00 Day 409 50 5		Stone	12.5 m ³	700	00	Cu.m	8750	00				
2. Labours: Head Mason ½ Nos. 325 00 Day 162 50 Mason 13 Nos. 314 00 Day 4082 00 Male Mazdoor 10 Nos. 273 00 Day 2152 00 Female Mazdoor 08 Nos. 269 00 Day 409 50 Bhisti 1½ Nos. 273 00 Day 409 50 Sundries, T & P L.S L.S 200 00 etc 11/2 Nos. 273 00 Day 409 50 C) Add water charges @ 1 % of total = 280.46 00 00 ½ M M dc ontractor's profit @ 10 % of total = 2804.80 00 ½ M Grant total = 31131.06 K ½ M ½ M		Through stone	20 Nos.	38	00	Nos.	760	00				
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Sundries, T & PL.SL.SL.S20000etcImage: state		Bhisti	1½ Nos.	273	00	Day	409	50				
C) Add water charges @ 1 % of total= 280.46Volume <thvolume< th="">VolumeVolumeVolum</thvolume<>		Sundries, T & P etc	L.S	L.S	L.S		200	00				
C) Add water charges @ 1 % of total = 280.46 D) Add contractor's profit @ 10 % of total = 2804.80 Grant total = 31131.06 Rate per cu.m = Grant total / Volume of masonry = Rs 3113.11/-						Total	28046	00				
D) Add contractor's profit @ 10 % of total = 2804.80 Grant total = 31131.06 Rate per cu.m = Grant total / Volume of masonry = Rs 3113.11/-		C) Add water charge	<u>ا</u> مد @ 1 % of t	otal	= 280.46		<u> </u>	<u> </u>	1/ 8.4			
Grant total = 31131.06 ½ M Rate per cu.m = Grant total / Volume of masonry = Rs 3113.11/-		D) Add contractor's	nrofit @ 10	% of tota	= 280.40				1/2 IVI			
Rate per cu.m = Grant total / Volume of masonry = Rs 3113.11/-		Grant total = 31131.06										
		Rate per cu.m = Gra	nt total / Vo	lume of r	masonry = R	s 3113.11/-			72 IVI			

SUMMER – 16 EXAMINATIONS

Model Answer- Estimating and costing

Consider 10 m ³ of P. C. C. (1:2:4) Volume of wet concrete = 10 m ³ Total dry volume of concrete = 1.52 x 10 m ³ = 15.2 m ³ Quantity of materials: i) Aggregate quantity = [15.2/(1+2+4)] X 4 = 8.68 m ³ ii) Quantity of cement = = [15.2/(1+2+4)] X 1 = 1.085 m ³ No of bags of cement = $= 1.085/0.035 = 31$ bags Rate analysis: Particulars Quantity Rate Per Amount Cement 63 Bags 300 00 Bag 18900 00 Sand 4.34 m ³ 800 00 Cu.m 3472 00 Cement 63 Bags 300 00 Bag 18900 00 Sand 4.34 m ³ 800 00 Cu.m 3472 00 Carse aggregate 8.68 m ³ 510 00 Cu.m 4427 00 Carse aggregate 8.68 m ³ 510 00 Day 250 00 Mason ½ Nos. 500 00 Day 3000 00	Solution:	· •	-		<u> </u>	. /							
Volume of wet concrete = $1.52 \times 10 \text{ m}^3 = 15.2 \text{ m}^3$ Quantity of materials: i) Aggregate quantity = $[15.2/(1+2+4)] \times 4 = 8.68 \text{ m}^3$ ii) Sand quantity = $[15.2/(1+2+4)] \times 2 = 4.34 \text{ m}^3$ iii) Quantity of cement = $= [15.2/(1+2+4)] \times 1 = 1.085 \text{ m}^3$ No of bags of cement = $1.085/0.035 = 31 \text{ bags}$ Rate analysis: Particulars Quantity Rs. Ps. Unit Rs. Ps. Unit I. Materials: Cement 63 Bags 300 00 Sand 4.34 m ³ 800 00 Coarse aggregate 8.68 m ³ 510 00 Cuants: Unit Head Mason ½ Nos. 500 00 Mason 2 Nos. 400 00 Male Mazdoor 12 Nos. 200 00 Day 4000 Mason 2 Nos. 200 00 Mason 12 Nos. 200 00 Day	Consider 10 m ³ of H	P. C. C. (1:2:4)										
Total dry volume of concrete = $1.52 \times 10 \text{ m}^2 = 15.2 \text{ m}^2$ Quantity of materials: i) Aggregate quantity = $[15.2/(1+2+4)] \times 4 = 8.68 \text{ m}^3$ ii) Sand quantity = $[15.2/(1+2+4)] \times 2 = 4.34 \text{ m}^3$ iii) Quantity of cement = $1.085/(0.035 = 31 \text{ bags})$ Rate analysis: Per Amount Particulars Quantity Rate Per Amount I. Materials: Rs. Ps. Unit Rs. Ps. 1. Materials: Cement 63 Bags 300 00 Bag 18900 00 Carse aggregate 8.68 m ³ 510 00 Cu.m 4427 00 2. Labours: Head Mason ½ Nos. 500 00 Day 800 00 Mason 2 Nos. 400 00 Day 3000 00 Female Mazdoor 12 Nos. 250 00 Day 4000 00 Statisti 4 Nos. 250 00 Day 4000 00 Statistic 4 Nos. 250 00 Day 1000 00 <t< td=""><td>Volume of wet con</td><td colspan="11">ume of wet concrete =10 m³</td></t<>	Volume of wet con	ume of wet concrete =10 m ³											
i) Aggregate quantity = $[15.2/(1+2+4)] X 4 = 8.68 m^3$ ii) Sand quantity = $[15.2/(1+2+4)] X 2 = 4.34 m^3$ iii) Quantity of cement = $=[15.2/(1+2+4)] X 1 = 1.085 m^3$ No of bags of cement = $1.085/0.035 = 31$ bags Rate analysis: Particulars Quantity Particulars Quantity Rate Per Amount 1. Materials: Rs. Ps. Unit Rs. Ps. 1. Materials: Cement 63 Bags 300 00 Bag 18900 00 Sand 4.34 m³ 800 00 Cu.m 3472 00 Coarse aggregate 8.68 m³ 510 00 Cu.m 4427 00 2. Labours: Head Mason ½ Nos. 500 00 Day 800 00 Mason 2 Nos. 400 00 Day 3000 00 Female Mazdoor 12 Nos. 250 00 Day 4000 00 Bhisti 4 Nos. 250 00 Day 1000 00 Sundries, T & P etc L.S L.S L.S <	Total dry volume of	al dry volume of concrete = $1.52 \times 10 \text{ m}^3 = 15.2 \text{ m}^3$											
i) Aggregate quantity = [15.2/(1+2+4)] X 4 = 5.00 m ii) Sand quantity = [15.2/(1+2+4)] X 2 = 4.34 m ³ iii) Quantity of cement = $[15.2/(1+2+4)] X 1 = 1.085 m^3$ No of bags of cement = $1.085/0.035 = 31$ bags Rate analysis: Per Amount Particulars Quantity Rate Per Amount I. Materials: Rs. Ps. Unit Rs. Ps. 1. Materials: Cement 63 Bags 300 00 Bag 18900 00 Sand 4.34 m ³ 800 00 Cu.m 3472 00 Coarse aggregate 8.68 m ³ 510 00 Day 250 00 Adason ½ Nos. 500 00 Day 250 00 Mason 2 Nos. 400 00 Day 3000 00 Female Mazdoor 12 Nos. 250 00 Day 4000 00 Bhisti 4 Nos. 250 00 Day 1000 00 Suddries, T & P etc L.S L.S L.S 1000 00	i) A garage	i) Aggregate quantity = $[15.2/(1+2+4)] \times 4 = 8.68 \text{ m}^3$											
ii) Sand quantity = $[15.2/(1+2+4)] X 2 = 4.34 m^3$ iii) Quantity cement = $[15.2/(1+2+4)] X 1 = 1.085 m^3$ No of bags of cement = $1.085/0.035 = 31$ bags Rate analysis:ParticularsQuantityRatPerAmountParticularsQuantityRs.Ps.UnitRs.Ps.I. Materials:Rs.Ps.UnitRs.Ps.1.890000Sand4.34 m^380000Cu.m347200Coarse aggregate8.68 m^351000Cu.m4427002. Labours:UnitRs.25000Day25000Mason½ Nos.50000Day300000Mason2 Nos.20000Day400000Bilsti4 Nos.25000Day100000Bilsti4 Nos.25000Day400000Grapentor1040000Day250000	I) Aggrege	ate quantity –	[13.2/(1	[2+4]] A 4 –0	5.00 11								
iii) Quantity of cement = $[15.2/(1+2+4)] X 1 = 1.085 m^3$ No of bags of cement = $1.085/0.035 = 31$ bags Rate analysis: Particulars Quantity $\mathbb{Rs.}$ Per $Amourter Particulars Quantity \mathbb{Rs.} Ps. Unit Rs. Ps. I. Materials: State analysis: Ps. Unit Rs. Ps. Isomorphic and the state analysis and the state and the state analysis and the state analysis and the state analysis and the state analysis and the state and the state analysis and the state a$	ii) Sand qu	antity =	= [15.2/(1-	+ 2 +4)] X 2 =	$= 4.34 \text{ m}^3$								
Rate analysis: Particulars Quantity Rate Per Amount Particulars Quantity Rs. Ps. Unit Rs. Ps. 1. Materials: Sama 00 Bag 18900 00 Sand 63 Bags 300 00 Cu.m 3472 00 Coarse aggregate 8.68 m ³ 510 000 Cu.m 4427 00 2. Labours: 500 00 Day 250 00 Mason ½ Nos. 500 00 Day 3000 00 Male Mazdoor 12 Nos. 250 00 Day 3000 00 Female Mazdoor 20 Nos. 200 00 Day 1000 00 Bhisti 4 Nos. 250 00 Day 1000 00 Sundries, T & P etc L.S L.S L.S 1000 00 3. Centering audurtering: 10 400 00<	iii) Quantit No of ba	y of cement = gs of cement	= =[15.2/(= 1.085/0	[1+2+4)] X 1 .035 =31 bag	$= 1.085 \text{ m}^3$								
Image: Constraint of the strength of the strengt of the strength of the strength of the strength of the	Rate analysis: Particulars	Quantity		Rate	Per	Amou	ınt						
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Cement 63 Bags 300 00 Bag 18900 00 Sand 4.34 m³ 800 00 Cu.m 3472 00 Coarse aggregate 8.68 m³ 510 00 Cu.m 4427 00 2. Labours: 500 00 Day 250 00 Mason ½ Nos. 500 00 Day 800 00 Mason 2 Nos. 400 00 Day 800 00 Male Mazdoor 12 Nos. 250 00 Day 3000 00 Female Mazdoor 20 Nos. 200 00 Day 4000 00 Bhisti 4 Nos. 250 00 Day 1000 00 Sundries, T & P etc L.S L.S L.S 1000 00 3. Centering and Shuttering: 250 00 Day 4000 00 Mazdoor 10 250	1. Materials:												
Sand 4.34 m³ 800 00 Cu.m 3472 00 Coarse aggregate 8.68 m³ 510 00 Cu.m 4427 00 2. Labours:	Cement	63 Bags	300	00	Bag	18900	00						
Coarse aggregate 8.68 m³ 510 00 Cu.m 4427 00 2. Labours: Head Mason ½ Nos. 500 00 Day 250 00 Mason 2 Nos. 400 00 Day 800 00 Mason 2 Nos. 400 00 Day 800 00 Male Mazdoor 12 Nos. 250 00 Day 3000 00 Female Mazdoor 20 Nos. 200 00 Day 4000 00 Bhisti 4 Nos. 250 00 Day 1000 00 Sundries, T & P etc L.S L.S L.S 1000 00 3. Centering and Shuttering: 1000 00 00 Mazdoor 10 400 00 Day 4000 00	Sand	4.34 m ³	800	00	Cu.m	3472	00						
2. Labours: Head Mason ½ Nos. 500 00 Day 250 00 Mason 2 Nos. 400 00 Day 800 00 Male Mazdoor 12 Nos. 250 00 Day 3000 00 Male Mazdoor 12 Nos. 250 00 Day 3000 00 Female Mazdoor 20 Nos. 200 00 Day 4000 00 Bhisti 4 Nos. 250 00 Day 1000 00 Sundries, T & P etc L.S L.S L.S 1000 00 3. Centering and Shuttering: Carpentor 10 400 00 Day 4000 00 Mazdoor 10 250 00 Day 2500 00	Coarse aggregate	8.68 m ³	510	00	Cu.m	4427	00						
Head Mason ½ Nos. 500 00 Day 250 00 Mason 2 Nos. 400 00 Day 800 00 Male Mazdoor 12 Nos. 250 00 Day 3000 00 Male Mazdoor 12 Nos. 250 00 Day 3000 00 Female Mazdoor 20 Nos. 200 00 Day 4000 00 Bhisti 4 Nos. 250 00 Day 1000 00 Sundries, T & P etc L.S L.S L.S 1000 00 3. Centering and Shuttering: 1000 00 00 Mazdoor 10 250 00 Day 4000 00	2. Labours:			-1									
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Male Mazdoor 12 Nos. 250 00 Day 3000 00 Female Mazdoor 20 Nos. 200 00 Day 4000 00 Bhisti 4 Nos. 250 00 Day 1000 00 Sundries, T & P etc L.S L.S L.S 1000 00 3. Centering and Shuttering: Carpentor 10 400 00 Day 4000 00 Mazdoor 10 250 00 Day 2500 00	Mason	2 Nos.	400	00	Day	800	00						
Female Mazdoor 20 Nos. 200 00 Day 4000 00 Bhisti 4 Nos. 250 00 Day 1000 00 Sundries, T & P etc L.S L.S L.S 1000 00 3. Centering and Shuttering: 1000 0	Male Mazdoor	12 Nos.	250	00	Day	3000	00						
Bhisti 4 Nos. 250 00 Day 1000 00 Sundries, T & P etc L.S L.S L.S 1000 00 3. Centering and Shuttering: Carpentor 10 400 00 Day 4000 00 Mazdoor 10 250 00 Day 2500 00	Female Mazdoor	20 Nos.	200	00	Day	4000	00						
Sundries, T & P etc L.S L.S L.S 1000 00 3. Centering and Shuttering: 1000 00	Bhisti	4 Nos.	250	00	Day	1000	00						
3. Centering and Shuttering: Carpentor 10 400 00 Day 4000 00 Mazdoor 10 250 00 Day 2500 00	Sundries, T & P etc	L.S	L.S	L.S		1000	00						
Carpentor 10 400 00 Day 4000 00 Mazdoor 10 250 00 Day 2500 00	3. Centering an	nd Shuttering:		-1	I								
Mazdoor 10 250 00 Day 2500 00	Carpentor	10	400	00	Day	4000	00						
	Mazdoor	10	250	00	Day	2500	00						
Timber planksLSLSLS100000	Timber planks	LS	LS		LS	1000	00						
NailsLSLS80000	Nails	LS	LS		LS	800	00						
Total 45149 00					Total	45149	00						
1. Add 1.5 % water charges = 677.00 2. Add contractor's profit @ 10 % of total = 4515 Grand total = 50341.00	1. Add 1.5 % wate 2. Add contracte	er charges = 677 or's profit @ 10	7.00 9% of total Grand tot	= 4515 = 50341.00			L]						

SUMMER – 16 EXAMINATIONS

tank.	Shown in figure no.	2.	i concrete a	mu excav	au011 [or unae	i ground water			
	Gm×	4 m								
_	PLAN									
200	SEC.	• <u>*</u> 2 • 00 -		- BBM	200 T	HICK	2			
Sr.	Description of items	No.	Length	Width	Depth	Qty	Explanatory notes			
No	and details of work		(m)	(m)	(m)					
1	Earth work in Excavation water tank up to 2.2	1	6.8	4.8	2.2	71.80 cu.m	Width= 4+0.2+0.2+0.2+0.2 = 4.8			
	m depth						Ht.=2 + 0.2 =2.2			
2	Cement concrete for bed 1:3:6- floor and foundation	1	6.8	4.8	0.2	6.52 cu.m				
3	Brickwork						Length of long wall = c/c dist of long wall + width of			
	Long wall	2	6.4	0.2	2	5.12	= 6.2 + 0.2 = 6.4 m			
	Short wall	2	4	0.2	2	3.2	Length of short wall =c/c dist of short wall – width			
					Total	8.32 cu.m				

Q.6	Attempt any four :	16 M							
a)	Describe long wall and short wall method for calculating quantities of items of work.	4 M							
	i) Draw the centre line plan.	2 Marks							
	ii) Consider wall spanning in horizontal direction as a long wall and vertical	for							
	direction as a short wall in plan or vice versa.	Descripti							
	iii) Calculate centre to centre lengths of long wall and short wall.	on							
	iv) Calculate length of long wall out to out.								
	Length of long wall = c/c length of long wall + width of item								
	v) Calculate length of short wall in to in.								
	Length of short wall = c/c length of short wall – width of item wi) Multiply the length by the width and depth to find quantity								
	vi) Multiply the length by the width and depth to find quality.								
	and the stretch of the second s								
		2 M for							
	and reacor is actively x Number of junction along	neat							
	B Length of	labeled							
	short wall = 5	fig							
		U							
	L = c/c Length + B/2 + B/2								
	I ength of long wall $S = c/c \text{ Length } - B/2 - B/2$								
	L								
b)	State form forting effecting tools morely	4.54							
U)	State four factors affecting task work.	4 IVI							
	Factors Affecting Task Work:-								
	1. Out turn of skined labour depends on the nature, size, neight, situation, location, Climatic condition, technique adopted, wages paid etc.								
	2. Availability of skilled labour.								
	3. A well-organized work increases the out turn of labour.								
	4. Job satisfaction and working condition may increase the out turn work.								
	5. If the work is allotted on piece work basis then the daily wages output of labour								
	increases.								
c)	Work out quantity of materials required for 12mm thick plaster in C.M. 1: 4 for	4 M							
,	200m ² area.								
	Area of cement plaster 200 m ²								
	ⁱ⁾ Wet volume of cement plaster = $200 \text{ x} (12/1000) = 2.4 \text{ m}^3$								
	ⁱⁱ⁾ Add 30 % mortar to fill up joint = $(30/100) \times 2.4 + 2.4 = 3.12 \text{ m}^3$								
	ⁱⁱⁱ⁾ Dry volume of mortar = 25 % more of total wet volume								
	$= (25/100) \times 3.12 + 3.12 = 3.9 \text{ m}^3$								
	^{1V)} Volume of cement = $\{3.9/(1+4)\}$ x 1 = 0.78 m ³								
	Number of bags of cement = $(0.78/0.035) = 22.285$ say 23 bags.								
	Volume of sand = $\{3.9/(1+4)\}$ x 4 = 3.12 m ³	- 101							

d)	State the names of software that are used for preparation of detailed estimates of	4 M
	building works.	
	List of software's are as follows:	½ For
	1) QE-Pro	each
	2) 2002 CD Estimator.	Any Eight
	3) Chief Estimator	
	4) ICE 2000.	
	5) TECS.	
	6) Estimator 2.0	
	7) Estimate Master 5.13	
	8) Build Soft	
	9) Plan Swift Software	
	10) EXTRAXION Estimating Software etc.	
e)	State any four advantages of using software have /programmes for estimating and	4 M
	costing.	
	Following are the advantages:	1 Mark
	1) Fort of accurate quantity computation.	for each
	2) Calculates quantities from building plans.	Any Four
	3) Generation of measurement sheet in LBD format.	,,
	4) Cost break up for material, labour and machine.	
	5) Project planning and Gantt chart.	
	6) Interface with MS project.	