GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FIFTH.** PROGRAM: **CIVIL ENGINEERING.**

COURSE CODE:**CEE509/CE408** COURSE NAME:**SOLID WASTE MANAGEMENT.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **28/04/2017**

Instruction:-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR** **(08)**

a) Enlist any four sources of solid waste.

b) What is necessity of providing transfer stations?

c) What is litter bin?

d) What do you mean by seggregation at source?

e) What is public participation in solid waste management?

f) Define clinical waste.

Q.2 Attempt any **FOUR** **(16)**

a) Explain factors affecting generation of solid waste.

b) Explain physical characteristics of solid waste.

c) Draw organisational pattern of solid waste management.

d) Explain use of solid waste as raw material in industry.

e) Classify colour coding for different types of hospital wastes.

f) Explain health aspects during storage and transportation of solid waste.

Q.3 Attempt any **FOUR** **(16)**

a) Explain handling and disposal of hazardous solid waste.

b) Define hospital waste. Enlist its sources.

c) Explain transportation of biomedical waste.

d) Define solid waste, rubbish and garbage.

e) Explain criteria's for storage of municipal waste.

f) What are the factors affecting capacity of transportation vehicles?

P.T.O.

Section – II

Marks

Q.4 Attempt any **FOUR** **(08)**

a) What do you meant by sanitary land filling?

b) Define –Composting.

c) What do you mean by Incinration of waste?

d) Define- Pyrolusis.

e) Enlist any four problems of disposal of industrial waste.

f) State the responsibility of industry about disposal of industrial waste.

Q.5 Attempt any **FOUR** **(16)**

a) Explain in brief-"Area method of land filling."

b) How the leachate can be controlled at land filling sites.

c) Describe the 'Ramp Method' of land filling.

d) How to recover Biogas energy from organic waste?

e) Explain the process of vermi-composting.

f) Draw the flow chart showing mechanical compost plant and explain in brief.

Q.6 Attempt any **FOUR** **(16)**

a) Write any four benefits of compost.

b) Describe in brief. Anaerobic method of composting.

c) Enlist types of incinerator and explain briefly any one.

d) Enlist the methods of Pyrolysis of waste and explain 'Destrugus Pyrolysis system.'

e) Describe the problem of disposal of fly ash from Thermal power plant.

f) Explain in brief "Recycling of industrial waste."

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **CIVIL ENGINEEING**

COURSE CODE: **CEE309/CE205** COURSE NAME: **SURVEYING -II**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **19/04/2017**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Q.1 Attempt any **FOUR** **Marks (08)**

a) Define the term – Face left.

b) What is meant by transitting?

c) Define the term- Independent co-ordinates.

d) What is menat by tacheometry?

e) State any two charactoristics of tacheometer.

f) State the constants of tacheometer with their usual values.

Q.2 Attempt any **FOUR** **(16)**

a) State the procedure of measurement of deflection angle with neat sketch.

b) The co-ordinates of two points C and D are as follows.

Point	North co-ordinate	East co-ordinate
C	850.00	751.45
D	372.89	453.42

Calculate length and bearing of line CD.

c) Following are the internal angles of closed traverse ABCDE $A = 85^0\,50'30''$, $B = 116^0 55'40''$, $C = 101^0 38'50''$, $D = 122^0 40'40''$, $E = 112^0 54'20''$. If bearing of line AB is 220^0, calculate bearings of all sides.

d) State and explain procedure of prolonging a straight line with theodolite by any one method.

e) Following are the lengths and bearings of closed traverse ABCD.

Line	Length in 'm'	Bearing
AB	60	$N43^0 30'W$
BC	62	$N47^0 30'E$
CD	58	$S46^0 30'E$
DA	?	?

Calculate length and bearing of line DA.

f) State and explain temporary adjustment of theodolite in detail.

Q.3 Attempt any **FOUR** **(16)**

a) State any four instrumental errors in theodolite. What precautions will you take to minimise the stated errors?

b) Following are the corrected consecutive co-ordinates of closed traverse ABCDE.

Line	Northing	Southing	Easting	Westing
AB	365.32	-	740.25	-
BC-	-	489.31	-	626.24
CD	-	942.52	632.13	-
DE	572.17	-	-	1014.12
EA	494.34	-	267.98	-

Calculate independent co-ordinates.

P.T.O

c) State the fundamental lines of theodolite with desired relationship between different lines.

d) An anallatic tacheometer was set up at station P and following observations were taken on vertically held staff.

Station	Staff station	Vertical angle	Hair readings	Remark
P	BM	$8^0 12'$	0.750,1.500,2.250	RL of BM = 251m
	Q	$-5^0 20'$	1.500, 1.800, 2.100	

The constant of instrument was 100. Calculate distance PQ and RL of Q.

e) Explain the procedure of measuring tacheometric constants by any one method.

f) Explain the principle of tacheometery with neat sketch.

Q.4 Attempt any **FOUR** **(08)**

a) State the methods of plane tabling.

b) Define " Degree of Curve"

c) State the types of curve used in road alignment.

d) In relation to the total station, define the term "Azimuth mark".

e) Enlist any four component parts of digital theodolite.

f) What is meant by remote sensing?

Q.5 Attempt any **FOUR** **(16)**

a) With neat sketch, explain the procedure of radiation method of plane tabling.

b) Write a note on orientation of plane table by back sighting.

c) Draw a neat sketch of simple curve & show on it the following.

i) Point of intersection

ii) Versed sine

iii) Length of curve

iv) Long chord.

d) Explain the temporary adjustments of a total station.

e) State any four special feature of digital theodolite.

f) Write a note on remote sensing process.

Q.6 Attempt any **FOUR** **(16)**

a) Explain with neat sketch method of intersection in plane table survey.

b) State any four uses of total station.

c) Write the process of measurement of vertical angle by digital theodolite.

d) Write the method of curve setting by "offsets from longchord".

e) In circular curve *if* $\phi = 85^0$, $R = 25m$, calculate angle of intersection & degree of curve.

f) Write a note on GPS system.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **SECOND** PROGRAM : **COMMON**

COURSE CODE :- **CCF/CCE202/X106**

COURSE NAME :- **COMMUNICATION SKILLS**

MAX. MARKS : **40** TIME : **2HRS.** DATE: - **20 / 04 / 2017**

Instruction:-

1) Answers must be written in the main answer book provided.(and supplements if required)
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR (Answer the following questions in 3-5 sentences).** (08)

a) Write importance of oral communication for engineers.

b) Write four examples of oral communication.

c) State the advantages of written communication.

d) Define the term artefacts.

e) Write two advantages of LCD projector.

f) Explain panel interview.

Q.2 Attempt any **FOUR** (16)

a) Explain communication process with suitable diagram.

b) Explain mechanical and physical barriers.

c) Write strengths of media aided presentation.

d) Explain 'Media plays an important role in the communication processes'.

e) Write four advantages and disadvantages of oral communication.

f) Write short note on mock interview.

Q.3 Attempt any **TWO** (16)

a) Write any four principles of effective communication.

b) Write an application for the post of Design Engineer in Tata Motors, Pune. Give your resume.

P.T.O

c) Prepare a pie-chart which shows the distribution of sales of the car industry among six car companies :

General Motors	: 37%
Maruti	: 22%
Ford	: 04%
Tata	: 12%
Hyundai	: 13%
Fiat	: 12%

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FOURTH.** PROGRAM: **CIVIL ENGINEERING.**

COURSE CODE: **CEE402/CE302/C303/1303.** COURSE NAME: **DESIGN & DRAFTING OF RCC STRUCTURE.**

MAX. MARKS: **80** TIME: **4 HRS.** DATE: **20/04/2017**

Instruction:-
1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I **Marks**

Q.1 Attempt any **FOUR.** **(08)**

a) Why concrete is required to be reinforced?
b) Define the characteristics load and characteristic strength.
c) Draw stress and strain variation diagram for singly reinforced beam in limit state method.
d) Define doubly rein forced section.
e) Why and where are doubly reinforced sections provided?
f) State the situation where a flanges R.C.C. section is preferred.

Q.2 Attempt any **TWO.** **(16)**

a) Define limit state. Write notes on
   1) Limit state collapse.
   2) Limit state serviceability.
b) A rectangular beam of size 300 mm X 600 mm overall has been reinforced 800 mm^2 and 1600 mm^2 respectively on compression and tension side. Cover on both side is 40 mm. Using concrete M15 and steel grade Fe 415. Find ultimate moment of resistance Take $F_{sc} = 0.87\ f_g$
c) Calculate depth and area steel at mid span of a simply supported beam over an effective span 6m. The beam is carrying all inclusive ultimate load 20 kN/m. Assume 300 mm bearings. Use M20 and Fe500.

Q.3 Attempt any **TWO.** **(16)**

a) Calculate ultimate moment of resistance of a doubly reinforced beam section 250mm x 450 mm effective. If A_{st}=1500 mm^2 and A_{sc}=600mm^2.Assume M20 concrete Fe415 steel and F_{sc}=280 mm^2 , cover to reinforcement is 40 mm.
b) Find the moment of resistance of a T-beam having width 1500mm, depth of slab 150 mm and effective depth of beam 650 mm,width of web 300 mm. The steel on tension side consists of 8 bars of 20 mm diameter. Grade of concrete M20 and steel M415 are used. Draw neat sketch of beam.
c) Design a T-beam for a half of size 20m x 8m for live load of 3 kN/m^2.use M20 and Fe415 materials. Assume NA lies within the flange. Check for shear need not be done FF=0.75 kN/m^2.

PTO

Section – II

Marks

Q.4 Attempt any **FOUR** **(08)**

a) Enlist two forms of shear reinforcement.

b) Calculate development length for a 12mm bar in compression for material M25-Fe415.

c) State values of basic l/d ratios for

1) Cantilever slab 2)Simply supported slab

d) Draw typical reinforcement detailing diagram for dog-legged stair-case waist slab in cross-section.

e) State IS specification for spacing of lateral ties in columns.

f) Enlist losses of prestress.

Q.5 Attempt any **TWO.** **(16)**

a) Design shear reinforcement for a beam with effective cross-section 230mm x 500mm with 3-20 diameter of bottom reinforcement. The beam is simply supported with spam 6 m & total ultimate load 80 kN/m. Provide one bent-up bar. Assume materials M-20-Fe-415.Take τ_c=0.72 MPa. Draw detailing diagram.

b) Design a cantilever slab as roof slab with access permitted for a span of 1.3m for materials M20-Fe-415 grade.

c) 1) Draw typical reinforcement detailing of two way slab in plan & cross-section along e_x & e_y.

2) Determine ultimate slab carrying capacity of 400mm X 400mm column of with 8-16 Φ bars of Fe415 grade steel & M25 grade concrete.

Q.6 Attempt any **TWO.** **(16)**

a) Design for assume isolated slopes column footing for a 230mm X 230mm for an ultimate load of 450 KN using M20-Fe415 grade materials. Take SBC as 300kN/m^2. Draw detailing diagram.

b) 1) State IS specifications regarding minimum & maximum shear reinforcement. Also state formula for spacing of shear stirrups.

2) Define & state purpose of ductile detailing. State salient IS code provisions for ductile detailing.

c) 1)Draw diagram showing ductile detailing at beam-column junction.

2) Define prestressing. Distinguish between pre-tensioning and post-tensioning.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FIFTH.** PROGRAM: **CIVIL ENGINEERING.**

COURSE CODE:**CEE506/CE401.** COURSE NAME: **IRRIGATION ENGINEERING.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **02/05/2017**

Instruction:-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I **Marks**

Q.1 Attempt any **FOUR** **(08)**

a) State any two advantages of irrigation project.

b) Define runoff.

c) What is crop season?

d) Define duty.

e) What is lift irrigation?

f) Write any two advantages of percolation tank.

Q.2 Attempt any **FOUR** **(16)**

a) State importance of irrigation in India.

b) Explain any four factors affecting rainfall.

c) Define 1) Time factor 2) Command area.

d) State any four factors affecting duty.

e) Define bandhara & state component parts.

f) State any four disadvantages of percolation tank.

Q.3 Attempt any **FOUR** **(16)**

a) Enlist the possible ill effects of irrigation projects.

b) Enlist methods of estimating of runoff. Explain any one method.

c) Derive relation between duty, delta & base period.

d) What is Kolhapur type weir? Draw a neat sketch of it.

e) State the advantages of well irrigation.

f) State the factor affecting selection of site for a percolation tank.

P.T.O.

Section – II

Marks

Q.4 Attempt any **FOUR** **(08)**

a) What do you mean by flood absorption capacity?

b) What do you mean by dead storage?

c) Define spillway.

d) Define Theoretical profile.

e) What is the purpose of canal lining?

f) State any two remedial measures for salt efflorescence.

Q.5 Attempt any **FOUR** **(16)**

a) Explain Area capacity curve with neat sketch.

b) Explain galleries in gravity dam with neat sketch.

c) Draw section of Earthen dam label all components and state the function of 1) Cut of trench 2) Rock toe.

d) Explain seepage controlling methods in earthen dam.

e) Classify canals based on their alignments. Explain in brief with neat sketch.

f) Explain with neat sketch.

1) Aquaduct.

2) Level crossing.

Q.6 Attempt any **FOUR** **(16)**

a) Fix the FRL, HFL & TBC from the following data.

1) DSL 110m

2) Effective live storage $8000m^3$

3) Tank losses $1500m^3$

4) Max flood discharge $400m^3/sec$

5) Francis formula $Q=1.8LH^{3/2}$

6) Free board = 1.5m.

Contour RL	110	112	114	116	118	120
Capacity in m^3	1000	3000	5000	6000	9000	12000

b) State purchase of spill way. Explain chute spillway with neat sketch.

c) Explain Radial gate with neat sketch.

d) Draw the canal section in

1) Full banking & label parts.

2) Full cutting & label parts.

e) Explain with neat sketch

1) Siphon.

2) Super passage.

f) Explain with neat sketch canal head regulator with functions & construction.

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EVEN TERM END EXAM APRIL/MAY-2017

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **CIVIL ENGINEERING**

COURSE CODE:**CEE310.** COURSE NAME: **TRANSPORTATION ENGINEERING.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **21/04/2017**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** **(08)**

a) What do you mean by alignment of road?

b) Define 'Super elevation'

c) What do you mean by 'Cutback'?

d) What is meant by 'grouted macadam?

e) State any four advantages of tunnels.

f) What is meant by 'shaft in tunnels'

Q.2 Attempt any **FOUR** **(16)**

a) Draw neat cross section of road in cutting. Label all component parts.

b) Explain 1) Stopping sight distance

2) Passing sight distance.

c) Compare rigid pavements with flexible pavements.

d) Explain alternative and continuous by method with neat sketch.

e) What are the various shapes of tunnels? Explain egg shaped tunnel with neat sketch with its suitability.

f) Write down detail construction procedure for construction of shaft in tunnels.

Q.3 Attempt any **FOUR** **(16)**

a) What are the various requirement of alignment of road? Explain in brief.

b) Draw the neat sketch of super elevation & explain it in brief with its objects.

c) Explain 1) Right of way.

2) Carriage way width with its IRC values.

d) What are the advantages and disadvantages of concrete roads?

e) Write down construction procedure for W.B.M road. With neat sketch.

f) Explain procedure for transferring the alignment through shafts.

PTO

Q.4 Attempt any **FOUR** **(08)**

a) Define the term – sleeper density.

b) What is meant by coning of wheels?

c) State the necessity of points and crossing.

d) Define the terms – stock rail, check rail.

e) State the types of yards.

f) Define the terms – freeboard, waterway.

Q.5 Attempt any **FOUR** **(16)**

a) State any eight function of ballast.

b) State any eight requirements of good sleeper.

c) What is meant by gauge? State types of gauges in India with their gauge distances.

d) What is spike? State its types. Draw sketch of any one type of spike.

e) Draw a neat sketch of left hand turnout naming component parts.

f) State any two requirements each from public, traffic staff, trains and locomotive point of view essential for railway station.

Q.6 Attempt any **FOUR** **(16)**

a) What is goods yard? State any four facilities to be provided at goods yard.

b) State and explain any four factors affecting selection of site for bridge.

c) What is an abutment? State the types of abutment without wing walls. Draw a neat sketch of any one type of it.

d) State any two functions of bridge bearing. Draw a neat sketch of fixed bearing for R.C.C slab bridge.

e) Classify bridges as per span length and as per level of bridge floor.

f) Draw a neat sketch of simple suspension bridge naming the parts.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FOURTH** PROGRAM: **CIVIL ENGINEERING**

COURSE CODE: **CEE403/CE309**

COURSE NAME: **DESIGN & DRAFTING OF STEEL STRUCTURES.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **21/04/2017**

Instruction:-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
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Section – I

Marks

Q.1 Attempt any **FOUR** **(08)**

a) Write the full form of ISMB & ISMC.
b) Draw a neat sketch of single lacing.
c) What are the different section used for tensile members?
d) What is gross area & effective area of section?
e) State two advantages of steel structures.
f) Enlist two grades of the steel along with their characteristics strength used for steel structure.

Q.2 Attempt any **TWO** **(16)**

a) A single angle section ISA 150 X 115 X 10mm with longer leg connected to gusset plate of 12mm thick with 6 bolts of 14mm diameter with pitch of 50mm, end cover 40mm and gauge distance 100mm. determine ultimate load carrying capacity of angle used as tension member. Take fu=410MPa & fy=250MPa area of ISA 150 x115 x10 is 25.66 cm^2

b) Design struct section to support load of 250KN, the section consists of two equal angles placed back to back of 12mm thick gusset plate. The effective length is 3m. Use fy=250MPa select the section from the following table.

Angle(mm)	Area(cm^2)	I_{xx}(cm^4)	C_{xx}(cm)
90x90x10	17.03	126.70	2.59
100x100x10	19.03	177.00	2.84
120x120x10	23.20	313.00	3.31

c) Draw two views of a labeled diagram of showing bolted connection between beam ISMB200 connected to flange of column ISHB 300.

Q.3 Attempt any **TWO** **(16)**

a) A single angle ISA 100x100x10 transfer factored tensile load of 300KN connected by bolt with 10mm thick gusset plate. Design the bolted connection. Take fu=400MPa

b) State I.S specification for
   i) Maximum & minimum pitch.
   ii) Maximum & minimum edge distance.
   iii) Diameter of bolt holes for bolted connection.

c) Draw front & top view of compound column made of two channels placed face to face with double facing system.

λ	70	80	90	100	110	120	130	140	150	160	170	180
f_{cd} MPa	152	136	121	107	94.6	83.7	74.3	66.2	59.2	53.3	48.1	43.6

Marks

Section – II

Q.4 Attempt any **FOUR** **(08)**

a) Enlist types of beam with common sections used.
b) Define plate girder & state its application
c) State necessity of column base & enlist types of foundations.

P.T.O.

d) Differentiate between slab base & gusseted base (any four points)

e) Write any four assumptions in the pin jointed frame analysis.

f) Define redundant & deficient frames.

Q.5 Attempt any **TWO** **(16)**

a) Check whether ISMB250 is suitable or not as a simply supported beam over an effective span of 6.0m. It carries u.d.l of 15 KN/m (including self weight). Properties of ISMB 250 are as below

b_f =125mm, t_f =12.5mm, t_w =6.9mm, I_{XX} =5131.6x10^{4}mm^4 , Z_{XX}= 410x10^{3}mm^3, r_1=13.0mm, Z_p=465.71x10^{3}mm^3, V_{m0}=1.1

b) Design a simply supported beam of 5m effective span carrying a service u.d.l of 30 KN/m excluding self weight & concentrated service load of 10KN at the midspan. The beam is laterally supported. Use beam section in table below & V_{m0}=1.1, f_y=250 N/mm^2

SR No	Section	Wt/m (N/m)	b_f (mm)	t_f (mm)	t_w (mm)	r_1 (mm)	Z_{XX} (mm^3)	I_{XX} (mm^4)	Z_p (mm^3)
1	ISMB350	514	140	14.2	8.1	14	778.9 x 10^3	1360.3 x 10^4	889.57 x 10^3
2	ISMB400	604	140	16.0	8.9	14	1022.9 x 10^3	20458.4 x 10^4	1171.22 x10^3
3	ISMB450	710	150	17.4	9.4	15	1350.7 x 10^3	30390.8 x10^4	1533.36 x10^3
4	ISWB300	472	200	10	7.4	11	654.8 x 10^3	9821.6 x10^4	731.21 x10^3

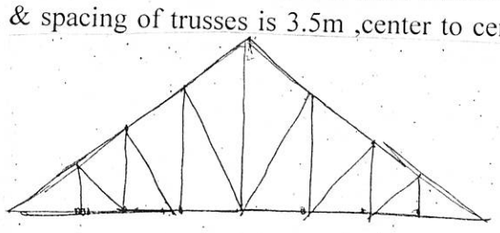
c) A column ISMB 300 carries an axial load of 1200KN. Design a slab base & concrete pedestal for the column. The SBC of the soil is 180 KN/m^2 & M20 grade of concrete is used for concrete pedestal take V_{m0}=1.1 & Draw a neat diagram of base in plan & elevation with dimension. For ISMB 300, b_f=140-mm, t_f=13.1mm & h=300mm.

Q.6 Attempt any **TWO** **(16)**

a) i) Draw a neat lebelled diagram of bolted plate girder.

ii) Enlist any four types of roof trusses with neat diagrams & state their suitability.

b) Calculate the panel point line load & wind load over a roof truss shown in figure. Rise of truss is , span of truss =16m & spacing of trusses is 3.5m ,center to center no of panels are 8.



Howe type roof truss.

Height of this roof is 10m with normal permeability i.e C_{pi}= ±.02. Assume basic wind speed 40m/sec, risk probability factor =1 structure size factor=0.8, Topography factor =1.0

External wind pressure coefficients C_{pe} are as below.

Slope	Wind normal to ridge wind angle 0^0		Wind parallel to ridge wind angle 90^0	
	Wind ward	Lee ward	Near gable end	Internal bay
20^0	-0.4	-0.4	-0.7	-0.6
30^0	0	-0.4	-0.7	-0.6

c) Check suitability of angle purlin for a roof truss having following details.

i) Spacing of trusses = 3.5m

ii) Span of truss =15m

iii) Rise of truss =3m

iv) Spacing of purlins =1.35m

v) Weight of G.I. sheets =130 N/m^2

vi) Wind load on purlin = 1170N/m^2

vii) Assume self wt of purlin = 100N/m

viii) ISA 90x90x6 @8.2kg/m.

Having $I_{XX}=I_{YY}$=80.10x10^{4}mm^4

$C_{xx}=C_{YY}$=24.2mm.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIFTH** PROGRAM : **CIVIL ENGINEERING**

COURSE CODE :- **CEE501**

COURSE NAME :- **CONTRACTS AND ACCOUNTS**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **24 / 04 / 2017**

Instruction :-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available o request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR** (08)

a) List the four classifications of works according to PWD.

b) Write names of any four methods of execution of works adopted in Government Organization.

c) Write the meaning of Lump sum contract.

d) Write the purpose of earnest money deposit.

e) Write the meaning of Subletting of contract.

f) Write the meaning of unbalanced tender.

Q.2 Attempt any **FOUR** (16)

a) Explain the procedure of built operate transfer (BOT) in Civil engineering contracts.

b) Write PWD procedure for Administrative approval and Technical Sanction.

c) Explain cost plus fixed fees and cost plus variable fees contract.

d) List any eight responsibilities of Junior Engineer in Civil Construction.

e) Define class of contractor and write procedure for registration for contractor.

f) Write the meaning of 'Negotiated contract' and state the situation where it is used.

Q.3 Attempt any **FOUR** (16)

a) Define tender notice and list any four important points to be included while drafting tender notice.

b) Explain the term 'corrigendum to tender notice' and also write the necessity of it.

c) Draft a tender notice for the construction of Girls hostel in polytechnic college costing of Rs. 3crores to be invited by superintendent engineer. Assume suitable data.

d) Explain the following i) Scrutiny of tenders. ii) Acceptance of tender.

e) Explain the following i) Time limit and Extension of time limit.
ii) Defect liability period and Escalation of cost.

f) Write Reasons for rejections of lowest tender and all tenders.

P.T.O.

Section – II	Marks

Q.4 Attempt any **FOUR** (08)

a) What do you mean by 'financial management'?

b) What is 'balance sheet'?

c) What is 'Daily Labour Report'?

d) Define i) Book Value ii) Scrap value.

e) Define – valuation.

f) What is 'sinking fund'?

Q.5 Attempt any **FOUR** (16)

a) State and explain the functions of financial management.

b) Enlist and explain the various financial sources.

c) Enlist and explain in brief various types of budgets.

d) Explain in brief i) Mobilization advance ii) Imprest.

e) Explain with example Reduced rate payment.

f) Explain in brief i) Measurement book ii) Indent .

Q.6 Attempt any **FOUR** (16)

a) State and explain the factors affecting 'valuation of building'

b) Give the difference between depreciation and obsolescence.

c) Enlist the methods of calculating depreciation and explain in brief 'straight line method'.

d) Enlist and explain the various purposes of valuation.

e) Define the terms : i) Market value ii) Sentimental value
iii) Year's purchase iv) Capitalized value.

f) The building was purchased for rupees 5lakhs. Assuming Life of building 55 years. Calculate the depreciated cost of it, alter 15 years. Assume salvage value is 10% of purchase cost. Use straight line method of depreciation.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST** PROGRAM: **COMMON**

COURSE CODE: **CCF110/CCE110/X111/R112** COURSE NAME: **APPLIED MECHANICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **02/05/2017**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Q.1 Attempt any **FOUR** **Marks (08)**

a) Define concurrent force system with any one of field example.

b) State polygon law of forces.

c) Explain funicular polygon with its use.

d) State any two laws of friction.

e) Explain the relationship between angle of friction & angle of Repose.

f) Draw free body diagram of body resting on rough inclined surface.

Q.2 Attempt any **FOUR** **(16)**

a) Resolve the 200N force along 30^0 & 20^0 on either side with neat sketch.

b) Find resultant in magnitude & direction of forces 1kN, 2kN, 3kN, 4kN, 5kN and 6kN acting from center of hexagon towards its angular points respectively. (solve by analytical method)

c) Solve Q.No.2 (b) by graphical method.

d) An electric bulb of 5N weight is hanging from ceiling. Its wire is pulled by a force acting horizontally such that the wire makes an angle of 60^0 with ceiling. Find the magnitude of pulled force & tension in the wire.

e) Find the support reaction of beam ABCD supported at 'A' & 'C' & portion CD is overhang. The given span is AB=BC=2m & CD=1.5m. The UDL of 20kN/m is acting on 'B' to 'D' with downward point load of 50kN acting at point D free end.

f) The body of weight 100N will begin to slide when horizontal plane is raised gradually upto 22^0. What is horizontals force required to drag the same body.

Q.3 Attempt any **FOUR** **(16)**

a) The forces 50N, 30N, 20N & 15N are acting on four sides of 10cm square box respectively on clockwise direction. Find resultant from force & locate from 50N side.

b) Three forces are acting along three side of an equilateral triangle of side 2m with forces 15N, 20N & 10N respectively. Find resultant from force of side 10N.

c) A solid sphere of radius 10cm weighing 1.2KN is hung with steel cable 50cm from vertical smooth wall to its center. Find the contact force between wall & solid sphere & tension in cable.

P.T.O

d) Beam AB of span 6m is hinged at A & roller support at B carrying vertically downward point load of 12kN at 2m from support A & inclined point load of 10kN inclined at 30^0 anticlockwise from horizontal at 4m from support A, Also udl of 5kN/m is acting over entire span. Calculate support reaction by analytical method.

e) Solve Q.No.3 (d) by graphical method.

f) A ladder of 3.5m with weight 150N is rested on smooth vertical wall & rough horizontal surface with 18^0 inclination to horizontal. What is force (pull) required at horizontal contact surface to keep ladder in equilibrium when man weighing 750N stands on its mid length. Take coefficient of friction between rough horizontal surface is 0.25.

Q.4 Attempt any **FOUR** **(08)**

a) Define Rectilinear motion.

b) Differentiate displacement & distance.

c) Define angular velocity.

d) Define energy.

e) Define work done by torque.

f) State law of machine with meaning of each notation.

Q.5 Attempt any **FOUR** **(16)**

a) A composite section as shown in figure in which a equilateral triangle is rested on a square. Determine centroidal position of the section from reference axes X& Y

b) A circular disc of 500mm diameter is cut off from a sheet of radius 500mm find the centroid of the remainder portion from reference axes X&Y as shown in figure.

c) A car staring from rest & increases speed from 0 to 10m/s with constant acceleration 0.5 m/sec^2 runs at this speed for a time of 30 seconds & finally comes to rest, with deceleration of 0.3m/sec^2. Find the total distance travelled by car.

d) A wheel moves from 200rpm to 150 rpm in 10 seconds find the retardation & time required to come to stop.

e) A bullet weighing 1N is fired with velocity 400m/sec. into a wooden block weighing 100N. If the bullet remains embedded in the block, calculate the velocity of the block after impact.

f) In a simple lifting machine 100N is lifted by an effort of 8N at an efficiency 62.5%. Find the effort lost in friction & the load lost in friction.

Q.6 Attempt any **FOUR** **(16)**

a) Determine center of gravity of a solid composite body as shown in figure from the base of body.

b) A stone is dropped into well. Its sound is heard after 3 seconds. The velocity of sound is 320 m/sec. find the depth of well.

c) A wheel starts from the rest & accelerates at 15 red/sec^2 until it reaches a speed of 300 rpm. With this speed it rotates for 3 minutes & then retards uniformly for 150 seconds & stops. Find total number of revaluations made.

d) In a simple lifting machine the effort required to lift a certain load is 150N. When efficiency is 65%. Find ideal effort of machine.

e) A simple lifting machine lifts a load of 400N & 600N by efforts of 60N & 80N respectively. Find law of machine & efficiency at a load of 800N if velocity ratio of machine is 22.

f) 300 cubic meters of water is to be raised to a tank of height 10 meters in 10 minutes. Calculate the power of the pump required in kilowatt.

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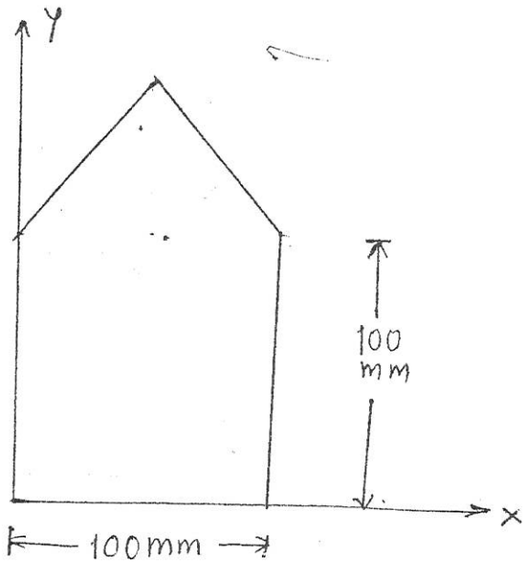
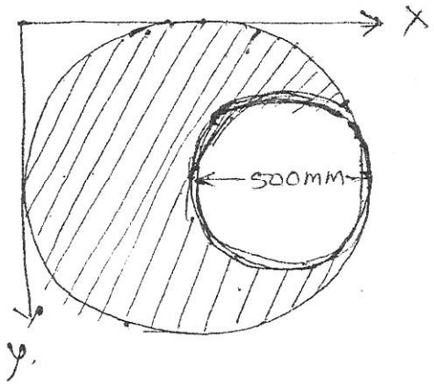
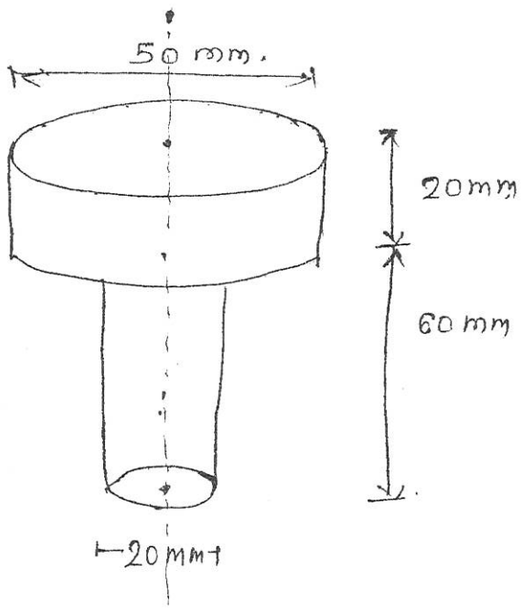
Q.5)
a)



Q.5)
b)



Q.6) a)



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EVEN TERM END EXAM APRIL/MAY-2017

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD.** PROGRAM: **CIVIL ENGINEERING.**

COURSE CODE:**CEE306/CE304.** COURSE NAME: **HYDRAULICS.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **03/05/2017**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data if necessary.
7) Use of Mobile is strictly prohibited.

Q.1 Attempt any **FOUR** **Marks (08)**

a) Define 1) Surface Tension 2) Viscosity.

b) Define atmospheric pressure and write its value in terms of water column

c) Define Specific gravity and Specific weight.

d) State Pascal's law.

e) Write any two applications of hydraulics.

f) Define Ideal fluid and Real fluid.

Q.2 Attempt any **FOUR** **(16)**

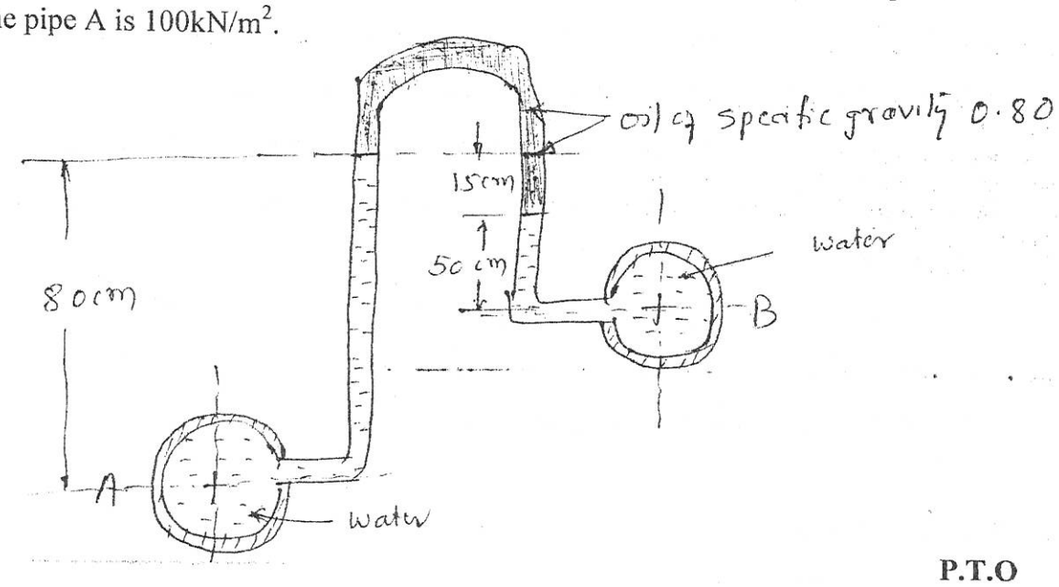
a) Convert vaccum gauge reading of 20cm mercury into absolute pressure in N/cm^2.

b) Define datum head, velocity head, and pressure head and write down Bernoull's equation.

c) Local atmospheric pressure is 720mm of mercury. Gauge pressure measured is 22 N/cm^2. What is the absolute pressure in terms of meter of water and also in kN/m^2?

d) If a mercury barometer reads 730mm and a Bourdon's pressure gauge at a point in a flow system reads $340kN/m^2$. What is the absolute pressure at that point?

e) An inverted differential manometer when connected to two pipes A and B gives the readings as shown in figure. Determine the pressure in the tube B, if the pressure in the pipe A is $100kN/m^2$.



P.T.O

f) Write four stability aspects of 'dam' against water pressure.

Q.3 Attempt any **FOUR** **(16)**

a) A concrete dam of rectangular section 15m high and 4m wide has water standing 3m below the top find

1) Water pressure on one meter length of dam.

2) Height of centre of pressure above the base.

3) The point of which the result out cuts the base.

Assume weight of concrete as $24kN/m^3$.

b) Define following terms

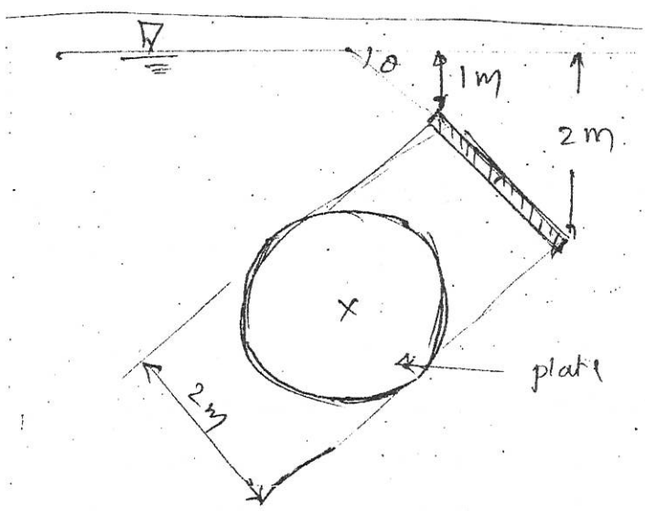
1)Steady flow

2) Uniform flow.

3) Streamline flow.

3) Equipotential lines.

c) A circular plate of 2m diameter is submerged in water as shown. Find the total pressure on the face of plate and the position of centre of pressure.



d) A rectangular container 2.5m wide has vertical partition in the middle. It is filled with petrol of specific gravity 0.80 to a height of 1.0m on one side and oil of specific gravity 0.90 to a height of 0.80m on the other. Find the resultant thrust per meter length of the partition wall and its point of application.

e) An oil of specific gravity 0.95 is flowing through a pipeline of 200mm diameter at the rate of 50liter/sec. Find the Reynolds number and comment on it. Take viscosity for the oil as $0.10N.s/m^2$

f) Water is flowing through a tapered pipe having diameters 150mm and 50mm respectively. Find the discharge at the larger end and velocity head at the smaller end, if the velocity of water at the larger end is 2m/sec.

Q.4 Attempt any **FOUR** **(08)**

a) What is syphon? Where it is used?

b) Define prismatic and no prismatic channel.

c) State Chezy's equation to find velocity of flow. Give meaning of notations.

d) What is float? What are its types?

e) What do you mean by end contraction? How it affects on discharge.

f) Define suction head and delivery head of pump.

Q.5 Attempt any **FOUR** **(16)**

a) Find diameter of uniform pipe to replace compound pipe having 2250m long is made up of pipes of 50cm diameter for 1000m length, 40m diameter for 700m and 30cm diameter for 550m. The total length should be remain same.

b) Three pipes having same length same friction factor have different diameters as 25cm, 10cm and 5cm. When these three pipes are connected in parallel gives total discharge of 650Lit/sec find out discharge in each pipe.

c) Distinguish clearly between open flow and pipe flow.

d) Find the discharge over triangular notch of angle 60^0, when head over notch is 20cm. Take Cd=0.625

e) What is priming? Why it is needed?

f) Find power required by pump under the following conditions

1) Water to be pumped =5000m^3/day.

2) Pumping Hours=08Hrs/day.

3) Total lift =20m.

4) Frictional losses= 5m.

5) Efficiency of pump=80%.

Q.6 Attempt any **TWO.** **(16)**

a) The difference in levels of water in two reserviors is 25m and they are connected to each other by siphon 1500m long and 200mm in diameter. The summit of siphon is 3.5m above the water surface in the upper reservoir. Determine discharge through syphon in lpm. Find maximum length of inlet leg of syphon without causing separation which occurs at an absolute pressure of 2.5m of water. Assume f=0.009 and Patm=10.33m of water.

b) In a trapezoidal channel of most economical section has side slope 1.5H: 1V. It is required to discharge 16m^3/sec of water with bed slope 0.5m in 3.5km. Design section using Manning's formula N=0.015.

c) A horizontal venturimeter is installed in a pipe of 20cm diameter carries 50 lps of water with differential mercury manometer reading 12.6cm. Calculate throat diameter of venturimeter. Assume Cd is unity.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST** PROGRAM: **COMMON**

COURSE CODE: **CCF105/CCE105/X104/R107/107** COURSE NAME: **BASIC MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **09/05/2017**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Q.1 Attempt any **FOUR** **Marks (08)**

a) Resolve into partial fraction $\frac{1}{x^2 - x}$

b) If $A = \begin{bmatrix} 2 & -1 & 1 \\ 3 & -4 & 0 \end{bmatrix}$ & $B = \begin{bmatrix} 0 & 2 \\ -3 & 1 \\ 4 & -1 \end{bmatrix}$ is the matrix AB is non singular.

c) Evaluate i) ${}^{7}P_{3}$ ii) ${}^{4}C_{3}$

d) Solve the equations by matrix method

$3x + y = 1$

$5x + 2y = 3$

e) Expand the following binomial upto 4th term of the expansion $(1+2x)^{1/2}$

f) Expand $(x+y)^5$ by using binomial theorem.

Q.2 Attempt any **FOUR** **(16)**

a) Find k if $\begin{vmatrix} 2-k & 7 \\ 3 & -4 & 13 \\ 8 & -11 & 33 \end{vmatrix} = 0$

b) Resolve into partial fraction $\frac{x^3 + x}{x - 9}$

c) If $A = \begin{bmatrix} 2 & 4 & 4 \\ 4 & 2 & 4 \\ 4 & 4 & 2 \end{bmatrix}$ show that A^2-8A is a scaler matrix.

d) Resolve into partial fraction $\frac{x^2 + x + 1}{(x-1)^3}$

e) If $A = \begin{bmatrix} 2 & -3 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 5 \\ 3 & -2 \end{bmatrix}$, $C = \begin{bmatrix} 3 & -1 \\ 0 & 6 \end{bmatrix}$ Find 3A+4B-2C

f) Find x and y if $\left\{4\begin{bmatrix} 1 & 2 & 0 \\ 2 & -1 & 3 \end{bmatrix} - 2\begin{bmatrix} 1 & 3 & 1 \\ 2 & -3 & 4 \end{bmatrix}\right\}\begin{bmatrix} 2 \\ 0 \\ -1 \end{bmatrix} = \begin{bmatrix} x \\ y \end{bmatrix}$

Q.3 Attempt any **FOUR** **(16)**

a) Solve the equations by Cramer's rule

$x + y + z = 3$

$x - y + z = 1$

$x + y - 2z = 0$

P.T.O

b) Resolve into partial fraction $\frac{2x+1}{x^2(x+1)}$

c) If $A=\begin{bmatrix}1 & -3\\ 2 & -1\end{bmatrix}$ & $B=\begin{bmatrix}1 & 0 & 1\\ 2 & -1 & 3\end{bmatrix}$ *verify that* $(AB)^T = B^T A^T$

d) Resolve into partial fraction $\frac{2x+3}{x^2-2x-3}$

e) Show that $\left(\sqrt{3}+1\right)^5 - \left(\sqrt{3}-1\right)^5 = 152$

f) Solve the equation using matrix method

$x+y+x=2$

$y+z=1$

$x+z=3$

Q.4 Attempt any **FOUR** **(08)**

a) Prove that $\cos ec^2\theta - \cos^2\theta.\cos ec^2\theta = 1$

b) Without using calculator find $\sin 15^0$

c) If $\sin A = \frac{1}{2}$, *find* $\sin 3A$

d) Prove that $\cos 2\theta = 1-2\sin^2\theta$

e) Prove that $\sin\left(\theta+\frac{\pi}{6}\right) - \sin\left(\theta-\frac{\pi}{6}\right) = \cos\theta$

f) Find the principal value of $\cos^{-1}\left(\frac{-1}{2}\right) - \sin^{-1}\left(\frac{1}{2}\right)$

Q.5 Attempt any **FOUR** **(16)**

a) Prove that $\frac{\cos ecA}{\cos ecA-1} + \frac{\cos ecA}{\cos ecA+1} = 2\sec^2 A$

b) Prove that $\sin(A+B) = \sin A\cos B + \cos A\sin B$

c) Simplify $\frac{\cos^2(180^0-\theta)}{\sin(-\theta)} + \frac{\cos^2(270^0+\theta)}{\sin(180^0+\theta)}$

d) Prove that $\frac{\cos 3\theta}{\cos\theta} + \frac{\sin 3\theta}{\sin\theta} = 4\cos 2\theta$

e) Prove that $\frac{\sin 4A+\sin 5A+\sin 6A}{\cos 4A+\cos 5A+\cos 6A} = \tan 5A$

f) Prove that $\cos^{-1}\left(\frac{4}{5}\right) + \cos^{-1}\left(\frac{12}{13}\right) = \cos^{-1}\left(\frac{33}{65}\right)$

Q.6 Attempt any **FOUR** **(16)**

a) If A & B are obtuse angles such that $\sin A = \frac{5}{13}$ & $\cos B = \frac{-4}{5}$. Find tan(A+B)

b) prove that $\cos 3\theta = 4\cos^3\theta - 3\cos\theta$

c) Prove that $\frac{1-\tan 2\theta.\tan\theta}{1+\tan 2\theta.\tan\theta} = \frac{\cos 3\theta}{\cos\theta}$

d) Prove that $\frac{\sin 8x-\sin 5x}{\cos 7x+\cos 6x} = \sin x + \cos x.\tan\frac{x}{2}$

e) Prove that $\tan^{-1}(x)+\tan^{-1}(y) = \tan^{-1}\left(\frac{x+y}{1-xy}\right)$ *if* $xy<1$

f) Prove that $\tan^{-1}(1)+\tan^{-1}(2)+\tan^{-1}(3) = \pi$

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEE303/CE302**
COURSE NAME :- **BUILDING DRAWING**
MAX. MARKS : **80** TIME : **4 HRS.** DATE: - **12 / 05 / 2017**

Instruction:-
1) Answers must be written in the main answer book provided.(and supplements if required)
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** (08)

a) What is meant by working drawing?
b) State any two requirements of good drawing.
c) State any four plan sanctioning authorities.
d) Define the term-floor area ratio.
e) State the standard dimensions of kitchen otta height and garage height.
f) Define the term-vanishing point.

Q.2 Attempt any **FOUR** (16)

a) Draw the symbols for stone, plaster, glass in elevation, single leaf single swing door.
b) Explain the role of contractor in building construction.
c) Define the terms i) built up area ii) control line.
d) Write note on grouping as principle of planning.
e) Draw the symbols for centre line, hidden line, section line, dimension line.
f) Write note on circulation as a principle of planning.

Q.3 (A) Attempt any **ONE** (06)

a) Draw a dimensioned line plan of hospital building.
b) Draw a line plan of nationalsed bank with dimensions.

B) Fig. No 1 shows plane and side elevation of small structure. Draw to a suitable scale two point perspective drawing. Assume eye level at 1.5m above G.L. The observer stands at a distance of 3m along central visual ray. Retain all the construction lines. (10)

P.T.O.

Q.4 Figure NO.2 shows a line plan of residential Building. Draw to suitable scale the following views.

a) Detailed plan. (10)
b) Front Elevation. (06)
c) Section along A-A. (12)
d) Schedule of doors and windows. (06)
e) Area statement. (05)
f) North line. (01)

Note:- Show all dimensions in plan, elevation and section.
Use following data for preparing drawing.

1) The structure is load bearing structure, having Hard murum available at depth 1.0m below ground level.
2) PCC (1:4:8) bed 200mm thick provided below foundation.
3) Plinth height is 0.75m above G.L.
4) Foundation and plinth walls are in U.C.R. masonry C.M. (1:6)
5) Super structure is constructed in B.B. Masonry in C.M.(1:6) and plastered on both the sides in C.M. 1:3 All external walls are 0.3m thick and partition walls are 0.15m thick.
6) Height of wall from floor level to bottom of slab is 3.0m.
7) R.C.C. Roof slab 0.12m thick and projection of slab is 0.15m.
8) Marbonite Tile flooring is provided over 0.12m thick P.C.C. bed.
9) Ceramic tiles are provided for dado of full height in W.C. and bath.
10) Provide Anodized Aluminum sliding windows.
11) Provide Teak wood Doors for all rooms and U.P.V.C. doors for W.C. and bath.
12) R.C.C. slab (1:2:4) of 0.12m thick is provided at 2.1m height over W.C. and Bath. Also provide louvered windows.
13) Provide R.C.C. lintels and Chajjas on masonry openings.
14) Provide R.C.C. loft, Kitchen platform, Sink, wash basins etc. at suitable positions.
15) Assume any other data if necessary.

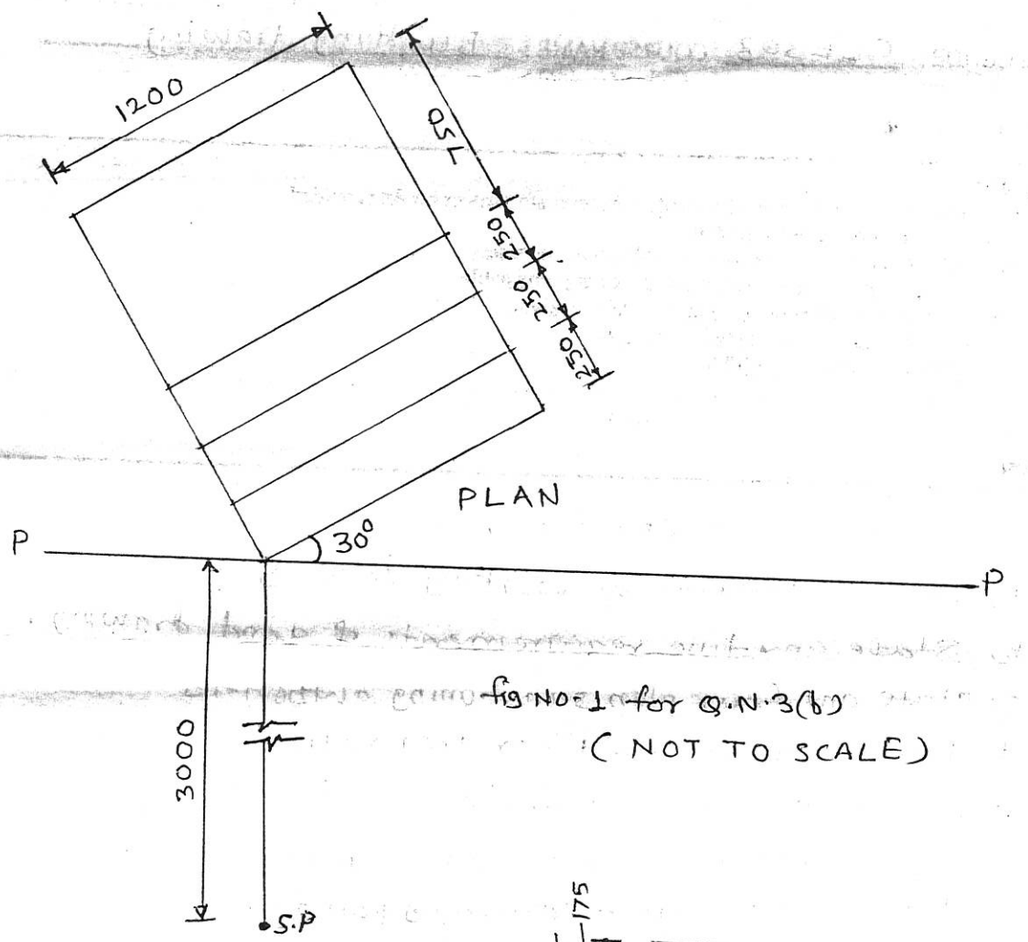
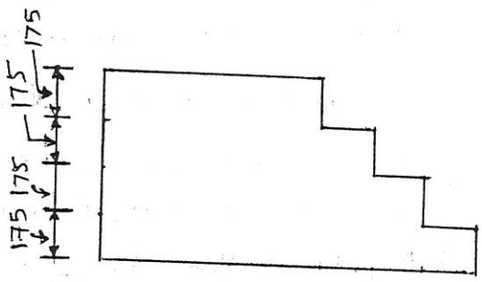
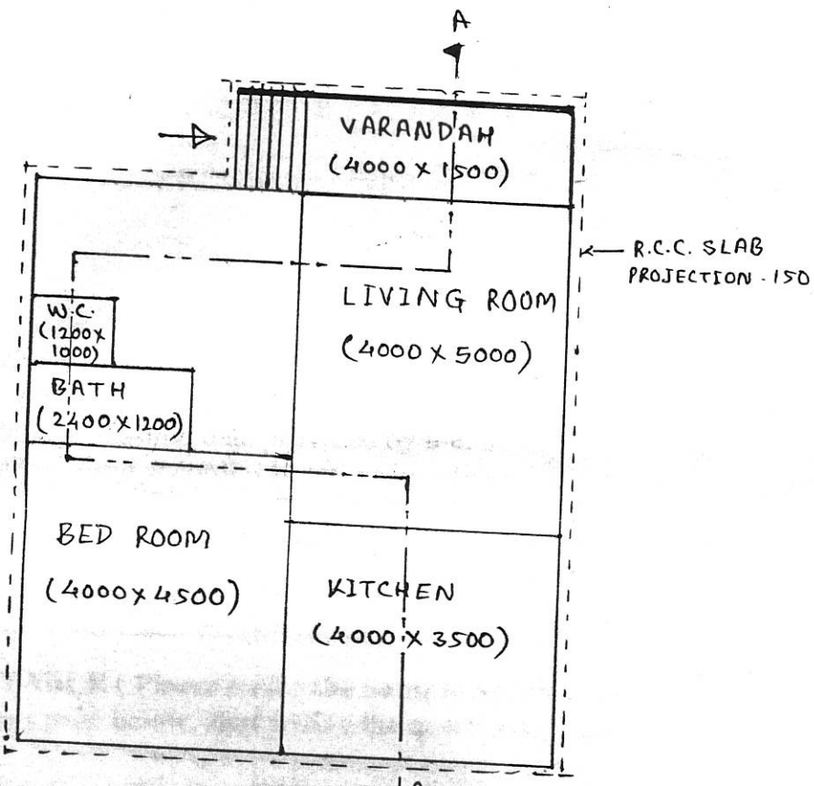


fig NO-1 for Q.N.3(b)
(NOT TO SCALE)



NOTE- ALL DIMENSIONS IN 'mm'

SIDE ELEVATION



Q.NO.4 · Fig.NO.2 - Line plan of Residential Building. All dimentions Are in mm.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FOURTH.** PROGRAM: **CIVIL ENGINEERING.**

COURSE CODE:**CEE401/CE301/1302** COURSE NAME:**ANALYSIS OF STRUCTURES.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **04/05/2017.**

Instruction:-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data if necessary.
7) Use of Mobile is strictly prohibited.

Section – I **Marks**

Q.1 Attempt any **FOUR** **(08)**

a) Define "Core of section" & draw figure for circular section.

b) Define torsion and give any two field examples.

c) State any four assumptions made in theory of torsion.

d) Define "Unsupported Length" & "Effective Length" of column.

e) Sketch deflected shape & write effective length of column.
   1) Both ends are fixed.
   2) One end is fixed & other is hinged.

f) Write assumptions made in "Euler's Theory" of column.

Q.2 Attempt any **TWO.** **(16)**

a) At a point in a strained media is subjected to two mutually perpendicular stresses 200MPa (comp.) & 300MPa (Tension) Determine -
   1) The intensities of normal & tangential stresses on oblique plane 35^0 to the plane carrying 200MPa
   2) The intensity of max shear stress & its position. Solve by analytical method.

b) Solve Q.2 (a) by graphical method.

c) A short column 200mmx300mm is subjected to an eccentric load of 100kN with an eccentricity 60mm in plane of bisecting shorter dimension. Determine external fiber stresses at base of column & also draw stress diagram.

Q.3 Attempt any **TWO.** **(16)**

a) A circular chimney having external diameter three times the internal diameter with height 8m is subjected to wind pressure of $1.5kN/m^2$. Calculate dimensions of chimney so that no tension develops at base and also draw stress distribution diagram. Take unit weight of masonary is 24 kN/m^3 & effective of wind resistance is 0.6.

b) Determine suitable diameter of solid circular shaft, to transmit the power of 100kiloWatt at 180rpm. The allowance stress in the material is $60N/mm^2$ & the twist is not more than 1^0 in a length of 3m.Take $C=80N/mm^2$.

c) Find crippling load by Rankine's formula for Hollow circular section of steel tube having external diameter 150mm and internal diameter 100mm. The length of column is3.5m with both ends is fixed. Take $\sigma_c=550N/mm^2$ & $\propto=\frac{1}{1600}$, E=200GPa.

P.T.O.

Section – II

Marks

Q.4 Attempt any **FOUR** **(08)**

a) Define fixed beam & state its advantages.

b) State the principal of superposition.

c) State Clapeyron's theorem of three moments.

d) Define stiffness factor and distribution factor.

e) Define slope and deflection of a beam

f) State the value of maximum slope and deflection for a simply supported beam of span '*l*' and carrying udl ω over entire span.

Q.5 Attempt any **FOUR** **(16)**

a) A fixed beam of span 6m carries a point load of 90kN at its center. Calculate the fixed end moments and draw bending moment diagram BMD.

b) A fixed beam 8m span is subjected to udl of 3kN/m over entire span along with a point load of 12kN at 3m from left hand support. Draw BMD.

c) A beam ABC is supported at A, B and C. AB=6m, BC=5m AB carries a udl of 30kN/m & BC carries a udl of 25kN/m calculate support moment.

d) A continuous beam ABC fixed at A and supported at B&C has span AB=6m & BC=4m. It carries udl of 30kN/m over AB and a point load of 80kN at center of BC. Find the moment at A&B.

e) A continuous beam ABC is supported on three supports A, B&C such that AB=BC=4m and carries a udl of 10kN/m over the beam ABC. Calculate support moment & draw BMD.

f) Define continuous beam and compare the simply supported beam and continuous beam w.r.t deflected shapes of beam and BM.

Q.6 Attempt any **FOUR** **(16)**

a) Calculate the Stiffness factors and distribution factors at the joint B for the beam of Q.5(c).

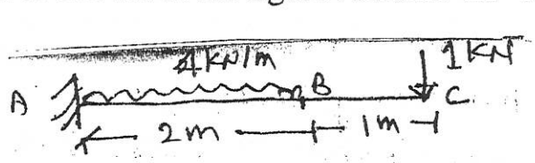
b) Calculate the support moment using moment distribution method (MDD) for beam of Q.5(c)

c) State sign convention used by Prof. Hardy Cross for fixed beam subjected to udl of w/m over entire span. State carry over factor for a beam fixed at one end and simply supported at the other end.

d) A cantilever beam of span 2.5m, 120mm wide and 200mm deep in section carries a udl of 15kN/m over the entire span. Find the slope and deflection at the free end. E=200GN/m^2.

e) A simply supported beam of 'L' and subjected point 'P' at center. Find deflection maximum by using differential equation.

f) Using Macaulays method determine the deflection under 1kN load of a cantilever beam as shown in the figure Assume EI=15000N-m^2



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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEE305/CE306**
COURSE NAME :- **SOIL MECHANICS & FOUNDATION ENGINEERING**
MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **09 / 05 / 2017**

Instruction:-
1) Answers must be written in the main answer book provided.(and supplements if required)
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** (08)

a) Define a soil

b) Define i) Water Content ii) Porosity.

c) Define coefficient of permeability and state its unit.

d) State two field situations of shear failure of soil.

e) State the purpose of compaction.

f) What is flow net?

Q.2 Attempt any **FOUR** (16)

a) Explain soil as a three phase system with labelled sketch.

b) Explain field application of soil mechanics.

c) Explain mechanical sieve analysis of soil.

d) A sample of soil 10cm height and 50cm^2 in c/s area, water flows through the soil under a constant head of 80cm. Water collected in 9 minutes is 450cc. Find the coefficient of permeability.

e) Following reading were taken in a direct shear test on a given soil sample find cohesion and angle & internal friction.

Normal Stress in N/mm^2	0.1	0.2	0.3	0.4
Shear stress of failure N/mm^2	0.110	0.152	0.193	0.285

f) State any four factors which affect the shear strength of soil.

P.T.O.

Q.3 Attempt any **FOUR** (16)

a) Explain the procedure for determination of plastic limit of soil.

b) Find coefficient of uniformity Cu and coefficient of curvature Cc for a soil particles of D_{10}=0.2mm, D_{30} =0.8mm, D_{60}= 2mm. Also classify grade of soil

c) With sketch, explain how to determine coefficient of permeability by falling head test.

d) In an unconfined compression test, the specimen has a diameter of 5cm. It fails at load of 110 N. Find the shear strength of soil.

e) Explain briefly significance of standard proctor test

f) The following observation were made using standard proctor test on soil sample.

Bulk density in gm/cc	1.75	1.95	2.1	2.2	2.15	2.05
Water content in %	5	10	15	20	25	30

Determine OMC and MDD.

Q.4 Attempt any **FOUR** (08)

a) Enlist any four methods of soil exploration.

b) Define laterial earth pressure.

c) Define Ultimate Bearing capacity and safe Bearing capacity of soil.

d) Define Deep foundation and give any one example of it.

e) What is use of sheet piles?

f) Enlist any two types of machine foundation.

Q.5 Attempt any **FOUR** (16)

a) Explain in short soil sampling.

b) Explain in brief necessity of site investigation.

c) State four assumption of Rankine's theory of earth pressure.

d) Explain factors affecting the depth of foundation.

e) Define shallow foundation, draw neat sketch of any two shallow foundations.

f) Explain plate load test with neat sketch.

Q.6 Attempt any **FOUR** (16)

a) Explain in brief effect of water table on bearing capacity of a soil.

b) State the use of piles and draw a neat sketch of under-reamed pile.

c) Write a short note on Well foundation.

d) Write a short note on Dewatering methods.

e) Explain the requirements of machine foundations.

f) Explain in brief cofferdam.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST** PROGRAM: **COMMON**

COURSE CODE: **CCF107/X105/R109/CCE107**

COURSE NAME: **ENGINEERING DRAWING -I**

MAX. MARKS: **80** TIME: **4 HRS.** DATE: **04/05/2017**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **TWO** **(08)**

a) On a plan of a field, a line of 1m long is represented on a drawing by a line of 5cm. construct a diagonal scale to read upto 2m and mark the length of 1m, 6 decimetres & 4cm on it.

b) Illustrate & write down application of following lines
   i) Ruled line with zigzag.
   ii) Short dashed medium.

c) Construct a scale of 1cm=0.4m to show metres & decimetres and large enough to measure upto 5m. Show a distance of 4m & 6 decimetres on it.

Q.2 Attempt any **FOUR** **(16)**

a) Construct an ellipse when the distance of focus from directrix is equal to 60mm & eccentricity=2/3.

b) The length of a top view of a straight line AB parallel to V.P & inclined at 40^0 to HP is 60mm. Its end A is 10mm above H.P is and 25mm infront of V.P. Draw front & Top views & determine the true length of the line AB.

c) Draw the projections F.V & T.V of a 75mm long straight line, inclined at 60^0 to V.P and its one end 15mm in front of it, parallel to and 25mm above H.P.

d) The top view of a 75mm long line measures 55mm. The line is in V.P, its one end being 25mm above the H.P. Draw its projections (F.V. and T.V)

e) End A & B of a line AB is 15mm & 55mm respectively infront of the V.P Elevation length of line is 60mm. it is parallel to XY line & 15mm above it. Draw Two views of the line & find its true length & inclination with V.P

f) The distance between the projectors through the ends of a line 75mm long is 60mm. Its end M is 15mm above HP & 20mm infront of V.P. Draw its two views when it is parallel to V.P. Determine its inclination with H.P.

Q.3 Attempt any **FOUR** **(16)**

a) Draw an Archemedian spiral of one convolution, the maximum & minimum radii being 80mm & 20mm respectively.

b) Draw a Helix on a cylinder of 50mm diameter of two turns, given pitch equal to 40mm.

c) A disc of diameter 50mm rolls without slip on a plane inclined at an angle of 15^0 to the horizontal. Trace & name the locus of point P on the circumference of the disc.

d) Draw in involute of a hexagon of side 20mm for one complete turn.

P.T.O

e) Draw a hyperbola with asymptotes OB=140 & OA=130 intersecting at an angle of 70^0 and passing trough point P on the curve 36mm from OB & 20mm from OA.

f) A stone is thrown upwards from a building 6m high & in its highest point of flight, it just crosses palm tree 12m high. Trace the path of the projectile, if the distance between the building and the palm tree be 3m. Take suitable scale.

Q.4 Attempt any **TWO** **(08)**

a) A circular plate 50mm diameter has its center 30mm above HP & 35mm infront of VP. Draw the three views of the plate when the surface is perpendicular to VP & inclined at 45^0 to HP.

b) A rhombus having diagonals 60mm & 30mm respectively is resting on a corner in VP. The longer diagonal is parallel to HP & inclined to VP such that front view appears as a square. Determine the angle made by the rhombus with VP.

c) A pentagonal plane of side 30mm is resting on HP on one of its side with the corner opposite to that side, 25mm above HP side on HP is perpendicular to VP. Draw three views of the pentagonal plane & find its inclination with HP.

Q.5 Attempt any **TWO** **(16)**

a) A cone of 50mm diameter & axis 70mm long is resting on HP on a point of its circumference of base such that its axis is parallel to VP & apex is 50mm above HP. Draw its projections.

b) A pentagonal prism base 20mm side & axis 55mm long, is standing on a corner of its base on HP with its axis inclined at 45^0 to HP & parallel to VP. Draw its projections.

c) A hexagonal pyramid base 25mm sides & axis 60mm long has a corner of base in the HP. Its axis makes an angle of 30^0 with HP & parallel to VP. Draw its projections.

Q.6 Attempt any **TWO** **(16)**

a) A hexagonal pyramid base 30mm side & axis 70mm long has its base on HP with an edge of base parallel to VP. A section plane perpendicular to VP & inclined at 45^0 to HP cuts the axis of pyramid 30mm from the apex.
Draw-
   i) Front view (02 marks)
   ii) Sectional top view (03 marks)
   iii) True shape of section. (03 marks)

b) A cylinder of 50mm diameter & axis 70mm long has its axis perpendicular to HP. It is cut by a section plane perpendicular to VP & inclined at 45^0 to HP & intersecting the axis 40mm above the base.
Draw-
   i) Front view (02 marks)
   ii) Sectional top view (03 marks)
   iii) True shape of section (03 marks)

c) A square prism base 40mm side & axis 80mm long, stands vertically on HP with the edges of the base equally inclined to VP. A section plane perpendicular to VP & inclined at 60^0 to HP cuts the axis of prism 15mm from its top end.
Draw-
   i) Front view (02 marks)
   ii) Sectional Top view (03 marks)
   iii) True shape of section. (03 marks)

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL:**FIFTH.** PROGRAM: **CIVIL ENGINEERING.**

COURSE CODE:**CEE504/CE402** COURSE NAME: **CONSTRUCTION MANAGEMENT.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **27/04/2017**

Instruction:-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I **Marks**

Q.1 Attempt any **FOUR** **(08)**

a) Write the name of agencies associated with construction.
b) Write any two advantages of management by objective.
c) Define motivation.
d) State any two applications where PERT is used.
e) What is mean by critical path?
f) Distinguish between private Ltd. Company and Public Ltd. Company.

Q.2 Attempt any **FOUR** **(16)**

a) State and explain importance of construction Industry in national development.
b) Define & describe planning as a function of management with the respect to execution, procurement, supervision & inspection.
c) Enlist desirable qualities of leader.
d) State the merits and limitations of bar charts.
e) State the advantages of critical path method.
f) Draw organization structure for public works department as an organization.

Q.3 Attempt any **TWO** **(16)**

a) 1) Classify civil engineering works. State their characteristics.
   2) State merits and demerits of Line and staff organization.
b) 1) Write any four necessities of management.
   2) What do you mean by management by exception? State its advantages and limitations.
c) A small scale mechanical unit carried out six activities as indicated below

Activities	Period
1-2	04 days
2-3	06 days
3-5	05 days
2-4	04 days
4-5	03 days
5-6	05 days

Draw the network diagram. Find project duration & identify critical path.

P.T.O.

Section – II

Marks

Q.4 Attempt any **FOUR** **(08)**

a) What do you mean by work study?
b) Define the 'Inventory'. What are the production inventories?
c) List the different types of labour employed in construction industry & define any one type.
d) State the points considered in good site layout.
e) Define the term 'Injury frequency rate'.
f) Draw any four symbols used in preparing the process chart of motion study.

Q.5 Attempt any **FOUR** **(16)**

a) State the advantages of work study.
b) Write a short note on ABC analysis.
c) Write a short note on gang employment system adopted for construction labours.
d) State the various labour welfare activities.
e) Draw the site layout for Apartment construction site. Assume suitable dimensions.
f) Explain in brief the common causes of accident at construction site.

Q.6 Attempt any **FOUR** **(16)**

a) What do you mean by time study (work measurement)? State its uses.
b) State various functions of material management.
c) What are the advantages of training?
d) Write a short note on workmen's compensation act.
e) State the precautions to be taken to avoid accidents at construction site.
f) Explain in brief the steps or procedure involved in method study.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY-2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST.** PROGRAM: **CE/EE/SM/MT.**

COURSE CODE:**CCF108/CCE108/X107/R110** COURSE NAME: **ENGINEERING DRAWING-II**

MAX. MARKS: **80** TIME: **4 HRS.** DATE: **28/04/2017**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data if necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Draw neat proportionate free hand sketches of any **FOUR** of the following. **(08)**

a) Sellers thread.
b) Square nut.
c) Cup-headed bolt.
d) Slotted nut.
e) Eye foundation bolt.
f) Single riveted single strap butt joint.

Q.2 Attempt any **ONE** **(16)**

a) Fig.no.01 shows pictorial view of an object.
Draw following views by using first angle method of projection.
i) Front view in the direction of X. (05marks)
ii) Top view. (05marks)
iii) Left hand side view. (05marks)
Give all dimensions. (01marks).

b) Fig.no.02. Shows pictorial view of bracket. Draw following views by using first angle method of projection.
i) Front view in the direction of X. (05marks)
ii) Top view. (05marks)
iii) Left hand side view. (05marks)
Give all dimensions. (01marks)

Q.3 Attempt any **ONE.** **(16)**

a) Fig.no.03 Shows pictorial view of an object. Draw following views by using first angle method of projection.
   i) Sectional front view, in the direction of X, section along AA. (06marks)
   ii) Top view. (05marks)
   iii) Left hand side view. (05marks)

b) Fig.no.04 Shows pictorial view of an object. Draw following views by using first angle method of projection.
   i) front view, in the direction of X. (05marks)
   ii) Top view. (05marks)
   iii) Sectional left hand side view, section along BB. (06marks)

P T O (1)

Q.4 Attempt any **ONE.** **(08)**

a) Fig. no.01 shows the front view and L.H.S.V. of an object. Draw the following views of the objects
   i) Front view. (02marks)
   ii) L.H.S.V. (02marks)
   iii) Top view. (missing view) (04marks)

b) Fig. no.02 show the front view and top view of the object. Draw the following views.
   i) Sectional front view A-A. (04marks)
   ii) Top view. (02marks)
   iii) R.H.S.V.(02marks)

Q.5 Attempt any **ONE.** **(16)**

a) Fig.no.03 shows the F.V. and T.V. of an object draw Isometric view taking '0' as origin.(16marks)

b) i) Fig.no.04 shows the F.V. and T.V. of an object draw Isometric projection taking '0' as origin.(14marks)
   ii) Construct the Isometric scale for the length 100mm.(2mark)

Q.6 Attempt any **TWO.** **(16)**

a) Draw the development of lateral surface of a pentagonal prism with edge of base 40mm and height 90mm, kept on the H.P. on its base with on edge of base parallel to V.P., When its cut by on AIP inclined at 30^0 to H.P. and bisecting the axis of the prism.

b) A cylinder having base diameter 50mm and axis length 70mm has its base in H.P. A square hole of side 25mm is drilled centrally having its sides equally inclined with H.P. and its axis being perpendicular to V.P. and bisecting the axis of the cylinder. Draw the DLS of the cylinder with the hole.

c) A square pyramid 50mm edge of base axis 60mm length is resting on its base in the H.P.with edge of base equally inclined to V.P. A square hole with side 25mm is cut through the square pyramid such that its axis intersect the axis of the pyramid ,22mm above the base. The axis of hole is perpendicular to V.P. All the faces of square hole are equally inclined with H.P. Draw the DLS of the pyramid.

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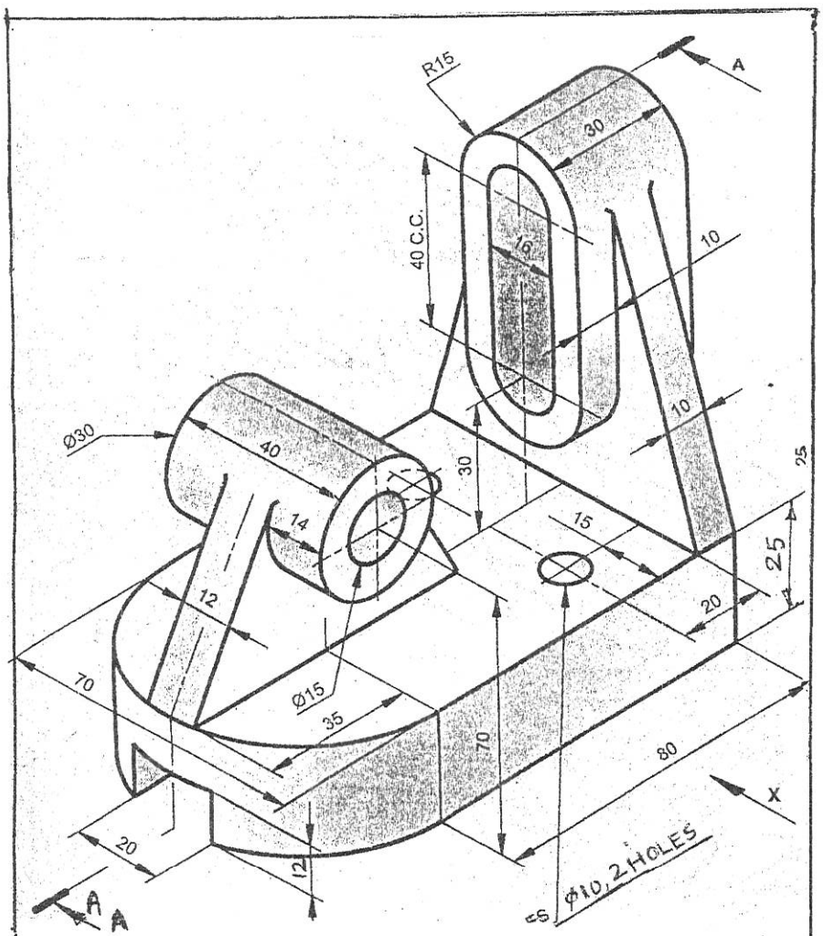
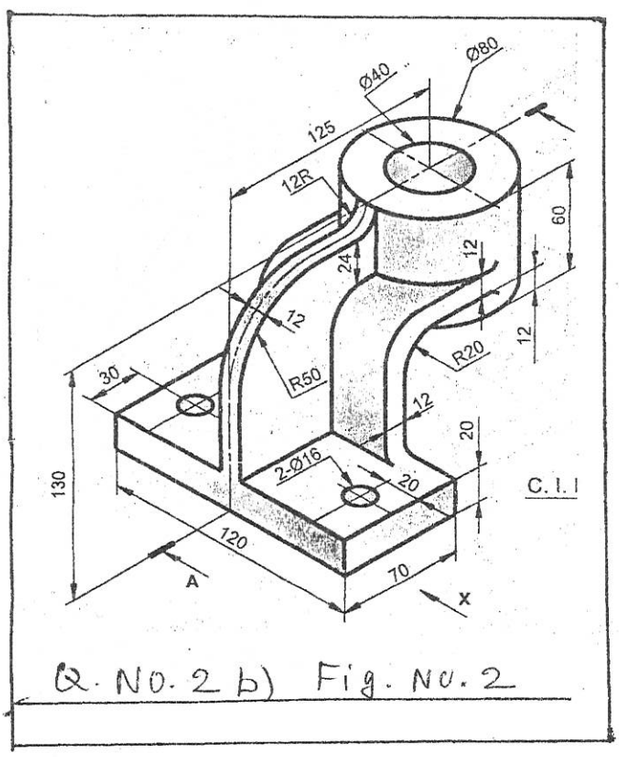
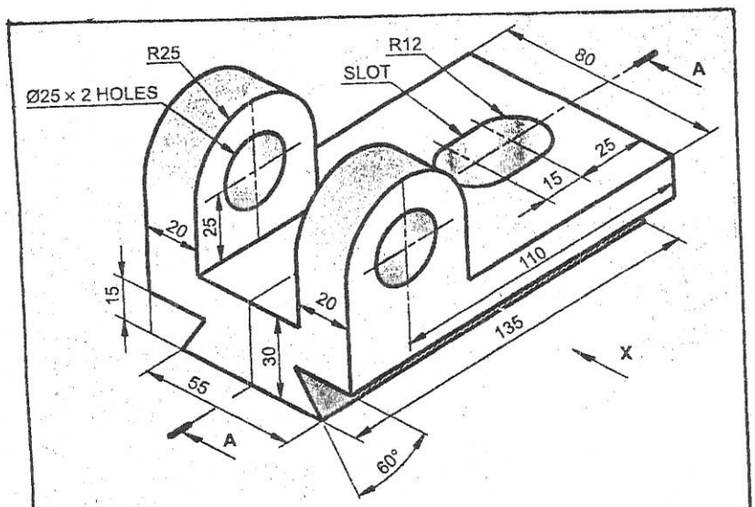


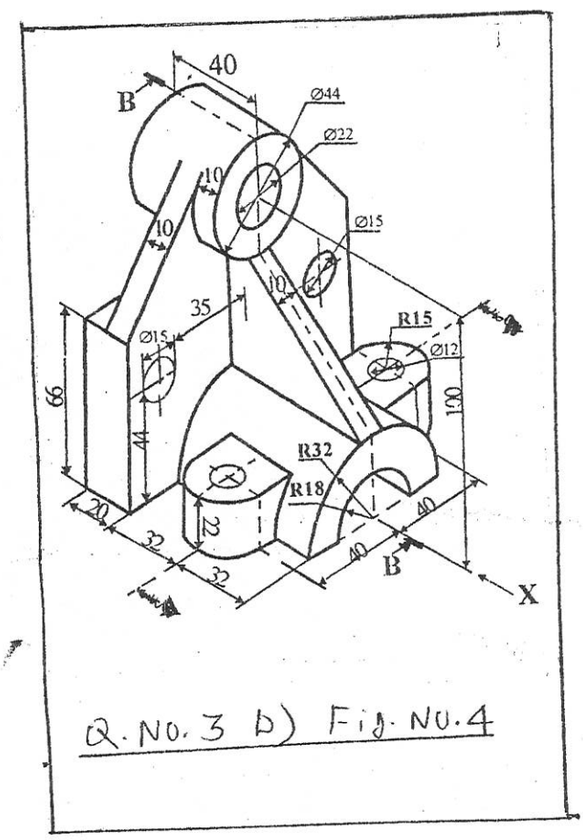
Q. NO. 2 a) Fig. NO. 1



Q. NO. 2 b) Fig. NO. 2

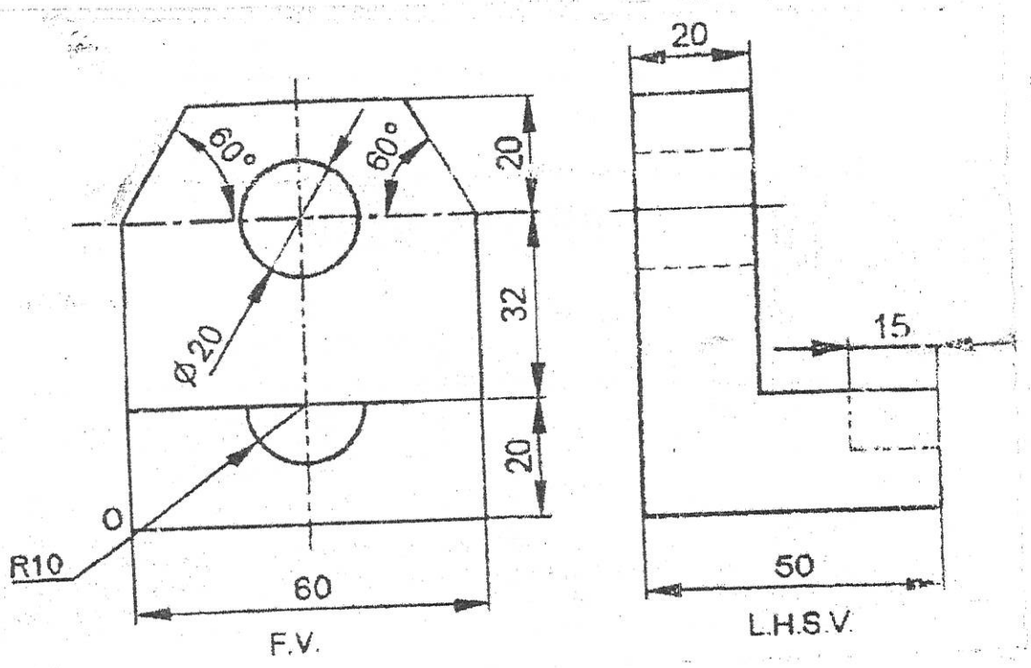


Q. NO. 3 a) Fig. NO. 3



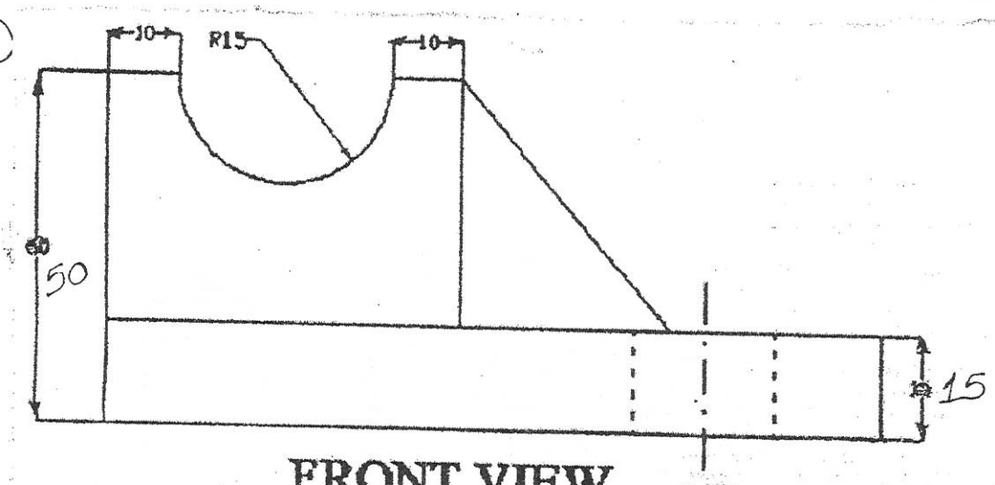
Q. NO. 3 b) Fig. NO. 4

Q. (4) (a)

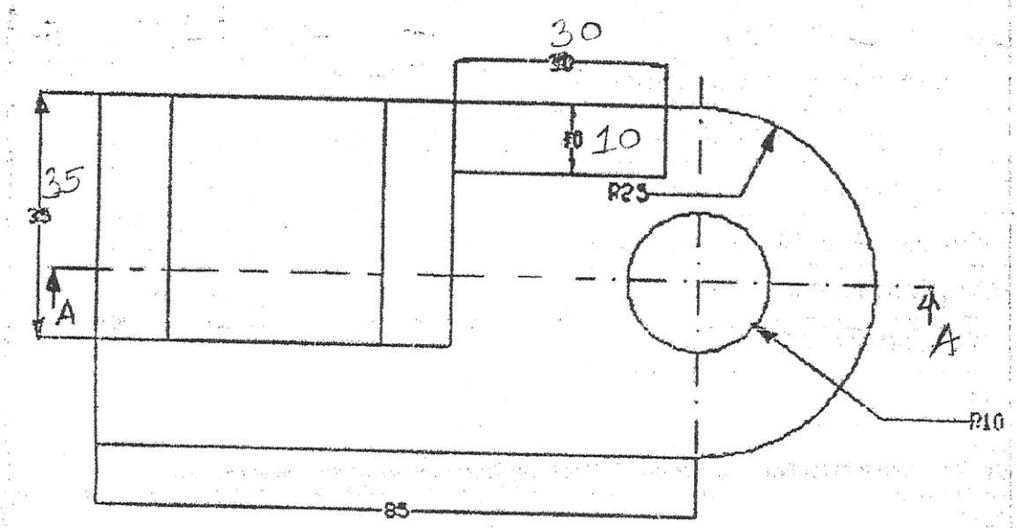


Q. 4 (a) Fig No -1

Q④(b)



FRONT VIEW



TOP VIEW

Q.4(b) Fig. No-2

Q5(a)

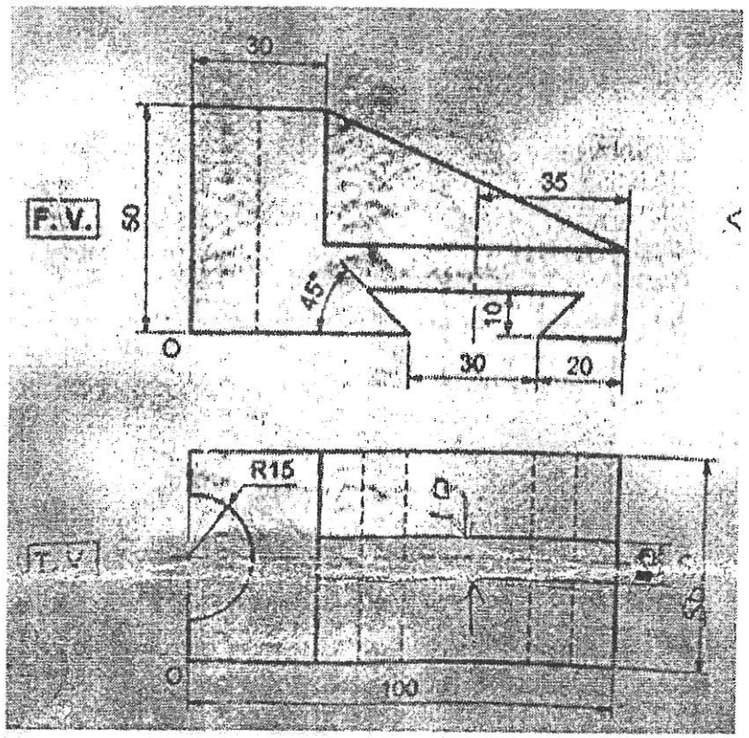


Fig. No. 3
Q. 5 @

Q5(b)

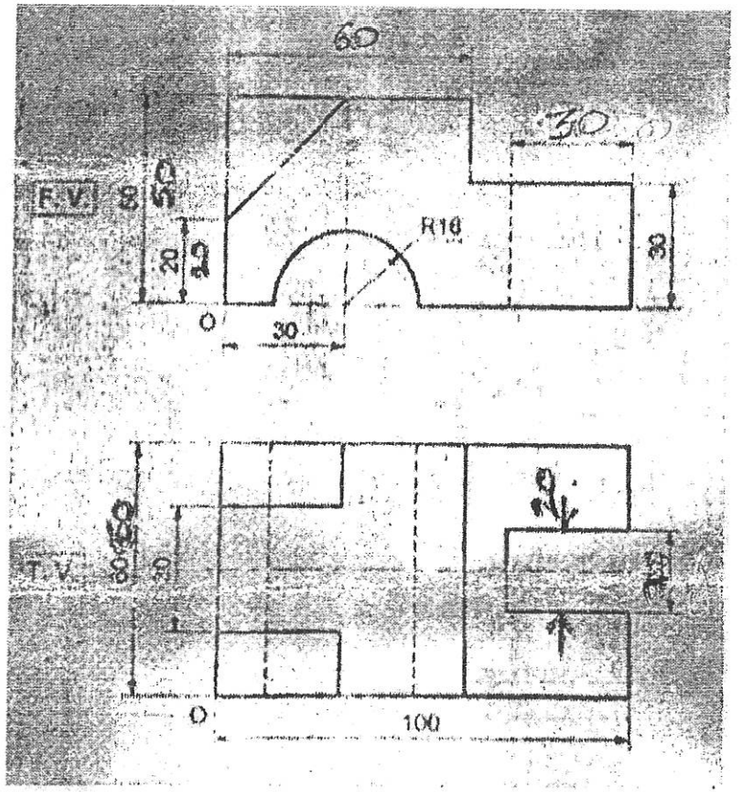


Fig NO. 4
Q. 5(b)

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEE311/CE211**
COURSE NAME :- **ADV. CONSTRUCTION TECH. & EQUIPMENTS**
MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **25 / 04 / 2017**

Instruction:-
1) Answers must be written in the main answer book provided.(and supplements if required)
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** (08)

a) What is slip formwork?

b) Enlist any four accessories required for prestressing work.

c) State any four advantages of RMC.

d) State any two necessities of grouting.

e) Enlist any four combinations of materials used for grouting

f) State any four uses of geosynthetic materials for reinforcement.

Q.2 Attempt any **FOUR** (16)

a) Explain the procedure of underwater concreting for bridge piers.

b) Explain procedure of pretensioning with the neat sketch.

c) Explain the procedure of strengthening of embankment by soil reinforcing techniques with neat sketch.

d) State the object of providing soil reinforcing. Draw a neat sketch of use of soil reinforcement in retaining wall.

e) Explain the term Mivan formwork.

f) Write down the stripping time for removal of formwork for any four structural members as per IS-456-2000 provision.

Q.3 Attempt any **FOUR** (16)

a) Prepare layout of ready mix concrete plant.

b) Explain the procedure of vaccum dewatering concreting.

c) Enlist any four uses and any four properties of steel fiber reinforced concrete.

d) What do you mean by grouting pressure? State any four factors on which it depends.

e) i) Enlist any four equipments used for grouting ii) Define grouting.

f) State and describe any four uses of slip formwork in high rise building construction. P.T.O

Q.4 Attempt any **FOUR** (08)

a) Define hoisting.

b) State any two advantages of scrapper.

c) State the various types of rollers.

d) State various types of concrete vibrator.

e) State any two uses of needle vibrator.

f) State any two advantages of standard equipments.

Q.5 Attempt any **FOUR** (16)

a) State any four uses of dumpers.

b) Write any four uses of scrappers.

c) Draw a neat sketch of bulldozer and label it.

d) Enlist the equipments for the production of artificial sand.

e) Explain the working of transit mixer.

f) State and discuss any four points to be considered for selection of equipment.

Q.6 Attempt any **FOUR** (16)

a) Explain working of tower crane with neat sketch.

b) Draw a neat labelled sketch of power shovel.

c) State any four uses of surface vibrator.

d) Explain any two equipments used for transportation of concrete.

e) Compare the standard equipment and special equipment.

f) Explain operating and owning cost of construction equipment.

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(12)

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEE308/CE204** COURSE NAME :- **SURVEYING- I**
MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **29 / 04 / 2017**

Instruction:-
1) Answers must be written in the main answer book provided.(and supplements if required)
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** (08)

a) Differentiate between plane surveying and geodetic surveying.

b) Draw neat sketch of arrow.

c) Define i) chaining ii) Ranging.

d) Define and write use of base line.

e) Draw conventional symbols for i) Embankment ii) Temple.

f) Convert following W.C.B to R.B. i) $236^0 37'$ ii) $132^0 12'$.

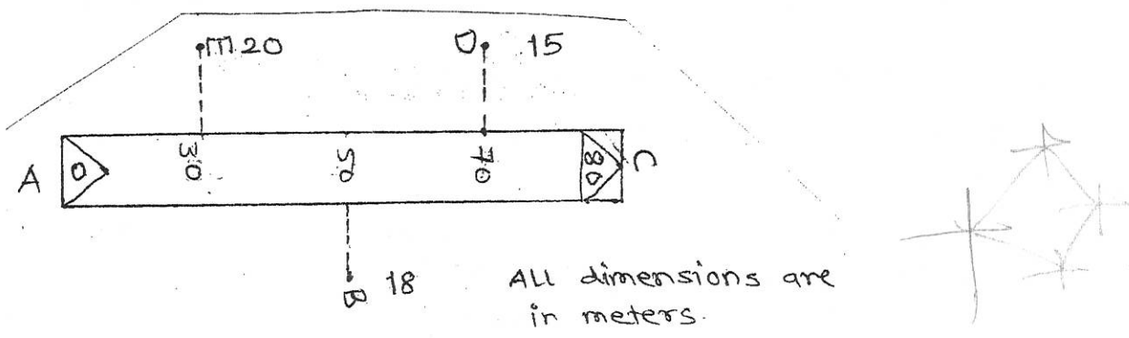
Q.2 Attempt any **FOUR** (16)

a) Classify surveying i) Based upon the nature of field ii) Based on instruments.

b) Explain procedure of direct ranging by eye with neat sketch.

c) Explain method of chaining on sloping ground with neat sketch.

d) Plot the given cross staff survey of a field and calculate area of the field ABCDEA.



e) Define meridian and write different types of meridians.

f) Following are the fore bearings of the lines of a closed transverse ABCD. Calculate the back bearings of traverse.

Line	AB	BC	CD	DA
F.B	N $45^0 10'$ E	S $60^0 40'$ E	S $9^0 50'$ W	N $80^0 40'$ W

P.T.O.

Q.3 Attempt any **FOUR** (16)

a) A 20m chain was found to be 0.05m too long after chaining 1400m. It was found to be 0.1m to long after chaining 2200m. If the chain was correct before commencement of work, find true distance chained.

b) What are the different types of obstacles in chaining? Explain chaining across a river by any one method.

c) i) State the principle of chain survey. ii) Define the term offset.

d) State any four points considered while selecting survey stations for chain surveying.

e) Below are the bearing observed in traverse survey conducted with a prismatic compass at place where local attraction was suspected. At what station do you suspect local attraction? Find the correction bearings of the lines.

Line.	F.B	B.B.
PQ	$124^0 30'$	$304^0 30'$
QR	$68^0 15'$	$246^0 0'$
RS	$310^0 30'$	$135^0 15'$
SP	$200^0 15'$	$17^0 45'$

f) What is closing error? How it is adjusted graphically?

Q.4 Attempt any **FOUR** (08)

a) State any two object of dumpy level.

b) Define contour gradient.

c) Enlist four types of Bench mark.

d) Write the formula for computation of area by mechanical planimeter.

e) What is interpolation of contouring?

f) Define contour interval and contour horizontal equivalent.

Q.5 Attempt any **FOUR** (16)

a) Show by contour lines
i) Over hanging cliff ii) Hill iii) ridge line iv) Pond or depression.

b) State the fundamental axis and mention their relationship for dumpy level.

c) Define horizontal surface, horizontal line, mean sea level and level surface in case of leveling.

d) An irregular area was measured with planimeter, keeping the anchor point inside the figure. The following were obtained I.R. = 9.358, F.R.= 4.425. The zero mark crossed the fixed index once in anticlockwise direction, M=100 C=28.4. Calculate the area of figure.

e) Enlist any four types of leveling. Explain differential leveling with a neat sketch.

f) The following readings were taken with a dumpy level. 0.895, 1.645, 3.015,0.955, 0.695, 0.250, 1.535, 2.135. the instrument was shifted after the third and sixth reading. The first reading was taken on staff held on B.M. of RL 820.765. Calculate reduced levels of all points by H.I. method. Apply usual checks.

P.T.O.

Q.6 Attempt any **FOUR** (16)

a) Explain profile leveling. What are important points to be kept in mind during profile leveling?
b) Explain indirect contouring. Enlist various methods of indirect contouring. Explain any one in detail.
c) Explain the temporary adjustment of dumpy level.
d) Write stepwise procedure of measuring area of a figure with a polar planimeter.
e) State any four difficulties in leveling.
f) Following consecutive readings are taken with a dumpy level.

0.894, 1.643, 2.896 3.016 0.954 0692
0.582 0.251 1.532 0.996 2.135

The instrument is shifted after 4^{th} and 8^{th} readings. The first reading was taken on the staff held on B.M. = 820.765. Calculate reduced levels & apply usual checks.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FIFTH** PROGRAM: **CIVIL ENGINEERING**

COURSE CODE: **CEE505/CE403** COURSE NAME: **ENVIRONMENTAL ENGINERRING**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **29/04/2017**

Instruction:-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I **Marks**

Q.1 Attempt any **FOUR** **(08)**

a) What is necessity of water supply scheme?

b) Enlist any two types of intakes.

c) Enlist any four water borne disease.

d) Enlist any four factors affecting the water demand.

e) Define design period.

f) Enlist any two tests to determine the residual chlorine in water.

Q.2 Attempt any **FOUR** **(16)**

a) Draw the flow diagram of water supply scheme from river as source of water to consumer

b) Enlist any four types of water demand and explain any one.

c) Explain impurities present in water.

d) Give standard of water to be used for domestic purpose for the following.

i) Turbidity

ii) Hardness

iii) pH value

iv) Dissolved oxygen

e) Enlist any four methods of aeration and explain any one.

f) Explain Jar test for determine of optimum coagulant dose.

Q.3 Attempt any **FOUR** **(16)**

a) Enlist any two advantages of sedimentation and enlist any four most commonly used chemical coagulants.

b) Explain theory of filtration.

c) Explain Break point chlorination.

P.T.O

d) Enlist any four types of valves used in water supply schemes with their functions.

e) Enlist any four methods of laying distribution pipes and explain any one.

f) Explain different types of service reservoirs.

Section – II **Marks**

Q.4 Attempt any **FOUR** **(08)**

a) What is meant by water carriage system?

b) Write any four sanitary fittings.

c) Define the hazardous waste.

d) Define COD.

e) Define self cleaning velocity.

f) Write any two objects of sewage disposal.

Q.5 Attempt any **FOUR** **(16)**

a) Draw neat sketch of Nahni trap and intercepting trap.

b) Explain the characteristics of hazardous waste.

c) Explain with neat sketch drop manhole.

d) Differentiate aerobic process with anaerobic process.

e) What is oxidation pond? State & explain the principle and working with neat sketch.

f) Explain with neat sketch two pipe system of plumbing.

Q.6 Attempt any **FOUR** **(16)**

a) Draw typical c/s of sewage treatment plant.

b) Define trap and write requirements of good trap

c) Explain the process of activated sludge process with flow diagram.

d) Write advantages and disadvantages of conservancy method.

e) Explain with sketch skimming tank.

f) Write importance of recycling and reuse of waste.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEE410/CE307**
COURSE NAME :- **TOWN & COUNTRY PLANNING**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **25 / 04 / 2017**

Instruction :-
1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available o request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I Marks

Q.1 Attempt any **FOUR** (08)

a) State any two objects of town planning.

b) What are disadvantages of ribbon development?

c) Enlist any two types of surveys required for town planning.

d) State the meaning of landscape Architecture.

e) List any two agencies associated with the housing schemes.

f) What do you mean by neighbourhood planning?

Q.2 Attempt any **FOUR** (16)

a) State and explain any four principles of town planning.

b) Describe in brief evolution of town planning.

c) Enlist and explain any four forms of town and country planning.

d) Explain land use analysis.

e) Enlist and explain any four types of parks in brief.

f) Enlist any eight factors to be considered in site selection for public building.

Q.3 Attempt any **FOUR** (16)

a) Explain role of co-operative housing societies in housing schemes.

b) Enlist any eight data to be collected for preparing master plan.

c) Explain any four causes of slum formation.

d) Explain any eight factors considered for site selection of industries.

e) Explain any four principles of neighbourhood planning.

f) Explain any four features of neighbourhood planning.

P.T.O

Section – II	Marks

Q.4 Attempt any **FOUR** (08)

a) What is the necessity of village planning?

b) What do you mean by agro industries?

c) List out current planning acts.

d) What is the necessity of planning law and registration?

e) Define Building bye-laws.

f) What do you mean by floor space index?

Q.5 Attempt any **FOUR** (16)

a) What are the aims and objectives of land acquisition act?

b) Discuss MR & TP act.

c) Explain importance of bye laws.

d) Discuss in brief i) Set buck ii) Light plane.

e) What are the principles of village planning?

f) Discuss Rural housing problem in India.

Q.6 Attempt any **FOUR** (16)

a) Write down frame work and function of Zilha Parishad.

b) Discuss in brief land acquisition act.

c) Define FSI & floating FSI. State their significance.

d) Explain i) Off-street parking. ii) Fire protection.

e) Explain low cost housing.

f) Explain general principles of rural housing design.

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EVEN TERM END EXAM APRIL/MAY-2017

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD.** PROGRAM: **CIVIL ENGINEERING.**

COURSE CODE: **CEE312.** COURSE NAME: **ADVANCED CONSTRUCTION MATERIALS.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **25/04/2017**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data if necessary.
7) Use of Mobile is strictly prohibited.

Q.1 Attempt any **FOUR** **Marks (08)**

a) Enlist any four future building materials.

b) What is meaning of advanced construction materials?

c) Give any four advantages of fly ash bricks.

d) Give the advantages of Rat trap Bond.

e) What is UPVC?

f) What is FRP? Define in brief.

Q.2 Attempt any **FOUR** **(16)**

a) Describe any one innovative building material.

b) Describe stabilized earth blocks with its advantages and applications.

c) Explain composite ferrocement systems.

d) Describe Fal-G, & its products.

e) What are Natural fibre reinforced polymers? Define with its applications.

f) Describe aluminum panels write process of anodizing.

Q.3 Attempt any **FOUR** **(16)**

a) What is the scope for advanced construction materials?

b) Explain fly ash based Aerated concrete walling with its advantages.

c) What are ready mix platering materials? Give its applications.

d) Explain construction of precast RCC panels with its uses & advantages.

e) Write note on UPVC. With reference to its applications.

f) What is process of ferrocement? Explain the advantages & applications of ferrocement shutters.

P.T.O.

Q.4 Attempt any **FOUR** **(08)**

a) Describe 'Ceramics'.

b) Describe 'Vitrification process'

c) Name a material of Ceiling. Tile and write its purpose.

d) Write the full form of 1) CPVC 2)TMT

e) Write any two properties of acoustic-materials.

f) Write any two points of water based paints.

Q.5 Attempt any **FOUR** **(16)**

a) Write any four benefits of synthetic flooring material.

b) What is tremix flooring? Write any two advantages of it.

c) What precautions are to be considered while installing decorative ceiling tiles?

d) List any three waterproofing chemicals and explain any one in detail.

e) What are the precast waffle units? And write their purpose or benefits.

f) Write any three types of acoustic material and explain any one in detail.

Q.6 Attempt any **FOUR** **(16)**

a) Explain TMT- sections.

b) Describe materials of plumbing pipe & fixtures.

c) Explain composite copper material.

d) Explain 'Life extended thatch roofing.'

e) Describe 'Cement bonded fibre roofing.'

f) What are 'Micro concrete tiles'? Explain.

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EVEN TERM END EXAM APRIL/MAY-2017

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD.** PROGRAM:**CIVIL ENGINEERING.**

COURSE CODE:**CEE307/CE210/1301.** COURSE NAME:**MECHANICS OF STRUCTURES.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **26/04/2017**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data if necessary.
7) Use of Mobile is strictly prohibited.

Q.1 Attempt any **FOUR** **Marks (08)**

a) Define 1) Structures 2) Structural design.

b) Give any two types of structures with their functions.

c) Write uniaxial loading with any field example.

d) Write any two relationships among elastic constant.

e) Define 1) Resilience 2) Modulus of Resilience

f) Explain impact loading with proper field example.

Q.2 Attempt any **FOUR** **(16)**

a) A concrete column 400mm x 300mm is reinforced with 6 bars of 16mm diameter and carries a load of 500kN. Calculate load shared by steel & concrete and also stresses developed by each material. Take modular ratio as 12.

b) Explain types of structural system with their field examples each.

c) Draw diagram of 'Simple pressing machine' & explain the basic structural actions in it.

d) A bar having different diameter is subjected to axial force as shown in fig.No.1 find the total change in length of bar. Take E=70GPa.

e) An axial pull of 100kN is applied gradually to a steel rod of 1m long and 20mm diameter in cross-section. Calculate magnitude of stress developed in rod. Also calculate when same load is applied on suddenly. Given E=200GPa.

f) Draw SFD & BMD for cantilever beam of span '*l*' m carrying UDL of 'w' per unit length over the entire span.

P.T.O.

Q.3 Attempt any **FOUR** **(16)**

a) In a bi-axial stress system, the stresses acting along the two perpendicular directions are 100MPa (compression) & 60MPa (tensile). Calculate the strains along these two directions. Take E=210GPa & μ=0.25.

b) A circular bar of 16mm diameter and 1m length subjected to load of 4kN from height of 100mm on the collar attached at the lower end of bar. Determine the instantaneous stress and deflection induced due to this impact load. Given E=200GPa.

c) A beam ABC is simply supported at A&B and portion BC is overhang such that AB= 4m & BC=1.5m, beam is subjected to UDL of 7kN from A to B and 10kN vertically downward point load at C. Calculate BM at important points and draw BMD. Also show point of contraflexture if any.

d) Calculate shear force of beam in Q. No.3(c) and draw SFD.

e) A Simply supported beam of span 4.5m carries UDL of 10kN/m over 3m span from left support and vertically downward point load at 0.5m from right support. Calculate shear force at important point & draw SFD.

f) The bending moment of diagram of beam is shown in fig.No.2 Draw sketch of beam with appropriate loading & support reactions.

Q.4 Attempt any **FOUR** **(08)**

a) State the parallel axis theorem.

b) State any four assumption made in theory of simple bending.

c) Draw a bending stress distribution for hollow rectangular beam of simply supported of span '*l*' & udl throughout span.

d) State the shear stress formula & meaning of each term in it.

e) Give relation between q_{avg} & q_{max} (shear stress) for a circular section

f) Define hoop stress and longitutional stress for cylindrical shell.

Q.5 Attempt any **FOUR** **(16)**

a) Determine centroidal moment of inertia about both axis for angle section ISA 100x100x10mm.

b) Determine centroidal moment of inertia about both axis of T-section having top flange 100x100mm & web 150 x 10mm.

c) A hollow rectangular section of outside size 200x400mm inside 100x200mm. Section is symmetry. Find the MI about bottom.

P.T.O.

d) Determine moment of inertia about XX-(Ixx) axis for I-section having top flange 200mmx40mm, web 300mmx30mm and bottom flange on 300mmx40mm.

e) A simply supported beam having span 6m carries a load of 35kN/m over entire span. Determine maximum values of bending stress developed. Cross section of beam is rectangular 230mmx380mm.If E=210GPa.

f) The cross-section of beam is a symmetrical I-section having flange 150mmx10mm and web 200mmx10mm if the permissible bending stress is 150N/mm^2. Find the moment of resistance.

Q.6 Attempt any **TWO.** **(16)**

a) Draw a shear stress distribution for channel section used on beam of span 8m and subjected udl of 40kN/m. Also calculate ratio of average shear stress to maximum shear stress.

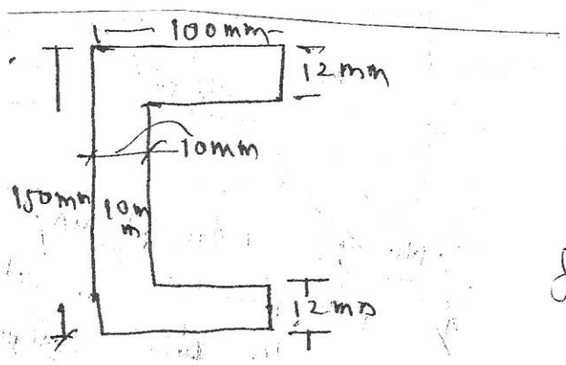

fig Q 6(a)

b) A thin pipe is required to carry water at pressure of 1MPa diameter of pipe is 700mm.permissible stress in material of pipe is 20MPa. Taking unit weight of water as 9.81kN/m^3. Determine suitable thickness of pipe.

c) Determine change in volume of a spherical shell of diameter 1000mm & thickness 15mm subjected to internal pressure of 1.5 N/mm^2. Poisson's ratio is 0.3 E=210GPa.

PTO

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Figures

Q.2. (d)

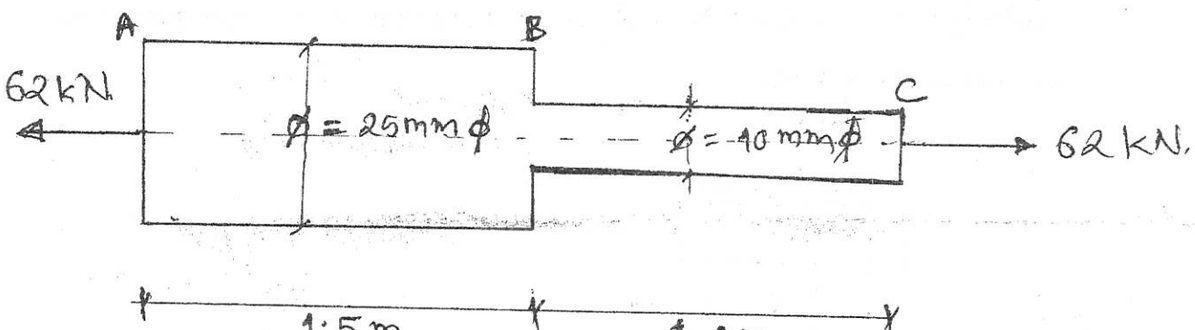

Fig No. 1 fig no. 1

Q. 3 (f)

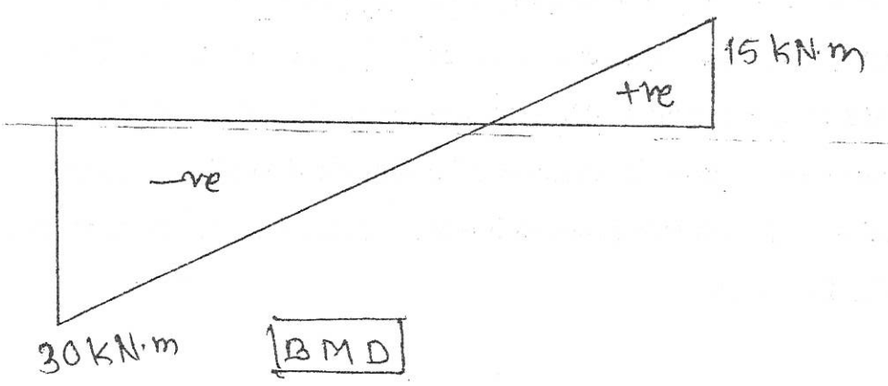

Fig No. 2 fig no 2.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST** PROGRAM: **CE/ME/SM/MT**

COURSE CODE: **CCF101/CCE101/X102/X108/R103/R104**

COURSE NAME: **ENGINEERING PHYSICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **26/04/2017**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** **(08)**

a) Define stress and state its types.

b) State stoke's law of viscosity. Write formula for the same.

c) Define i) Density ii) compressibility

d) What is effect of temperature and impurity on surface tension of liquid?

e) Write any two characteristics of linear SHM.

f) Define i) nanometer ii) nanoparticle.

Q.2 Attempt any **FOUR** **(16)**

a) Explain stress-strain curve for a wire under continuously increasing load.

b) Define viscosity and velocity gradient. State Newton's law of viscosity.

c) Derive an expression for surface tension by capillary rise method.

d) Write any four applications of surface tension.

e) Distinguish between free oscillations and forced oscillations (any four points)

f) Define nanostructured material and write its three examples.

Q.3 Attempt any **FOUR** **(16)**

a) Write any four applications of viscosity.

b) State significance of angle of contact.(any four points)

c) Distinguish between transverse wave and longitudinal wave (any four points)

d) Define the following terms.

i) Periodic motion

ii) Forced oscillations

iii) Wave

iv) Resonance

e) State any four applications of nanotechnology in space.

P.T.O

f) A wire of length 2m extends by 3mm when a force of 1.8N is applied to it calculate

i) Stress produced in it if $Y=2x10^{11}N/m^2$

ii) Area of wire

Q.4 Attempt any **FOUR** **(08)**

a) Define echo & reverberation

b) Define ultrasonic wave.

c) State any two properties of X-rays.

d) State Ohm's law.

e) State Snell's law of refraction.

f) What is meant by LASER?

Q.5 Attempt any **FOUR** **(16)**

a) State any four requirements of good acoustics of building.

b) Explain the production of X-rays using collidge tube.

c) Derive Einstein photoelectric equation.

d) Derive expression for equivalent resistance when number of resistance are connected in series.

e) State four properties of LASER.

f) Explain with neat ray diagram, refraction through glass prism.

Q.6 Attempt any **FOUR** **(16)**

a) Three resistances are 1, 2 & 3 Ohms. Find the ratio of their effective resistance when connected in series to that connected in parallel.

b) State any four characteristics of photoelectric effect.

c) Derive prism formula.

d) What is Planck's hypothesis? Define threshold frequency of radiation.

e) State applications of LASER (any four)

f) Explain the production of ultrasonic wave using magnetostriction method.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FOURTH** PROGRAM: **CIVIL ENGINEERING**

COURSE CODE: **CEE406/CE207** COURSE NAME: **CONCRETE TECHNOLOGY**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **27/04/2017**

Instruction:-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR** **(08)**

a) Enlist ingredients (any four) of the cement and write role of each ingredient.

b) Enlist any four admixtures used in concrete with their function only.

c) Define initial setting time & final setting time of cement.

d) Enlist any four types of cements & write their applications.

e) State ISI specification for coarse aggregates crushing value & impact value for roads.

f) Define fineness modulus ranges for fine aggregates & coarse aggregates.

Q.2 Attempt any **FOUR** **(16)**

a) Draw process diagram for manufacturing of concrete & also state role of each ingredient of it.

b) State any eight advantages of concrete over other construction material.

c) Explain laboratory procedure to find compressive strength of cement.

d) Write a short note on storage of cement.

e) State effects of aggregate properties on strength of concrete.

f) Define aggregate abrasion value & explain the procedure of determining abrasion value in the laboratory.

Q.3 Attempt any **FOUR** **(16)**

a) Define compaction & explain any one method of compaction of concrete.

b) Write any four precautions should be taken while transporting the concrete.

c) State why weigh batching is preferred over volume batching.

d) Enlist any eight factors that affect the workability of concrete.

e) Define segregation & bleeding. State effects of both on concrete.

f) Write stepwise procedure to measure workability by slump cone test & write range of values of workability by slump cone test.

P.T.O

Section – II

Q.4 Attempt any **FOUR** **(08)**

a) Define mix design of concrete.

b) Define 'Durability' of concrete.

c) What is M20 concrete? State meaning.

d) State effect of cold weather on concrete.

e) What do you mean by NDT? State its importance.

f) State four importances of concrete testing.

Q.5 Attempt any **FOUR** **(16)**

a) State eight objectives of mix design.

b) Differentiate between nominal mix concrete and design mix concrete.

c) Write the requirement of good formwork.

d) Draw a typical sketch of a formwork used for monolithic casting of RCC beam and slab.

e) State Duff Abrahams law w/c ratio. State effect of w/c ratio on strength of concrete. Explain with graph.

f) Write note on 'Impermeability' of concrete.

Q.6 Attempt any **FOUR** **(16)**

a) As civil engineer, what precautions will you observe while concreting in hot weather?

b) Explain the procedure of 'Tremie method' of concreting under water.

c) Draw neat sketch of 'Rebound hammer'

d) Explain the procedure of determining compressive strength of concrete by pulse velocity method.

e) Write properties and limitations of RMC (ready mixed concrete).

f) State applications of following (Two each)

i) Polymer concrete

ii) Ferro-cement.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **COMMON**

COURSE CODE: **EEE305/IEE301/ETE301/ITE301/EE201/IX201/EJ201/IT201/IE201/IF201/201**

COURSE NAME: **APPLIED MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **08/05/2017**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Q.1 Attempt any **FOUR** **Marks (08)**

a) Evaluate $\int \left[e^{2\log x} + e^{x\log a}\right] dx$

b) Find $\int \frac{\sin\sqrt{x}}{\sqrt{x}} dx$

c) Evaluate $\int \frac{dx}{3+2x-x^2}$

d) Evaluate $\int_1^2 \frac{dx}{3x-2}$

e) Evaluate $\int_1^e \log x dx$

f) Find mean value of y=cosx over the range from $x = \frac{-\pi}{2}$ *to* $x = \frac{\pi}{2}$

Q.2 Attempt any **FOUR** **(16)**

a) Evaluate $\int \frac{dx}{(x^2+4)(x+1)}$

b) Evaluate $\int \frac{dx}{3\sin 2x + 2\cos 2x}$

c) Evaluate $\int \frac{x+2}{\sqrt{x^2+5x+6}} dx$

d) Evaluate $\int_0^{\pi/4} \log(1+\tan x) dx$

e) Evaluate $\int_1^3 \frac{\sqrt[3]{x+5}}{\sqrt[3]{x+5}+\sqrt[3]{9-x}} dx$

f) Using integration find the area of the circle $x^2 + y^2 = 16$

Q.3 Attempt any **FOUR** **(16)**

a) Evaluate $\int_{\pi/6}^{\pi/3} \frac{1}{1+\sqrt[n]{\cot x}} dx$

b) Evaluate $\int \frac{3\sin x + 4\cos x}{2\sin x - \cos x} dx$

P.T.O

c) Evaluate $\int \cos\sqrt[3]{x}\, dx$

d) Evaluate $\int \frac{dx}{4\cos^2 x + 9\sin^2 x}$

e) Find R.M.S value of the I=10sin100πt over a complete period.

f) Find the area enclosed by the parabola $y = x^2 - 5x + 15$ and the line $y - 3x = 3$.

Q.4 Attempt any **FOUR** **(08)**

a) From the differential equation whose solution is y=acos3t+bsin3t

b) State order and degree of $y = \frac{dy}{dx} + \frac{c}{dy/dx}$

c) Show that $y^3 \sec^2 x\, dx + (3y^2 . \tan x - \sec^2 y)dy = 0$ is exact.

d) Find x and y satisfying the equation $(2+i)x + (i-3)y = 4$

e) Find the value of $i^{49} + i^{68} + i^{89} + i^{110}$

f) Find the complex conjugate of $\frac{3+5i}{1+2i}$

Q.5 Attempt any **FOUR** **(16)**

a) Solve: $\frac{dy}{dx} - \frac{2}{x}y = x^2 e^x$, if y=0 when x=1

b) Solve: $(e^x + 2x^2 y + y^3)dx + (a^y + 2x^2 y + 3xy^2)dy = 0$

c) Solve : $x^2 y dx = (x^3 + y^3)dy$

d) Express $1+i$ *in* $(x+iy)$ form.

e) Simplify using De Moivre's Theorem $\frac{(\cos 2\theta + i\sin 2\theta)^3 (\cos 3\theta - i\sin 3\theta)^4}{(\cos\theta + i\sin\theta)^2 (\cos 2\theta - i\sin 2\theta)^{-3}}$

f) If $\cos(x+iy) = \alpha + i\beta$ show that *i)* $\frac{\alpha^2}{\cos^2 x} - \frac{\beta^2}{\sin^2 x} = 1$ *ii)* $\frac{\alpha^2}{\cosh^2 y} + \frac{\beta}{\sinh^2 y} = 1$

Q.6 Attempt any **FOUR** **(16)**

a) Solve $\frac{dy}{dx} = \sin(x+y)$

b) Solve $\frac{dy}{dx} = \frac{xy}{(1-x)(1+y)}$

c) If the slope of the curve is $x^2 + 2x + 1$, find its equation if it passes through the point (1, 1)

d) Find 2 values of $(1-i)^{1/2}$

e) Using Euler's formula, prove the following

i) $\sin 2\theta = 2\sin\theta\cos\theta$

ii) $\cosh^2 x + \sinh^2 x = \cosh 2x$

f) Show that $\sqrt{3+i}$ is a cube root of $8i$

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEE302/CE206**
COURSE NAME :- **BUILDING CONSTRUCTION**
MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **08 / 05 / 2017**

Instruction:-
1) Answers must be written in the main answer book provided.(and supplements if required)
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** (08)

a) What is mean by superstructure?

b) Enlist any eight superstructure components of building.

c) State any two objects of providing foundation.

d) Define the term-Hearting.

e) What is meant by header?

f) Define the term-frog.

Q.2 Attempt any **FOUR** (16)

a) State any one function of each of lintel, Chajja, beam and column.

b) State any four natural defects in timber with their causes.

c) Draw a neat sketch of double under-reamed pile foundation.

d) Draw the sketches in plan for alternate courses of one brick thick double Flemish bond.

e) State any eight requirements of good brick masonry.

f) Draw neat sketches of any two hinges.

Q.3 Attempt any **FOUR** (16)

a) State any eight requirements of good building stone.

b) What is job layout? State any four precautions to be taken while marking layout of ground.

c) Classify the pile foundations as per their function. Write note on any one type of it.

d) State any four precautions to be taken for foundation in black cotton soil.

e) Compare stone and brick masonry (any four points)

f) Draw a neat sketch of four paneled single shutter door in elevation.

P.T.O.

Q.4 Attempt any **FOUR** (08)

a) Define Stair.

b) Where do you use bifurcated staircase?

c) Enlist any four latest types of flooring available in market.

d) State any four requirements of good roof.

e) Under what situations do you recommend the pointing work?

f) State any two necessities of painting work.

Q.5 Attempt any **FOUR** (16)

a) Draw a neat labelled, sketch of formwork for beam and column.

b) Draw a neat labelled, sketch of plan and section of dog legged staircase.

c) Explain the procedure of water proofing for R.C.C. slab.

d) What do you meant by Mezzanine floor? State the uses of Mezzanine floor.

e) i) State any two necessities of Rebarring Technique.

ii) State the necessity of Termite proofing.

f) State any four causes of cracks in building.

Q.6 Attempt any **FOUR** (16)

a) Define :- i) Riser ii) Baluster iii) Cloing iv) Winders.

b) State any four remedial measures of cracks in building.

c) State any four requirements of good formwork.

d) Explain the term tremix floors.

e) Define i) Gunting ii) Grouting.

f) i) Enlist any four types of external plastering.

ii) Explain the term stucco plaster.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **COMMON**

COURSE CODE:

CEE301/MEE301/SME301/MTE301/CE201/ME201/SM201/MT201/C201/M201/1201/2201

COURSE NAME: **APPLIED MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **08/05/2017**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Q.1 Attempt any **FOUR** **Marks (08)**

a) Evaluate $\int \left[e^{2\log x} + e^{x\log a}\right] dx$

b) Find $\int \frac{\sin\sqrt{x}}{\sqrt{x}} dx$

c) Evaluate $\int \frac{dx}{3+2x-x^2}$

d) Evaluate $\int_1^2 \frac{dx}{3x-2}$

e) Evaluate $\int_1^e \log x dx$

f) Find mean value of y=cosx over the range from $x = \frac{-\pi}{2}$ to $x = \frac{\pi}{2}$

Q.2 Attempt any **FOUR** **(16)**

a) Evaluate $\int \frac{dx}{(x^2+4)(x+1)}$

b) Evaluate $\int \frac{dx}{3\sin 2x + 2\cos 2x}$

c) Evaluate $\int \frac{x+2}{\sqrt{x^2+5x+6}} dx$

d) Evaluate $\int_0^{\pi/4} \log(1+\tan x) dx$

e) Evaluate $\int_1^3 \frac{\sqrt[3]{x+5}}{\sqrt[3]{x+5}+\sqrt[3]{9-x}} dx$

f) Using integration find the area of the circle $x^2 + y^2 = 16$

Q.3 Attempt any **FOUR** **(16)**

a) Evaluate $\int_{\pi/6}^{\pi/3} \frac{1}{1+\sqrt[n]{\cot x}} dx$

b) Evaluate $\int \frac{3\sin x + 4\cos x}{2\sin x - \cos x} dx$

c) Evaluate $\int \cos\sqrt[3]{x}\ dx$

d) Evaluate $\int \frac{dx}{4\cos^2 x + 9\sin^2 x}$

e) Find R.M.S value of the I=10sin100πt over a complete period.

f) Find the area enclosed by the parabola $y = x^2 - 5x + 15$ and the line $y - 3x = 3$.

P.T.O

Q.4 Attempt any **FOUR** **(08)**

a) Form the differential equation by eliminating arbitrary constants if $y = A\cos 3x + B\sin 3x$

b) Solve $\sqrt{1-y^2}\,dx = \sqrt{1-x^2}\,dy$

c) state order and degree of the differential equation $\sqrt{1+\frac{dy}{dx}} = \frac{d^2y}{dx^2}$

d) Find range of the following data: 49, 13, 11, 12, 42, 29, 18, 27.

e) Find the probability of getting a sum of 3 when 2 unbiased dice is thrown.

f) The velocity of a body is given by $v = t(3+5t)$. How much distance does it travel in 4sec if it was initially at rest?

Q.5 Attempt any **FOUR** **(16)**

a) Solve: $\cos^2 x\frac{dy}{dx} + y = \tan x$

b) Solve: $v\frac{dv}{dx} = g - kv^2$ Where g and k are constants.

c) Solve: $(x+y+1)^2\frac{dy}{dx} = 1$

d) Calculate mean deviation about mean of the following data

Marks	3	4	5	6	7	8
No. of student	1	3	7	5	2	2

e) Calculate variance

C.I	0-10	10-20	20-30	30-40	40-50	50-60
fi	14	23	27	21	15	19

f) A husband and wife appeared for an interview for two vacancies in an office. The probability of husbands' selection is $\frac{2}{7}$ and that of wife selection is $\frac{1}{4}$. Find the probability that

i) Both of them are selected.

ii) Only one of them is selected.

Q.6 Attempt any **FOUR** **(16)**

a) If A and B are two events such that P(A)=0.8, P(B)=0.6, P(A∩ B)=0.5, find i) P(AUB) ii) p($\frac{A}{B}$) iii) p($\frac{B}{A}$)

b) Solve: $(2xy + y - \tan y)dx + (x^2 - x\tan^2 y + \sec^2 y)dy = 0$

c) Solve: $y\,dx = xdy + \sqrt{xy}\,dx$

d) Find the equation of curve whose slope at any point is equal to $\frac{2y+x+1}{x}$ and which passes through the point (1, 0).

e) The mean weight of 150 students is 60kg. The mean weight of boys is 70kg with a S.D of 10kg. For the girls, the mean weight is 55kg. and the S.D is 15kg. Find the number of boys and the combined S.D.

f) The following table shows the marks obtained by 100 students in an examination. Calculate mean and variance.

Marks	1-10	11-20	21-30	31-40	41-50	51-60
No.of candidates	3	16	26	31	16	08

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **CIVIL ENGINEERING**

COURSE CODE :- **CEE404/CE303***

COURSE NAME :- **ESTIMATING AND COSTING**

MAX. MARKS : **80** TIME : **4 HRS.** DATE :- **05 / 05 / 2017**

Instruction :-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available o request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR** (08)

a) State the purpose of estimating and costing.

b) Define centage charges.

c) State the meaning of prime cost.

d) State two purposes of approximate estimate.

e) State any two rules for deduction of plaster as per IS 1200.

f) Explain in short plinth area method of approximate estimate.

Q.2 Attempt any **FOUR** (16)

a) Write mode of measurement for following
i) Site clearance ii) U.C.R. masonry iii) Excavation iv) G.I. pipe

b) Workout the quantities of M.S. reinforcement for following item.

Item	Overall size	Details of reinforcement
Beam	2500mm long (230 X 450mm	a) Main bar- 4 ₹ 12mm (2 Straight 12 bent up 45^0) b) Anchor bars -2 ₹ 10mm c) Stirrups – 6mmΦ @ 150mm c/c

c) Workout the quantities of the following item of work and enter in measurement sheet
i) Excavation for foundation ii) UCR in foundation and plinth (Refer the fig, No.1)

d) Suggest suitable method of approximate estimate for i) A hospital ii) a Factory shed.

e) Write a short note on work charged establishment.

f) Draw format of abstract sheet and measurement sheet.

P.T.O.

Q.3 Attempt any **FOUR** (16)

a) Enlist the data required for preparation of detailed estimate.

b) State the rules for deduction for brick work as per IS 1200.

c) Prepare approximate estimate of a building using following data
   i) Proposed area of the building = 240sqm
   ii) Similar type of building recently constructed in nearby locality having builtup area 120sqm and total cost of construction is 12lakh.

d) Describe centre line method.

e) Calculate the quantity of brickwork and concrete for underground water tank from following Fig.No.2

f) Prepare Bar Bending schedule for a RCC footing from following data
   i) Size of footing = 1.20m X 1.50m.
   ii) 10mm M.S. Bars are used both way at 150mm centre to centre

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Section – II Marks

Q.4 Attempt any **FOUR** (08)

a) What do you mean by specification? List any two types of specifications.

b) Define the terms lead and lift.

c) List the four methods of calculating earth works.

d) What do you mean by Task work?

e) State the two important purposes of the specifications.

f) What is the load carrying capacity of two bullock cart and 8 tonner truck on puacca road for cement and sand?

Q.5 Attempt any **TWO** (16)

a) i) State the points to be observed in framing the specification of an item.

   ii) What are the factors affecting the rate analysis.

b) Prepare the rate analysis for II class brickwork in C.M. 1:6 for superstructure.

c) Calculate quantity of earthwork for road from the following data. Use mid section area method.

   Formation width of the road = 10.00m
   Slope in cutting ⇒ 1.5:1
   Slope in banking ⇒ 2:1.

Chainage (m)	0	30	60	90	120
G.L. (m)	500.00	498.50	497.00	495.25	494.25
Formation level (m)	497.00	496.50	496.00	495.50	495.00

P.T.O.

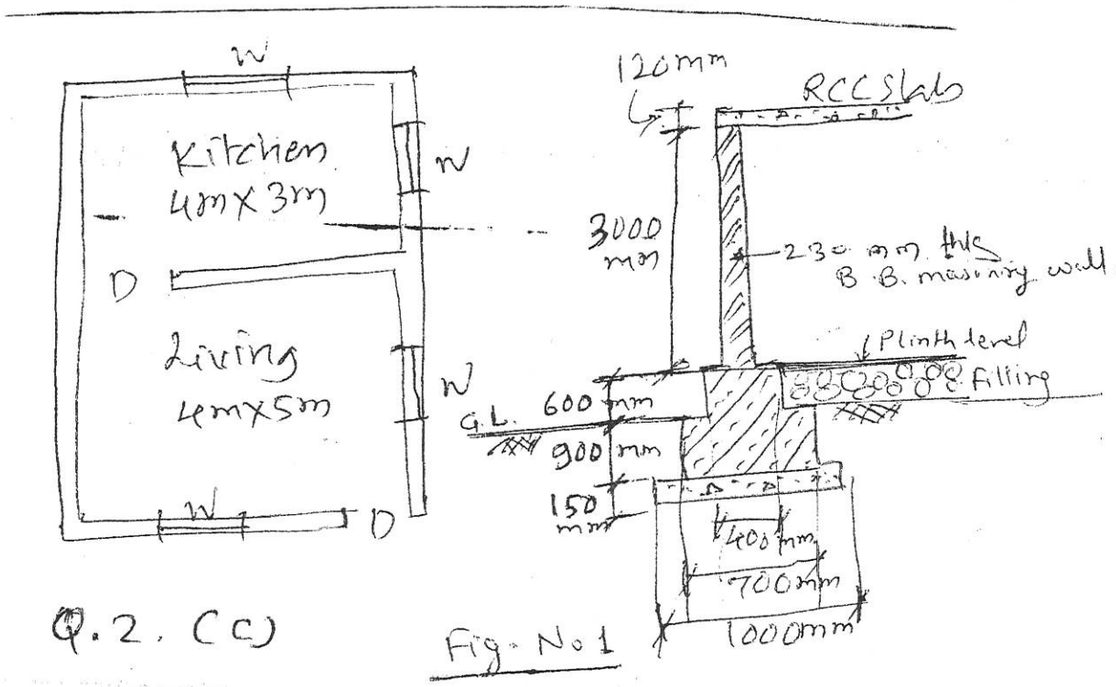
Q.6 Attempt any **TWO** (16)

a) Draft the detailed specification for P.C.C.1:4:8 for foundation concrete.

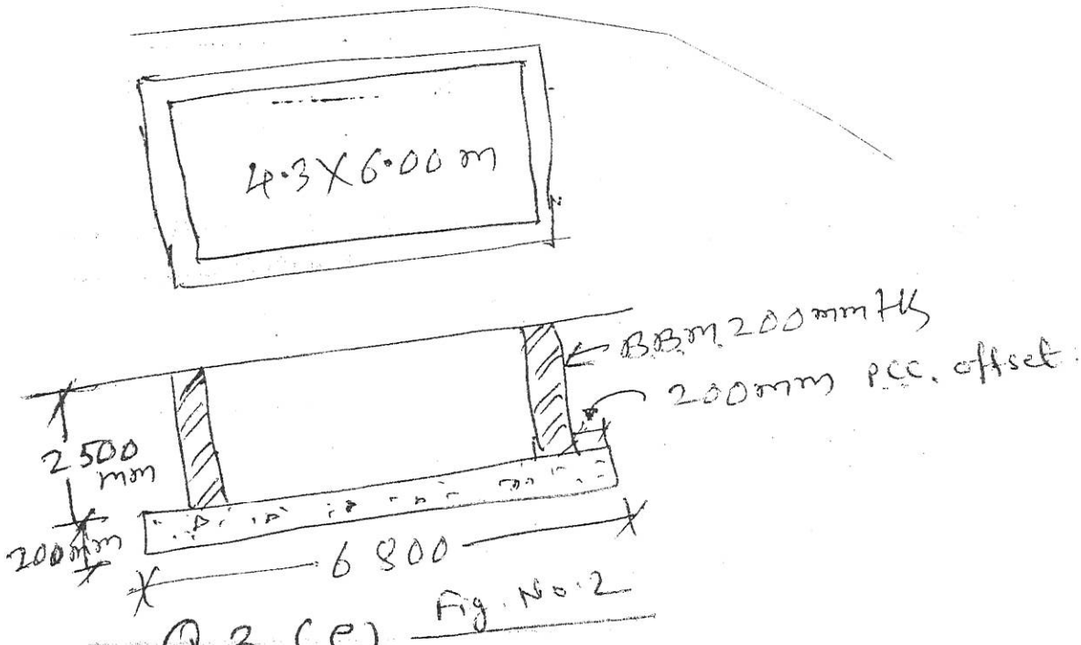
b) i) State the factors affecting Task work.
ii) Calculate the quantity of materials required for UCR masonry in CM 1:3 for 15 cum.

c) Calculate the quantity of earth work required for the earthen dam by prismoidal formula by using following data:-
Top width of embankment = 3m.
RL of top of embankment = 105.00m
Side slopes ⇒ Both sides 2:1

Chainage (m)	200	230	260	290	320
R.L. of ground (m)	100	98	97.5	95.2	97



Q.2. (c) Fig. No 1



Q.3 (e) Fig. No. 2

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY-2017

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD.** PROGRAM: **CE/ME/SM/MT.**

COURSE CODE: **CEE313/MEE313/MTE312/SME312/ME214/MG228/R228.**

COURSE NAME: **HIGHER MATHS.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **05/05/2017**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data if necessary.
7) Use of Mobile is strictly prohibited.

Q.1 Attempt any **FOUR** **Marks (08)**

a) Prove that $\Delta\nabla = E + E^{-1} - 2$

b) Show that $(\frac{\Delta^2}{E})x^3 = 6x, if\ h = 1.$

c) Write Lagrange's interpolation formula for $x = x_3$

d) If $u = f\left(\frac{x}{y}\right) + \sqrt{x^2 + y^2,}\ \ find\ \frac{\partial u}{\partial x}$

e) If u=f(v) where v is a homogeneous function of x, y of degree n, prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = nv\, f^1(v).$

f) If x=ucosv, y=usinv find Jacobian, $J\left(\frac{x,y}{u,v}\right)$

Q.2 Attempt any **FOUR** **(16)**

a) Using Lagrange's interpolation formula, find the polynomial which takes the values as

x	0	1	2
y	1	4	6

b) Given :

x	10	15	20
f(x)	14	18	28

Estimate f(12) using Newton's forward interpolation formula.

c) Given :

x	0^0	30^0	60^0	90^0
$Cosx^0$	1	0.87	0.5	0

Find $\cos 75^0$ using Newton's backward difference interpolation formula.

d) If u= f(r) & $r^2 = x^2+y^2+z^2$, prove that, $\frac{\partial^2 y}{\partial x^2} + \frac{\partial^2 y}{\partial y^2} + \frac{\partial^2 y}{\partial z^2} = f''(r) + \frac{2}{r}f'(r)$

e) If u=sin $(\frac{xy+yz+zx}{x^2+y^2+z^2})$ prove that, $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + z\frac{\partial u}{\partial z} = 0$

f) If $u=x+2y^2-z^3$, $v=x^2yz$, $w=2z^2-xy$, find $\frac{\partial(u,v,w)}{\partial(x,y,z)}$.

Q.3 Attempt any **FOUR** **(16)**

a) Given f(0)=3,f(1)=6,f(2)=11,f(3)=18, estimate f(1.5) using Lagrange's interpolation formula.

P.T.O

b) Find f(4.5) from the following data.

x	1	2	3	4	5
f(x)	2.38	3.65	5.85	9.95	14.85

c) Using Newton's forward difference interpolation formula find f(8) from the data

x	5	10	15	20
f(x)	50	70	100	145

d) If $x= r\cos\theta$, $y= r\sin\theta$, prove that $JJ^{1}=1$

e) If $z=x^2+\tan^{-1}(\frac{y}{x}) - y^2 tan^{-1}(\frac{x}{y})$, prove that, $\frac{\partial^2 z}{\partial x \partial y} = \frac{x^2-y^2}{x^2+y^2}$

f) Verify Euler's formula for the function $Z=\sin^{-1}[\frac{x^2+y^2}{x+y}]$

Q.4 Attempt any **FOUR** **(08)**

a) Find L(cos5t cost)

b) Find L $\left(\frac{(3t^2+t)^3}{t^2}\right)$

c) Find L $(2te^{2t})$

d) Find L^{-1} $(\frac{3+2s+s^2}{s^3})$

e) Find L^{-1} $(\frac{3s-12}{s^2+8})$

f) Solve $\frac{d^2x}{dt^2} + \frac{2dx}{dt} + 1 = 0$.

Q.5 Attempt any **FOUR** **(16)**

a) Evaluate $\int_0^\infty e^{-3t} t\cos 2t \, dt$ by *L.T.*method.

b) Find $L^{-1}\left(\frac{4s+5}{(s-1)^2(s+2)}\right)$.

c) Find $L^{-1}\left(\frac{1}{s(s^2+4)}\right)$ by Convolution theorem.

d) Solve $\frac{dy}{dt} + y = e^{-3t}, y(0) = 1$.

e) Solve $\frac{d^4y}{dx^4} + 4y = 0$.

f) Solve $(D^3 - 4D^2 + 13D)y = 0$

Q.6 Attempt any **FOUR** **(16)**

a) Find L $\left(te^{-t}\sin 3t\right)$

b) Find L^{-1} $\left(\frac{1}{(s^2+4)^2}\right)$ by Convolution theorem

c) Find $L^{-1}\left(\frac{s+3}{(s^2+4s+13)}\right)$ by Convolution theorem

d) Solve $\frac{dx}{dt} = 1 + e^t, x(0) = -1$.

e) Solve $\frac{d^3y}{dx^3} - \frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 5y = 0$.

f) Solve $(D^4+2D^2+1)\, y=0$.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM April/ May 2017

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **CE/ME/IE/SM/MT/E & TC**

COURSE CODE :- **MEE312/MTE311/IEE311/ETE311/MG227/R227**

COURSE NAME :- **NON CONVENTIONAL ENERGY SOURCES**

MAX. MARKS : **80** TIME : **3 HRS.** DATE: - **05 / 05 / 2017**

Instruction:-

1) Answers must be written in the main answer book provided.(and supplements if required)
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** (08)

a) Enlist any four renewable energy sources.

b) How energy sources are classified?

c) Define: Power Coefficient.

d) State the basic principle of wind energy conversion.

e) State the categories in which biomass resources fall.

f) State different biomass conversion technologies.

Q.2 Attempt any **FOUR** (16)

a) Why alternative energy sources are necessary?

b) Define : i) Hour angle ii) Declination iii) Azimuth angle iv) Zenith angle.

c) Describe the prospects of alternative energy sources.

d) Draw a block diagram showing basic components of wind energy conversion system.

e) Differentiate between biomass and conventional fuel.

f) How Wind Mills are classified?

Q.3 Attempt any **TWO** (16)

a) Explain with neat sketch, Deenbandhu biogas plant.

b) What factors are considered for selection of site of Wind Mill?

c) Explain with neat sketch solar pond.

P.T.O.

Q.4 Attempt any **FOUR** (08)

a) How should be the site, favorable for a tidal power plant?

b) What are the difficulties in tidal power plant?

c) State two advantages and disadvantages of geothermal energy over other energy forms.

d) State the principles of Energy conservation.

e) State the meaning of the term ' Simple Pay back Period'.

f) What is fuel cell? State the main components.

Q.5 Attempt any **FOUR** (16)

a) Explain single basin and double basin arrangement of tidal power plant.

b) Describe the working and main types and OTEC power plants.

c) Write four advantages and four limitations of small scale hydroelectric power generation.

d) Explain Geothermal energy power plant.

e) Draw a simple MHD generator and explain principle of MHD power generation.

f) Write various components of SHP and state their functions.

Q.6 Attempt any **FOUR** (16)

a) Write classification of small hydro power station. State type of turbine suitable for micro hydel plant and explain.

b) Explain the concept of waste heat utilization.

c) State the types of energy audit and explain in short.

d) Explain the meaning of Co-generation and its benefits in industries.

e) Discuss the energy conservation technologies.

f) Draw and explain Sankey diagram for energy audit of a factory.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM APRIL/MAY -2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST** PROGRAM: **COMMON**

COURSE CODE: **CCF106/CCE106/X110/R108/0108**

COURSE NAME: **ENGINEERING MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **06/05/2017**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Q.1 Attempt any **FOUR** **Marks (08)**

a) Find the centroid of a triangle whose vertices are (1, 4) (2, 3) (0, -1)

b) Find the distance between the parallel lines $3x+2y-8=0$ and $3x+2y-4=0$

c) Find the acute angle between the lines $3x-2y+4=0$ *and* $2x-3y-7=0$

d) Find the equation of a circle whose center is at origin and radius 5

e) Find the equation of a circle whose diameter is the line segment joining the points (9, 0) & (0, 6)

f) Starting with the approximations $x_0=y_0=z_0=0$, for solving a set of equations by Gauss-Seidel method. If the next approximation gives $x_1=0.85,\ y_1=1.0275$. Find z_1. Given that $z=\frac{1}{10}[25-2x+3y]$

Q.2 Attempt any **FOUR** **(16)**

a) Show that the points (-2, 1), (-1, 3) and (1, 7) are collinear.

b) Determine which of the two circles is greater: $x^2+y^2-3x+4y=0$ and $x^2+y^2-6x+8y=0$

c) Find the equation of a circle passing through the point (2, 5) and (-5, 4) and whose center lying on the line $2x-3y+5=0$

d) Find the equation of a line passing through the points of intersection of the lines $2x+3y=13,\ 5x-y=7$ and passing through (1, -1)

e) Find the equation of perpendicular bisector of the join of A(-2, 3) and B(8, -1)

f) Use Jacobi's method to solve the equations $5x+2y+z=12,\ x+4y+2z=15,$ $x+2y+5z=20$ (Third iterations only)

Q.3 Attempt any **FOUR** **(16)**

a) Using Gauss Seidel method solve $10x=2y+2z+6,\ 10y=x+2z+7,$ $10z=x+y+8$ (upto Third iterations)

b) Using Jacobi's method solve $5x-y-2z=-3,\ 3x+5y-z=10,\ -2x-y+4z=8$ (three iterations only)

c) Use Regula-Falsi method to solve $x^3-3x+5=0$ (upto second approximation)

d) Find $\sqrt[3]{29}$ by Regula-Falsi method upto second iteration

e) Find the square root of 12 by the method of bisection (upto 4 approximations)

f) Solve $x^3-6x+2=0$ by Bisection method (upto four iterations)

P.T.O

Q.4 Attempt any **FOUR** **(08)**

a) Test whether the function is even or odd if $f(x) = x^3 + 5\sin x$

b) Evaluate $\lim_{x \to 3} \frac{x^3 - 27}{x - 3}$

c) Evaluate $\lim_{x \to 0} \frac{\sin 5x}{3x}$

d) Find $\frac{dy}{dx}$ *if* $y = \cos^2 x$

e) Find $\frac{dy}{dx}$ *if* $y = \log(x^2 + 2x + 5)$

f) Find the slop of tangent to the curve $y = x^3$ *at* $x = 4$

Q.5 Attempt any **FOUR** **(16)**

a) If $y = f(x) = \frac{x+1}{x-1}$, $x \neq 1$ then show that $x = f(y)$

b) Evaluate $\lim_{x \to \frac{\pi}{4}} \frac{\sin x - \cos x}{x - \pi/4}$

c) If $y = x^y$ *prove that* $\frac{dy}{dx} = \frac{y^2}{x(1 - y\log x)}$

d) Find the derivative of $x.\sin^{-1} x$

e) Find $\frac{dy}{dx}$ *if* $y = \log\left[x + \sqrt{x^2 + a^2}\right]$

f) Discuss the stationary (Maximum & Minimum values) of $x^3 - 6x^2 + 9x - 2$

Q.6 Attempt any **FOUR** **(16)**

a) If $f(x) = 16^x + \log_2^x$ then find $f(1/4)$ $f(1/2)$

b) Evaluate $\lim_{x \to 4} \frac{x^4 - 64x}{\sqrt{x^2 + 9} - 5}$

c) Differentiate w. r. t x; $\tan^{-1}\left(\frac{x}{\sqrt{1 - x^2}}\right)$

d) Find $\frac{dy}{dx}$ *if* $13x^2 + 2x^2y + y^3 = 1$

e) If $y = (\sin x)^{\log x}$ *find* $\frac{dy}{dx}$

f) If $x = a(\theta + \sin\theta)$, $y = a(1 - \cos\theta)$ *find* $\frac{dy}{dx}$

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EVEN TERM END EXAM APRIL/MAY-2017

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST.** PROGRAM: **CE/ME/SM/MT.**

COURSE CODE:**CCF103/CCE103/X109/X103**

COURSE NAME: **CHEMISTRY OF ENGINEERING MATERIALS.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **24/04/2017**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data if necessary.
7) Use of Mobile is strictly prohibited.

Q.1 Attempt any **FOUR** **Marks (08)**

a) Write fundamental particles of atom with respect to charge & mass.

b) Define atom. Why the structure of atom is neutral?

c) Define Conductor & Electrolyte.

d) Distinguish between metallic conduction & Electrolytic condition.(any two points).

e) Write impurities in water.

f) Write any two reactions of hard water with soap.

Q.2 Attempt any **FOUR** **(16)**

a) Write the formation of NaCl molecule. Which is the type of bond?

b) With diagram explain electrolysis of $CuSO_4$ solution by using Pt electrodes.

c) Which is the method used for coating irregularly shaped articles & explain it with diagram?

d) Write classification of corrosion. Which film is called as protective type & why?

e) Write disadvantages of hard water for textile industry & dying industry.

f) Explain with diagram ion exchange method to remove total hardness of water.

Q.3 Attempt any **FOUR** **(16)**

a) State & explain Hund's rule of maximum multiplicity.

b) Calculate the time in seconds in which 0.3gms of copper is deposited from $CuSo_4$ solution when a current of 0.5 amp is passed. The chemical equivalent (eq.wt.)of Cu being 31.6.

c) Write factors affecting atmospheric corrosion.

d) Distinguish between hard water & soft water.(any four points)

e) With chemical reactions explain sterilization of water by using bleaching powder.

f) What are the disadvantages of scale formation in boilers?

Q.4 Attempt any **FOUR** **(08)**

a) Define the terms 1) Mineral 2) Ore.

b) Write any four application of monel metal alloy.

c) Give any four function of lubricant.

d) Write with example classification of composite materials.

e) State two constituents of paint and give one function of each.

f) Give the characteristics of good insulator.

Q.5 Attempt any **FOUR** **(16)**

a) Write chemical reactions involved in the zone of reduction of blast furnace.

b) Distinguish between calcination and roasting.

c) Define alloy. Give the classification of alloy. State the purposes of making alloy

d) Explain with diagram gravity separation method.

e) Define oil paint . Write characteristics of good oil paint.

f) What is lubrication ? Explain the Fluid film lubrication with diagram.

Q.6 Attempt any **FOUR** **(16)**

a) Define lubricant. Suggest the suitable lubricant for

   i) Gears

   ii) Cutting tools

   iii) Concrete mixture machine

b) Give four points of difference between paint and varnish.

c) Define polymerization. Give the types of polymerization. State the characteristics of thermosoftening plastic.

d) Write any four uses of rubber based on it's different properties.

e) Define adhesive. Write characteristics of good adhesives.

f) How is thermocole prepared? Write the uses and properties of thermocole.

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