GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CCE105/X104/R107/0107** COURSE NAME: **BASIC MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **30/04/2016**

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) Resolve into partial fractions: $\frac{x+1}{(x+3)(x-2)}$

b) Resolve into partial fractions: $\frac{x}{x^2-1}$

c) Find X if $\begin{bmatrix} 4 & 5 \\ -3 & 6 \end{bmatrix} + x = \begin{bmatrix} 10 & -1 \\ 0 & -5 \end{bmatrix}$

d) Find x & y if $\begin{bmatrix} 3x^2 & 4 \\ 1 & y-3 \end{bmatrix} = \begin{bmatrix} 12 & 4 \\ 1 & 8 \end{bmatrix}$

e) If $A = \begin{bmatrix} 2 & 3 \\ 4 & 7 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 3 \\ 4 & 6 \end{bmatrix}$ find 2A+3B-4I

f) Find the middle term in the expansion of $(x+5)^8$

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

a) Solve using determinants: $x+y+z=1;\ \ 2x+3y+z=4;\ \ 4x+9y+z=16$

b) Prove using properties that $\begin{vmatrix} a & b & c \\ a^2 & b^2 & c^2 \\ a^3 & b^3 & c^3 \end{vmatrix} = abc(a-b)(b-c)(c-a)$

c) Resolve into partial fractions: $\frac{x^2+2x}{(x-3)(x^2+1)}$

d) Express the matrix 'A' as the sum of symmetric and skew-symmetric matrices $A = \begin{bmatrix} -1 & 7 & 1 \\ 2 & 3 & 4 \\ 5 & 0 & 5 \end{bmatrix}$

e) If $A = \begin{bmatrix} -1 & 3 & 5 \\ 0 & 6 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 3 & -5 \\ 7 & 8 \\ 1 & -1 \end{bmatrix}$, $C = \begin{bmatrix} 4 & -5 \\ 1 & 1 \end{bmatrix}$, *verify that* $(AB)C = A(BC)$

f) Find A^{-1} by adjoint method if $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$

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

a) Solve the following equation $\begin{vmatrix} x+10 & x+2 & x+3 \\ x+4 & x+5 & x+6 \\ 2x+7 & x+8 & 0 \end{vmatrix} = 0$

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

c) Resolve into partial fractions: $\frac{2x^4+x^2+4}{(x^2+1)(2x^2+3)(x^2-2)}$

d) Solve the following simulations equations by matrix method: 2x+y=3; 2y+3z=4; 2z+2x=8

e) Using Binomial theorem prove that $\left(\sqrt{2}+1\right)^5-\left(\sqrt{2}+1\right)^5=82$

f) The term independent of x in the expansion of $\left(x^3+\frac{m}{x^8}\right)^{11}$ is 1320 find m.

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

a) Prove that as $\cos(\pi+\theta)=-\cos\theta$

b) If A=30^0 verify that $\sin 3A=3\sin A-4\sin^3 A$

c) Express as product and evaluate $\sin 99^0-\sin 81^0$

d) Prove that a=b cos c + C cosB

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

f) In ΔABC if a=125cm, b=123cm, c=62cm find $\sin\frac{A}{2}$

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

a) If $\tan(x+y)=\frac{3}{4}$, $\tan(x-y)=\frac{8}{15}$ *them show that* $\tan 2x=\frac{77}{36}$

b) Prove that $\frac{\sec 8A-1}{\sec 4A-1}=\frac{\tan 8A}{\tan 2A}$

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

d) Prove that $\tan^{-1}\left(\frac{1}{7}\right)+\tan^{-1}\left(\frac{1}{13}\right)=\cot^{-1}\left(\frac{9}{2}\right)$

e) Prove that $\left(b^2-c^2\right)\sin^2 A+\left(c^2-a^2\right)\sin^2 B+\left(a^2-b^2\right)\sin^2 c=0$

f) Solve ΔABC *if* $b=1,\ c=\sqrt{3}-1$ & $A=60^0$

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

a) If α and β both are obtuse angles and $\sin\alpha=\frac{5}{13}$, $\cos\beta=\frac{-4}{5}$ *evaluate* $\cos(\alpha+\beta)$

b) Prove that $4\sin A\sin(60^0-A)\sin(60^0+A)=\sin 3A$

c) Show that $\cos^{-1}\left(\frac{4}{5}\right)+\tan^{-1}\left(\frac{3}{5}\right)=\tan^{-1}\left(\frac{27}{11}\right)$

d) In ΔABC *show that* $\tan A+\tan B+\tan C=\tan A\tan B\tan C$

e) Solve ΔABC in which the sides are a=52.8, b=39.3, c=72.1

f) In any ΔABC, prove that $a\cos\left(\frac{B-C}{2}\right)=(b+c)\sin\frac{A}{2}$

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **CEE501/CE406/C406/1413**

COURSE NAME :- **CONTRACTS AND ACCOUNTS**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **30 / 04 / 2016**

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 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) Define Major work and Minor work.
b) Enlist any four essentials of valid contract.
c) What is liquidated Damage?
d) Enlist any four methods of execution of work in PWD.
e) Define contract.
f) State the purpose of EMD and Security Deposit.

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

a) Illustrate corrigendum to tender notice with its necessity.
b) Explain Administrative Approval and Technical Sanction
c) Answer the following
   i) Differentiate between lumpsum contract and item rate contract (any two points)
   ii) Extention of time limit is granted for contract. State the situation.
d) Define Tender and state its necessity (four points)
e) Answer the following.
   i) Explain day work method with one example.
   ii) Enlist various class of contractor.
f) Explain the clause escalation of cost.

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

a) State the responsibilities of junior engineer in PWD.
b) Enlist the various types of contract and explain item rate contract with its advantages and disadvantages.
c) Draft a tender notice for school building situated in Kolhapur city. Total No. of storey is 03& Estimated cost 1cr., R.C.C. frame structure is considered in design and estimate. Assume other suitable data if required and mention it clearly at the start of answer.
d) Illustrate BOT contract with one example.
e) Define Arbitration; state the qualities of arbitrator and explain arbitration process.
f) State the reasons for rejection of lowest tender.

P.T.O.

Section – II

Marks

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

a) Enlist any four objectives of financial management.

b) What do you mean by Royalty Tax?

c) State the any four purposes of budget.

d) What are the uses of invoice?

e) What do you mean by daily dairy?

f) What do you mean by monopoly value?

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

a) Explain Excise Tax.

b) Enlist functions of financial management and explain any two.

c) Enlist any eight important features of cash-book.

d) Explain importance of maintaining accounts of works and stores.

e) Explain the terms mobilization advance and reduced rate payment.

f) Explain factors affecting value.

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

a) What price would you advice to a prospective buyer for purchasing a property the details of which are given below?
   i) Gross rent per month Rs.600.
   ii) Future life 50 years.
   iii) Rate of return for redemption of capital by S.f. method = 3%.
   iv) Rate of intrest on capital = 7.5%.
   v) Gross outgoings = 33.33%.
   (Assume S.F. to produce Rs. 1 in 50years at the rate 3% = 0.0089)

b) Explain the terms cost, price and value.

c) Explain scrap value and speculative value.

d) Explain methods of calculation of sinking depreciation.

e) Explain methods of land valuation.

f) Describe the factors affecting value of the property.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: **THRID** PROGRAM: **CE/ME/IE/E&TC/SM/MT/IT**

COURSE CODE:

MEE313/MTE312/ME214/R228/MG228/ITE312/R228/IEE/ETE312/IX/EJ210/R228/0228

COURSE NAME: **HIGHER MATH'S**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **02/05/2016**

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) Evaluate $\left(\frac{\Delta^2}{E}\right)x^2$ *taking* $h=1$

b) Prove that $E\Delta = \Delta E$

c) Prove that $\Delta \log f(x) = \log\left[1+\frac{\Delta f(x)}{f(x)}\right]$

d) If $z=\log(x^2+y^2)$. *find* $\frac{\partial z}{\partial x}$ & $\frac{\partial z}{\partial y}$

e) If $z=x^y$, *then find* $\frac{\partial z}{\partial x}$ & $\frac{\partial z}{\partial y}$

f) If $u=\sin(xy)$, *find* $\frac{\partial^2 u}{\partial x.\partial y}$

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

a) Estimate the missing term in the following table.

X	1	2	3	4	5
Y	2	5	7	-	32

b) Express $f(x)=2x^4+x-1$ in factorial notation & find $\Delta^3 f(x)$ *at* $x=1.5$

c) It f(x)is a polynomial of degree 2 in x If f(0)=8, f(1)=12, f(2)=18 then find f(x) using suitable interpolation formula.

d) The following table gives the premium payable for the policy of RS.1000 at age x.

Age	20	25	30	35	40
Premium	23	26	30	35	41

Find the premium, if the policy is taken at the age of 26 years.

e) Find f(1.7), if f(-2)=4, f(-1)=26, f(0)=58, f(1)=112, f(2)=446

f) Using Lagrange's formula, find f(6)

X	3	7	9	10
Y	168	120	72	63

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

a) If $z=\sin^{-1}\left(\frac{y}{x}\right)$, *verify that* $\frac{\partial^2 z}{\partial x.\partial y}=\frac{\partial^2 z}{\partial y.\partial x}$

b) If $\sin U=\frac{x^2y^2}{x+y}$ *show that* $x\frac{\partial u}{\partial x}+y.\frac{\partial u}{\partial y}=3\tan u$

P.T.O.

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

a) If $z = \sin^{-1}\left(\frac{y}{x}\right)$, *verify that* $\frac{\partial^2 z}{\partial x.\partial y} = \frac{\partial^2 z}{\partial y.\partial x}$

b) If $\sin U = \frac{x^2 y^2}{x+y}$ *show that* $x\frac{\partial u}{\partial x} + y.\frac{\partial u}{\partial y} = 3\tan u$

c) If $u = x^2.\tan^{-1}\left(\frac{y}{x}\right) - y^2.\tan^{-1}\left(\frac{x}{y}\right)$ *show that* $\frac{\partial^2 u}{\partial x.\partial y} = \frac{x^2 - y^2}{x^2 + y^2}$

d) If $x = r\cos\theta$, $y = r\sin\theta$, *find* $\frac{\partial(x,y)}{\partial(r,\theta)}$

e) If $x = e^U.\cos V$ *and* $y = e^U.\sin V$ *prove that* $\frac{\partial(x,y)}{\partial(U,V)} X \frac{\partial(U,V)}{\partial(x,y)} = 1$

f) If $u = \tan^{-1}\left(\frac{x^3 + y^3}{x - y}\right)$ *then prove that* $x^2\frac{\partial^2 u}{\partial x^2} + 2xy\frac{\partial^2 u}{\partial x.\partial y} + y^2\frac{\partial^2 u}{\partial y^2} = \sin 4U - \sin 2U$

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

a) Evaluate $L\{\sin 2t.\sin t\}$

b) Find the Fourier constant a_0 for the function $f(x) = e^{ax}$ in $(0,2\pi)$ where $a \neq 0$

c) Evaluate $L\{e^{-t}\cos 2t\}$

d) Evaluate $L^{-1}\left\{\frac{1}{(s+1)^2}\right\}$

e) Evaluate $L^{-1}\left\{\frac{1}{s^2 + 5s + 6}\right\}$

f) Find a_0 for Fourier series expansion for the function $f(x) = x + x^2$ *in* $(-\pi,\pi)$

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

a) Find the inverse Laplace transform of $\frac{1}{(s+2)(s+4)}$ using convolution theorem.

b) Solve the differential equation using Laplace transform. $\frac{d^2y}{dt^2} - \frac{dy}{dt} - 2y = e^{-t}$, $y(0) = -3$ & $y'(0) = 0$

c) Find $L\{t^2 e^{4t}\sin t\}$

d) Find $L^{-1}\left\{\frac{3s+2}{(4s+3)(2s+7)}\right\}$

e) Find $L\{\sin^2(3t).e^{4t}\}$

f) $L^{-1}\left\{\frac{4}{s+3} - \frac{s+2}{s^2 - 2s - 3}\right\}$

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

a) Find a Fourier series to represent $f(x) = x^2$ *in* $(0,2\pi)$ & Hence deduce that $\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + - - - - -$

b) Obtain Fourier series expansion for the function $f(x) = x + \frac{\pi}{2}, -\pi < x < 0$ $= \frac{\pi}{2} - x, \quad 0 < x < \pi$

Hence deduce, $\frac{\pi^2}{8} = \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + - - - -$,

c) Find the Fourier series expansion of $f(x) = x, \quad 0 < x < 1$ $= 1 - x, \quad 1 < x < 2$

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: **THRID** PROGRAM: **CE/ME/IE/E&TC/SM/MT/IT**

COURSE CODE:

MEE313/MTE312/ME214/R228/MG228/ITE312/R228/IEE/ETE312/IX/EJ210/R228/0228

COURSE NAME: **HIGHER MATH'S**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **02/05/2016**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
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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) Evaluate $\left(\frac{\Delta^2}{E}\right)x^2$ *taking* $h=1$

b) Prove that $E\Delta = \Delta E$

c) Prove that $\Delta \log f(x) = \log\left[1+\frac{\Delta f(x)}{f(x)}\right]$

d) If $z=\log(x^2+y^2)$. *find* $\frac{\partial z}{\partial x}$ & $\frac{\partial z}{\partial y}$

e) If $z=x^y$, *then find* $\frac{\partial z}{\partial x}$ & $\frac{\partial z}{\partial y}$

f) If $u=\sin(xy)$, *find* $\frac{\partial^2 u}{\partial x.\partial y}$

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

a) Estimate the missing term in the following table.

x	1	2	3	4	5
y	2	5	7	-	32

b) Express $f(x)=2x^4+x-1$ in factorial notation & find $\Delta^3 f(x)$ *at* $x=1.5$

c) It f(x)is a polynomial of degree 2 in x If f(0)=8, f(1)=12, f(2)=18 then find f(x) using suitable interpolation formula.

d) The following table gives the premium payable for the policy of RS.1000 at age x.

Age	20	25	30	35	40
Premium	23	26	30	35	41

Find the premium, if the policy is taken at the age of 26 years.

e) Find f(1.7), if f(-2)=4, f(-1)=26, f(0)=58, f(1)=112, f(2)=446

f) Using Lagrange's formula, find f(6)

x	3	7	9	10
y	168	120	72	63

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

a) If $z = \sin^{-1}\left(\frac{y}{x}\right)$, *verify that* $\frac{\partial^2 z}{\partial x.\partial y} = \frac{\partial^2 z}{\partial y.\partial x}$

b) If $\sin U = \frac{x^2 y^2}{x+y}$ *show that* $x\frac{\partial u}{\partial x} + y.\frac{\partial u}{\partial y} = 3\tan u$

c) If $u = x^2.\tan^{-1}\left(\frac{y}{x}\right) - y^2.\tan^{-1}\left(\frac{x}{y}\right)$ *show that* $\frac{\partial^2 u}{\partial x.\partial y} = \frac{x^2 - y^2}{x^2 + y^2}$

d) If $x = r\cos\theta,\ y = r\sin\theta,$ *find* $\frac{\partial(x,y)}{\partial(r,\theta)}$

e) If $x = e^U.\cos V$ *and* $y = e^U.\sin V$ *prove that* $\frac{\partial(x,y)}{\partial(U,V)}\ X\ \frac{\partial(U,V)}{\partial(x,y)} = 1$

f) If $u = \tan^{-1}\left(\frac{x^3 + y^3}{x - y}\right)$ *then prove that* $x^2\frac{\partial^2 u}{\partial x^2} + 2xy\frac{\partial^2 u}{\partial x.\partial y} + y^2\frac{\partial^2 u}{\partial y^2} = \sin 4U - \sin 2U$

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

a) Find L(f(t)) by using definition if $f(t) = 3, \quad 0 < t < 5$
$= 0, \quad t > 5$

b) Find $L\left(e^{2+3t}\right)$

c) Find $L\left(\cos^3 2t\right)$

d) Find $L^{-1}\left(\frac{2}{s} + \frac{1}{s^3} + \frac{1}{s^2+4}\right)$

e) Find $L^{-1}\left(\frac{1}{(s-3)^3}\right)$

f) Find $\left(D^3 - 1\right)y = 0$

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

a) Find $L\left(t\ e^t \sin 2t\cos t\right)$

b) Find $L\ \ L\left(\frac{e^{-3t}\sin 2t}{t}\right)$

c) Find by L.T method the value of $\int_0^\infty e^{-3t} t\sin t\ dt$

d) Find $L^{-1}\left(\frac{s+29}{(s+4)(s^2+9)}\right)$

e) Using convolution theorem find $L^{-1}\left(\frac{1}{s(s+4)}\right)$

f) Solve $\frac{d^3y}{dx^3} - 4\frac{d2y}{dx^2} + 5D - 2 = 0$

Q 6) **A)** Attempt Any **TWO** **08**

a) Solve $\left(D^3 - 3D^2 + 4\right)y = 0$

b) Solve $\frac{d^4y}{dx^4} + 6\frac{d^2y}{dx^2} + 9 = 0$

c) Solve $\frac{d^3y}{dx^3} + y = 0$

B) Attempt Any **ONE** **08**

a) Solve by using L.T. Method $\left(D^2 - 3D + 2\right)y = 4e^{2t}$ *given that* $y^x(0) = -3$ *and* $y'(0) = 5$

b) $\left(D^2 - D - 2\right)y = 20\sin 2t$ *given that* $y(0) = 1$ *and* $y'(0) = 2$

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CCE107/X105/E109** COURSE NAME: **ENGINEERING DRAWING-I**

MAX. MARKS: **80** TIME: **4 HRS.** DATE: **29/04/2016**

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) Write Auto CAD command for the following
   i) To draw line of 40mm
   ii) To draw circle of radius 25mm

b) State the applications of parabola.

c) If point B is in the V.P. and 35mm above H.P. Draw its projection.

d) Draw conventions/ symbols for the following.
   i) Long brake line
   ii) Center line

e) A 2cm long line on a drawing represents a distance of 1 meter calculate Representative Fraction (R.F)

f) State the uses of the following drawing instrument.
   i) Set squares
   ii) French curves.

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

a) Construct parabola by rectangle method, given the base 100mm and height 70mm.

b) Draw direct (external) common tangent to two unequal circles of radius 25mm and 35mm respectively. The distance between the centers of two circles is equal to 100mm.

c) A string is unwound from a circle of 30mm radius. Draw the Involute of a circles the end of a string for unwinding the string completely. String is kept tight while being unwound.

d) The length of the top view of line parallel to VP and inclined at 45^0 to the H.P is 50mm. One end of the line is 12mm above the HP and 25mm in front of V.P. Draw the projection of the line and determine its true length.

e) Construct an ellipse by Arcs of circle method, given the major axis and minor axis 80mm and 50mm respectively.

f) The distance between end projections of a line PQ 100mm long is 80mm. The line is parallel to H.P. The end P is 15mm above H.P and 35mm in front of V.P Draw projections of line PQ and find inclination with V.P.

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

a) Draw a cycloid of a circle of 50mm diameter.

b) Construct and Archemedian spiral for one convolution, given the greatest and least radii being 70mm and 15mm respectively.

c) A straight line AB 60mm long makes an angle of 55^0 to the H.P and 25^0 to the V.P The one end of the straight line AB is in the H.P and 20mm in front of V.P. Draw the projection of line AB.

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

a) An isosceles triangle of base 30mm and attitude 50mm is having its base on H.P. plane is perpendicular to V.P and is inclined to H.P. in such a way that top view appears to be an equilateral triangle. Draw three views of plane.

b) A circular plate of diameter 60mm is resting on the V.P on a point of its circumference. The plate is inclined to V.P. in such a way that the elevation length of diameter (minor axis) passing through the point on V.P is 35mm, The plate is perpendicular to H.P. Draw its three views of the plate.

c) A pentagonal plate of 30mm side is resting on one of the side on H.P such that plate is inclined at 40^0 with H.P. and perpendicular to V.P. The center of plate is 50mm from V.P. draw its three views.

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

a) A pentagonal prism having base side 30mm and axis 60mm long is resting on H.P on one of its base edge. Draw the projections of prism if the face containing that edge makes an angle of 60^0 with the H.P and its axis is parallel to V.P.

b) A cylinder having its base diameter 40mm and axis length 60mm is kept on the V.P on a point of its base circle such that its axis is inclined to V.P at 30^0 and parallel to H.P. Draw the projections of the cylinder.

c) A square pyramid side of the base 30mm and height 50mm is resting on its base with one of the sides of the base perpendicular to the V.P. It is cut by on AIP inclined at 45^0 to the H.P. in such a way that it bisects the axis. Draw F.V. sectional T.V. and true shape of section

i)	F.V.	(02 Marks)
ii)	Sectional T.V.	(02 Marks)
iii)	True shape	(04 Marks)

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

a) A right circular cylinder of 60mm base diameter and axis 100mm long is resting on the ground on its base. It is cut by a section plane perpendicular to V.P. and inclined to H.P (or ground) in such a way that the true shape of section is an ellipse having major axis 80mm. Draw

i)	Front view	(02 Marks)
ii)	Sectional Top view	(02 Marks)
iii)	True shape of section	(04 Marks)

b) A cone of base diameter 40mm and axis length 50mm is kept on the H.P. on its base. It is cut by an AIP inclined at 45^0 to the H.P. and passes through a point on the axis 30mm above the base. Draw

i)	Front view	(02 Marks)
ii)	Sectional Top view	(02 Marks)
iii)	True shape of section	(04 Marks)

c) A cone of base diameter 40mm and axis length 60mm is kept on the V.P. on a point of its base circle such that its axis inclined to V.P. at 30^0 and parallel to H.P. Draw the projections of cone.

Stage I	i) F.V	(01 Marks)
	ii) T.V	(01 Marks)
Stage II	i) F.V	(03 Marks)
	ii) T.V	(03 Marks)

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **CEE506/CE401/C401/1401**

COURSE NAME :- **IRRIGATION ENGINEERING**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **04 / 02 / 2016**

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 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) Define i) irrigation ii) irrigation engg.
b) Define i) CCA ii) GCA.
c) Write down necessity of percolation tank.
d) What is the importance of irrigation?
e) Define duty.
f) What are the advantages of Bundhara irrigation?

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

a) What are various types of irrigation projects? Explain in brief.
b) Draw neat sketch of K.T weir. Show all components. Write down its construction procedure.
c) What are the various factors affecting runoff?
d) Explain in brief drip irrigation method with neat sketch.
e) Draw layout of typical Bandhara irrigation scheme. State its design principles.
f) What are the methods of determining yield of wells? Explain in brief.

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

a) The rainfall data over a catchment is as given below

Year	1981	1982	1983	1984	1985
Rainfall in mm	950	1150	1200	1325	1175
Year	1986	1987	1988	1989	1990
Rainfall in mm	1225	1315	1250	1370	1205

Size of catchment area = 50 Sqm.
Coeficient of runnoff =0.60
Calculate the yield of the catchment at 60% dependability

b) What are the various factors affecting on duty? Explain in brief.
c) Calculate the discharge required of the head of the distributory from the following
Culturable irrigation area = 80% of gross area.
Intensity of irrigation = 50% for Rabi
Intensity of irrigation = 25% for Kharif.
Average duty of head of distributory = 200 ha/camec for Rabi
Average data at the head of distributory = 900 ha/cumec for Kharif

P.T.O.

d) Draw neat sketch of percolation tank. Show all component parts and state factors require to be considered for selection of site for percolation tank.
e) State advantages and disadvantages of lift irrigation scheme
f) Draw labelled layout of a lift irrigation scheme. Mention functions of each parts.

Section – II

Marks

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

a) Define i) Carryover ii) Storage.

b) What is area capacity curve?

c) Enlist the different forces acting on a gravity dam.

d) What is drainage gallery?

e) Define level crossing.

f) Define super passage.

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

a) Name and define storage between different control levels and state their effects.

b) Differentiate between theortical and practical profile of a gravity dam.

c) What are the types of earthen dam?

d) Draw labelled diagram of canal cross section in cutting.

e) Write four advantages of canal lining.

f) What is aqueduct? State the conditions where it can be used.

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

a) Fix the F.R.C. of a dam from the following data
i) D.S.L. = 110.00m ii) Effective live storage = 8000m^3. iii) Tank losses = 1500m^3.

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

Assume any other data of required.

b) Enlist the commonly used construction material for earthen dam.

c) State any four purposes of providing drainage gallery in gravity dam.

d) State suitability of any four types of spillway.

e) Classify various types of cross-drainage works.

f) Write any four requirement of canal outlet.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **CEE504/CE402/C402/1402**

COURSE NAME :- **CONSTRUCTION MANAGEMENT**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **28 / 04 / 2016**

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 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 four pre-tender stage activities.

b) Define management.

c) Write any four desirable qualities of leader.

d) What is meant by free float?

e) Write any two limitations of Bar chart.

f) What is importance of organization in various firms?

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

a) Explain the responsibilities of architect in construction work.

b) Explain controlling as function of management.

c) Explain the importance of motivation.

d) Compare CPM & PERT with respect to four points : defintion, areas of application, significance and example.

e) "Planning work is the most important of the functions of the supervisor". Explain.

f) State the advantages and disadvantages of line organization.

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

a) i) State any eight duties of an engineer.
ii) State four disadvantages of co-operative societies.

b) i) Enlist principles of the management.
ii) Why scientific management is essential?

c) i) What are the advantages of PERT?
ii) What are the advantages of Network over bar chart?

P.T.O.

	Section – II	Marks
Q.4	Attempt any **FOUR**	(08)

a) State the two important aims of work-study.

b) What do you mean by JIT and ERP?

c) State the advantages of good site layout,

d) What are the direct and indirect costs related to the accident?

e) What do you mean by skilled and unskilled labours at construction site?

f) Draw any four symbols used in process chart prepared in motion study.

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

a) Write a short note on work-study.

b) Explain in brief the modern techniques adopted in material management.

c) Explain in brief various training methods for skilled (craftsmen) workers.

d) Write a short note on Minimum wages act.

e) State the points to be considered for preparing a good site layout.

f) Write a short note on safety programme.

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

a) Explain in brief the steps or procedure involved in time study (work measurement).

b) Explain in brief the main causes of accident at construction site.

c) Write a short note on functions of the material manager.

d) What do you mean by motion study? State its advantages.

e) State the functions of personal management.

f) What are the various labour welfare activities?

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CCE103/X103/X109/R105/R106** COURSE NAME: **ENGINEERING CHEMISTRY**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **28/04/2016**

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) Why inert gases are monoatomic in nature?

b) Write the orbital electronic configuration of ${}_{7}N^{14}$, ${}_{16}S^{32}$

c) Define i) Degree of ionization ii) Electro refining.

d) Define corrosion mention two types of corrosion.

e) Distinguish between hard water & soft water (any two points)

f) Define p^H. What is the p^H of extremely acidic & extremely alkaline solution?

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

a) Give the four assumptions of Bohr's Atomic theory.

b) Distinguish between electrovalent & covalent compound.

c) Describe the process of silver plating on iron spoon.

d) State and explain the type of impurities present in natural water. Name the process for the removal of these impurities.

e) Explain the disadvantages of hard water in cooking & washing use.

f) State & explain four causes of scale formation in boiler.

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

a) When same amount of current was passed through the solution of copper sulphate & zinc sulphate 0.7gm & 0.7164gm of copper & zinc get deposited on cathodes. If atomic weight of copper is 63.5. Calculated equivalent weight of Zn.

b) Describe electrolysis of $CuSo_4$ solution by using copper electrode.

c) Name & explain the method used for coating on large & irregular shape of articles for prevention of corrosion.

d) Define atmospheric corrosion. Explain two factors affecting atmospheric corrosion.

e) Draw the diagram. Give two chemical reactions in regeneration of ion exchange process.

f) Define sterilization of water. Explain with reactions use of bleaching powder.

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

a) Name the products of blast furnace. Give the composition of one product.

b) What is flash point and fire point of a lubricant?

c) Give two properties and two uses of glass wool.

d) What is vulcanization of rubber?

e) What are composite materials? Give its types.

f) Give the chemical composition of Portland cement.

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

a) What is nonferrous alloy? Give the composition, properties and uses of a) Duralumin b) Monel metal.

b) Give the reactions in heat absorption zone of blast furnace.

c) Name and explain the lubrication used for delicate machine parts.

d) Define paint. Give the functions of paints.

e) Give the reactions of setting and Hardening of cement.

f) Give four properties and uses of rubber.

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

a) Give the difference between calcinations and Roasting process.

b) What is ferrous alloy? Give the composition, properties and uses of i) Heat resisting steel ii) Magnetic steel.

c) Define lubricant. What are the functions of lubricant?

d) Name the drying oil and thinner added in paint. Give its functions.

e) What is thermocole? Give the properties and uses of thermocole.

f) What us addition polymerisation? Explain with examples.

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(3)

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: FIFTH PROGRAM: CIVIL ENGINEERING

COURSE CODE:CEE510/CE407/C413/1412 COURSE NAME: WATERSHED MANAGEMENT

MAX. MARKS: 80 TIME: 3 HRS. DATE: 27/04/2016

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 meant by evapotranspiration?

b) Define the term-watershed.

c) What is meant by scheduling of irrigation?

d) Define the term-delta

e) What is sprinkler irrigation?

f) State the components of drip irrigation.

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

a) State the benefits of watershed management.

b) Explain the importance of soil survey.

c) State any four characteristics of black soil.

d) State any four objectives of watershed management.

e) In relation to irrigation explain the term-infiltration.

f) Write note on hygroscopic water.

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

a) State any four characteristics of laterite soil.

b) State any eight factors affecting consumptive use of water.

c) Water shall be applied at right time in right quantity to the crops-Justify the statement.

d) Define the terms i) base period ii) duty.

e) State any four advantages of sprinkler irrigation.

f) State the components of sprinkler irrigation. Explain any one in detail.

P.T.O.

Marks

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

a) State the different pipes used for pipe line system for on farm irrigation.

b) What is land leveling?

c) Which equipments are used for land leveling?

d) What is recharge well?

e) What is bore hole?

f) What is betterment levy?

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

a) What are different water supply facilities available for on farm irrigation?

b) Why is it necessary of disposal of excess water?

c) What are different methods for disposal of excess water?

d) What are different structures built for conveyance of water.

e) What are different construction works carried for leveling?

f) What are benefits of land leveling?

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

a) What are different surveys carried for land leveling?

b) Write short note on watershed development.

c) What are different recharge structures.

d) Which engineering works are involved in watershed development?

e) Which study is required for watershed development.

f) Write down the organizational set-up for irrigation Dept. in state of Maharashtra.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: **FIFTH** PROGRAM: **CIVIL EINGINEERING**

COURSE CODE: **CEE509/CE408/C414** COURSE NAME: **SOLID WASTE MANAGEMENT**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **27/04/2016**

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) Define the terms "solid waste".

b) What do you mean by "Toxic waste"?

c) Name any four typical Hazardous waste.

d) State any two precautions while handling hazardous wastes.

e) Enlist various types of Hospital wastes.

f) How hospital wastes are collected?

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

a) What do you mean by solid waste management? What are the different sources of solid waste?

b) Give the complete classification of solid waste.

c) Enlist and explain the factors affecting the generation of solid waste.

d) Explain in brief " storage of municipal waste"

e) Describe in brief " collection of domestic and trade waste"

f) Enlist the various transportations equipments used for transportation of solid waste with their suitability.

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

a) What do you mean by 'Transfer stations'? What is its necessity? How its location is decided?

b) What do you mean by 'segregation of solid waste and salvage recovery in solid waste management?

c) What are core should be taken to preserve the health of workers who involved in handling and processing of solid waste.

d) How the hospital waste is disposed off?

P.T.O

e) Explain in brief about 'storage of hospital infectious waste'.

f) State the need of public involvement and participation in solid waste management.

Section – II **Marks**

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

a) Define Leachate.

b) Write the meaning of composting.

c) Define pyrolysis.

d) Define vermicomposting.

e) What is meant by industrial waste?

f) Write two advantages of trench method of landfilling.

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

a) Write various methods of land filling. Explain one of them.

b) Compare Bangalor method with Indore method

c) Explain municipal incinerator with sketch.

d) How are the following industrial waste recycled or reused?

i) Flyash

ii) Red mud

iii) Blast furnace slag

iv) Pulp & paper.

e) Explain various factors affecting process of composting.

f) Write advantages and disadvantages of incineration.

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

a) Write benefits of composting.

b) Define incineration. Explain incineration with respect to need & process.

c) Explain four 'R' in waste management.

d) Explain mechanical composting.

e) Write the precautions are taken by industries to control generation of industrial waste.

f) Enlist advantages and disadvantages of landfilling methods.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.
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EVEN TERM END EXAM APRIL/MAY -2016
EXAM SEAT NO. | | | | | | |

LEVEL : - **FIRST** PROGRAM : **COMMON**
COURSE CODE :- **CCE110/X111/R112/0116**
COURSE NAME :- **APPLIED MECHANICS**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **26 / 04 / 2016**

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 equilibrium and state the relation between resultant force and equilibrant force.
b) State principle of Transmissibility.
c) Define Resolution of force.
d) State graphical conditions of equilibrium for parallel force system.
e) Define angle of repose.
f) If angle of repose is 30^0, calculate coefficient of friction.

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

a) A force of 100KN makes an angle of 135^0 with the horizontal. Find its orthogonal components.
b) Calculate the total moment about point 'A' for the force system shown in fig.
c) Find resultant force of concurrent force system graphically.
d) Find support reaction of a given beam as shown in figure by analytical method.
e) A body resting on a rough horizontal plane is on the point of moving by a pull of 22N acting 30^0 inclined to horizontal. Find the weight of body and coefficient of friction.
f) A body of weight 400N is placed on plane inclined at an angle of 18^0 with the horizontal. If $\mu = 0.27$, find the value of the force to be applied parallel to the plane just to move the body up the plane.

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

a) Two point loads are acting on beam as shown in fig. The self weight of beam is 2 KN/m. Using graphical method. Find support reactions.
b) A sphere of diameter 1.2m and weighing 1800N rest against two smooth planes inclined at 60^0 and 45^0 respectively. Determine reactions offered by the planes.
c) Determine analytically, the resultant of coplanar parallel forces acting vertically upwards. 40N, 20N at 30mm, 30N of 50mm and 60N at 70mm. All distances are taken from first force towards right.

PTO

d) Four forces 20N, 15N, 30N and 25N are acting at 0^0,60^0,90^0 and 150^0 from X-axis taken in order. Find resultant by analytical method.

e) Two concurrent forces of magnitude 100N have their resultant as 100N. Calculate the angle between the forces.

f) Explain Law of frictions.

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

a) Define centriod of plain figure.
b) State or locate the centre of semicircle and semisphere.
c) State law of conservation of momentum.
d) State Newton's 1st law of motion.
e) State equation for angular motion and given meaning of each term.
f) Define power and its S.I. unit

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

a) Find the centre of gravity of an equal angle section 100 X 100 X10mm and locate on figure.

b) Find the centriod of shaded area as shown figure.

c) A body falling freely under gravity passes two points 9m aparts vertically in 0.2sec. Find from what height above the upper point did it start to fall?

d) A bullet weighing 3N leaves the barrel of a rifle with a muzzle velocity of 750m/s. If the length of parallel is 100cm. Find the impulse and impulsive force.

e) A particle is rotating at 300 RPM. If the radius of rotation is 1.5m calculate i) angular Velocity ii) Linear velocity.

f) The shaft of an electric motor rotates at 1500 rpm at a particular instant. In 8 second the speed uniformly decreases to 500 rpm. Find the angular retardation.

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

a) How many litres of water can be raised in 10 minutes to a height of 30m by means of pump of 2.5KW power and efficiency 80%?

b) Water having volume of 1500 liters is lifted to a height of 6m and is delivered at velocity of 4m/sec. What is the energy possessed by water?

c) A machine having following observation. Find the law of machine.

Load (N)	100	200	300	400	500	600
Effort (N)	10	18	25	28	33	39

d) For a lifting M/C UR=50.6. An effort of 90N lifts load of 1800N and an effort of 135N requires a load of 3150N. Determine law of M/C and Maximum efficiency of machine.

e) Define i) Mechanical Advantages ii) Velocity Ratio
iii) Efficiency iv) Reversible machine.

f) Draw the nature of graphs for a lifting machine.
i) Load Vs effort ii) Load Vs idea effort. iii) Load Vs Mechanical Advantage
iv) Load Vs effort lost in friction.

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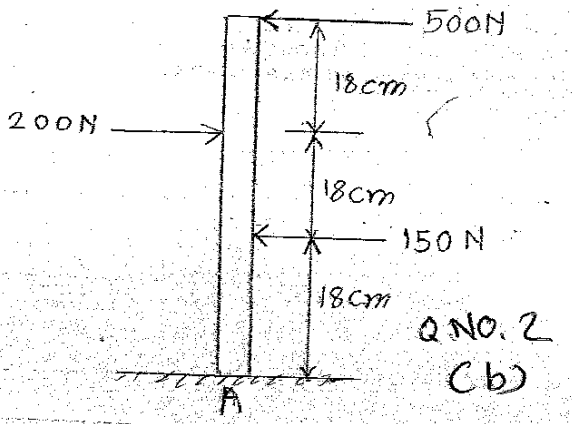
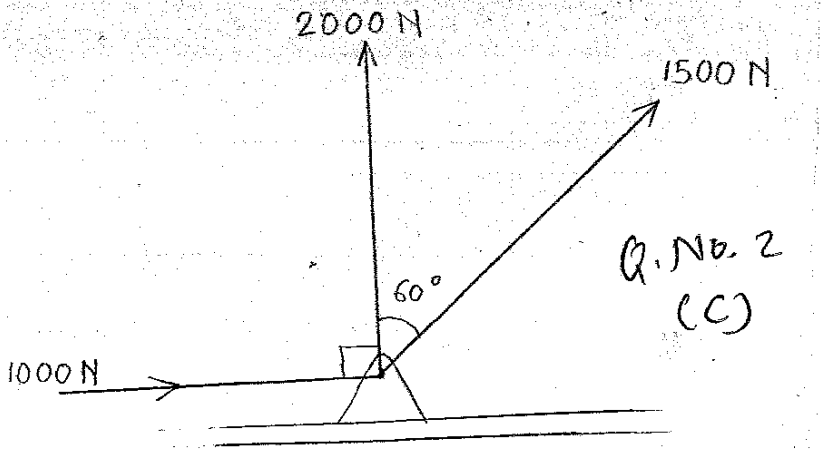
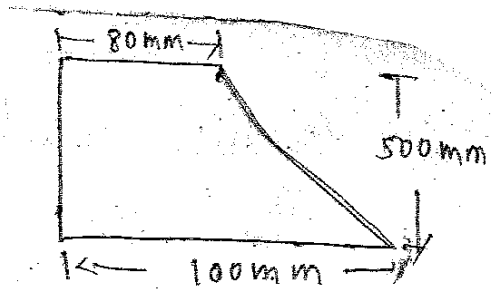


Q No. 2
(b)



Q. No. 2
(c)



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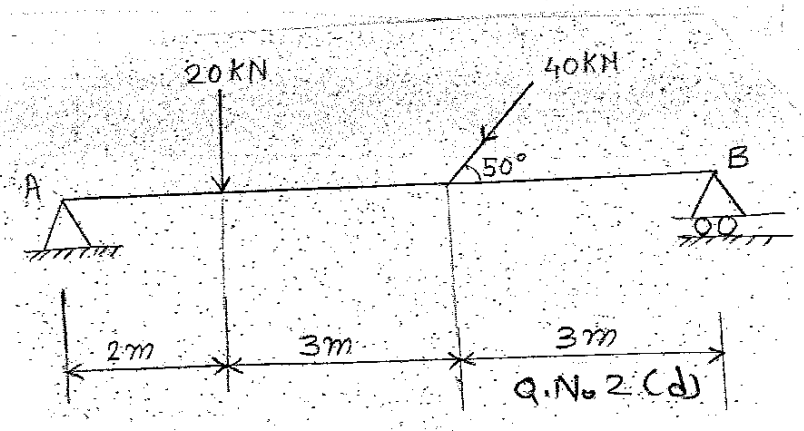
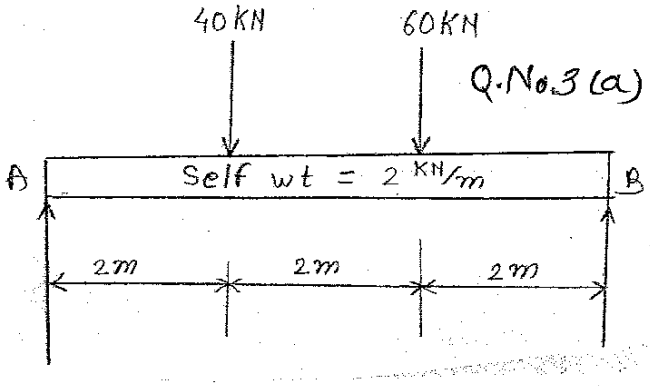


Q. No. 2 (d)



Q. No. 3 (a)

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEE311/CE211/C211/1211**
COURSE NAME :- **ADVANCE CONSTRUCTION TECH. & EQUIPMENT**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **26 / 04 / 2016**

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) State any two advantages of prestressed concrete.

b) Define ready mix concrete.

c) Enlist any four grades of concrete.

d) Define tremix concreting.

e) Define grouting.

f) State any two necessities of grouting.

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

a) State the meaning of the term pretensioning and posttensioning.

b) Draw a neat labeled sketch of tremix method of underwater concreting.

c) List the equipments required for grouting and explain any one.

d) Draw a neat sketch of slope stabilization in cutting.

e) State any four uses of slip formwork in high rise building construction.

f) State the necessities of formwork.

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

a) Explain the working of transit mixer.

b) Explain procedure of roller compacted concrete.

c) Enlist any four uses of grouts in building.

d) Explain slope stabilization in embankment by soil reinforcing.

e) Explain in short maivan formwork.

f) State any four types of formworks used in advance construction techniques.

P.T.O.

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

a) Enlist any four types of conveying equipments.

b) List any two factors affecting output of bulldozers.

c) State any two uses of Rammers.

d) List the equipments used for producting of artificial sand.

e) State any two uses of concrete vibrators.

f) Define standard equipment.

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

a) Draw a neat sketch of Gantry Crane & Explain its working.

b) State the different types of Trucks and explain its suitability.

c) Draw a neat sketch of power shovel and explain its working.

d) State the different types of Rollers and explain any one.

e) State the various types of stone crushers and explain any one.

f) Explain in detail working of hot mix bitumen plant.

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

a) Draw a neat sketch of tower Crane and explain its working.

b) Draw a neat sketch of Dragline and explain its cycle of operation.

c) Explain the working of a scraper.

d) Draw a neat sketch of tilting mixer and explain its working.

e) Describe in detail any two equipments used for transportation of concrete.

f) Explain in detail how maintenance of equipment is carried out?

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **CEE505/CE403**

COURSE NAME :- **ENVIRONMENTAL ENGINEERING**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **25 / 04 / 2016**

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 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) Define 'Design Period' and 'Detention Period'.

b) State the demands of water.

c) What is meant by per capita demand?

d) Name any four types of pipe joint.

e) Write two objects of sedimentation.

f) Write two requirements of good disinfection.

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

a) Compare gravity system with pumping system of water distribution.

b) Describe cascade aeration method with neat sketch.

c) Explain principle of coagulation. Write name of commonly used coagulants.

d) Enlist the various methods of population forecasting and explain any one method by assuming suitable data.

e) Explain with sketch Rapid Sand Gravity filter.

f) Define disinfection. Write various methods of disinfection

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

a) Explain with sketch 'Dorr clarifier'

b) Explain the methods of testing of pipes for water tightness.

c) State various sources of water. Comment about its quantity and quality.

d) What do you mean by wholesome water? State the requirements of wholesome water.

e) Draw a typical layout of water treatment plant.

f) Why valves are provided in pipeline? Name different values.

P.T.O.

Section – II	Marks

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

a) Define the terms i) Sullage ii) Night soil.

b) What do you mean by 'House drainage system'?

c) Define 'Trap'. State its function.

d) What do you mean by 'Self cleansing Velocity'?

e) What do you mean by 'Dry weather flow'?

f) Define 'BOD'.

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

a) Enlist and explain the principles of sanitation.

b) State any eight principles of House drainage.

c) Enlist the various plumbing systems of drainage and explain one pipe system with labeled sketch.

d) Enlist and explain the methods of collection of solid waste.

e) Define the term ' Hazardous waste'. How they are classified?

f) State the meaning of 'conservancy system' and state its three advantages and three disadvantages.

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

a) Draw the labeled sketch showing plan and longitudinal section of septic tank and describe its working.

b) Enlist the various systems of sewerage and explain 'combined system' with any two advantage and two disadvantage.

c) Describe the process of 'Aerobic Decomposition'.

d) State any four objects of sewage treatment.

e) Draw the flow diagram showing 'activated sludge process' and describe its working.

f) What do you mean by primary treatment of sewage? State the units provided for primary treatment and write purpose of each.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: THIRD PROGRAM: CIVIL ENGINEERING

COURSE CODE: CEE303/CE202/C202/1203 COURSE NAME: BUILDING DRAWING

MAX. MARKS: 80 TIME: 4 HRS. DATE: 25/04/2016

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) Enlist any two purposes of drawing.

b) Give symbols of i) concrete ii)wood

c) Enlist various types of drawings.

d) What is the concept of working drawing

e) Define Floor area.

f) Enlist any two Roles of structural Engineer in Building construction.

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

a) Explain any four types of lines used in civil engineering drawing.

b) Define i) Floor area Ratio ii) Height of Building in case of flat Roof

c) Explain role of i) supervisor ii) Quantity surveyor

d) Explain aspect principle of building planning.

e) Give minimum/standard dimensions of following units.

i)W.C. ii) Bath ii) Plinth Height iv) Garage Height.

f) Enlist various units required for planning of post office Building. Also mention standard width and height of counter.

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

a) Draw to suitable scale line plan of a single stored primary school Building of 360 students intake assume each class of 60 students capacity.

b) Explain concept of one point and two point perspective with suitable examples for both cases.

c) Draw the two point perspective to a suitable scale for the object shown in figure Number 1. Assume eye level at 1.5 mt above ground level. The observer stands at distance of 4.0 mt along central visual ray. Retain all construction lines.

P.T.O.

Q.4 Fig shows a Line plan of residential building. Draw to a suitable scale the following views.

a) Developed plan **15**

b) Section along AB **10**

c) Elevation **06**

d) North direction **02**

e) Schedule of door & windows **07**

Use following construction details.

a) Plinth height = 650 mm

b) Height of bottom slab from floor = 3450 mm

c) Thickness of slab = 150 mm

d) All walls of BBM 230 mm thick except WC & Bath & 115 mm thick.

e) The height of slab on WC & bath is 2200 mm

f) The structure is load bearing type structure.

g) Assume suitable data if required.

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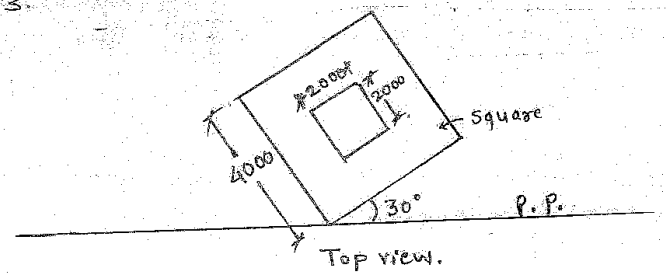
9.3) 3.

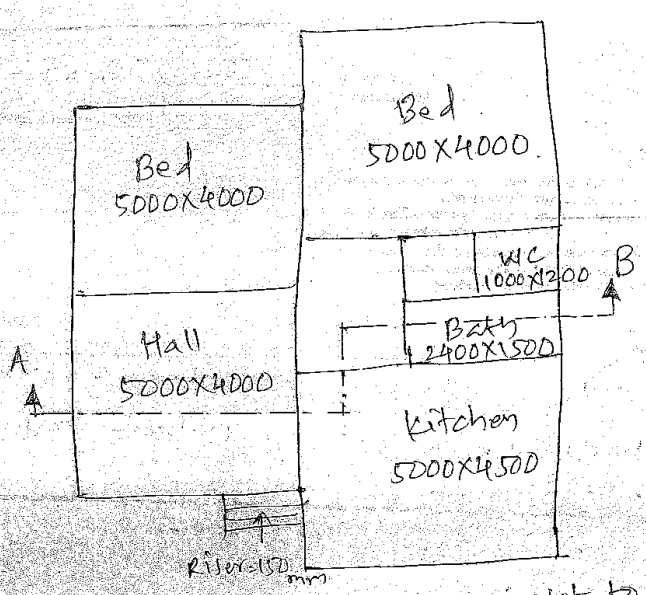


Top view.

Elevation

Figure No. 1 all dimensions in mm, Figure N.T.S.

9.4)



Not to scale.

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE:**CEE403/CE309**

COURSE NAME: **DESIGN & DRAFTING OF STEEL STRUCTURE**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **06/05/2016**

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) Define limit state. State types of limit states.

b) Write values of four physical properties of steel.

c) Write four advantages of welded connections.

d) Enlist various modes of failure for bolted connections with sketch.

e) Enlist two types of hot rolled Indian standard steel sections. Write meaning of ISMB 300 and ISLC 250

f) Check ISA 100 x 75 x 8 mm for local buckling.

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

a) Draw two views of a beam-to-beam bolted connection.

b) Tension member of a truss consists of an ISA 65,65,6mm bolted to Gusset plate 8 mm thick. Design the joint to transmit an axial factored load of 170KN. Assume 16 mm bolts.

c) Two ISA 80,50,6 mm placed back to back and connected on opposite sides of 8 mm thick gusset plate with 16 mm bolts. Find number of bolts required if it carries a factored axial force of 106 KN.

d) Show with sketch single and double lacing system for built-up column, in which channel sections are placed facing each other.

e) Write four advantages and four dis-advantages of steel structures.

f) An ISA 150x 75 x 10 mm is connected to 12 mm gusset plate with 3 bolts of 20 mm diameter. Calculate values of Avg, Avn, Atg and Atn if gauge distance is 100 mm.

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

a) Calculate the strength of discontinuous strut of length 3.20m. The strut consist of two unequal ISA 100 x 75 x 8 mm with long legs connected and placed on Opposite sides of gusset plate.

For ISA 100 x 75 x 8,

$I_{xx} = 131.6\ cm^3$

$A = 13.36\ cm^2$

$C_{xx} = 3.1$ cm, $C_{yy} = 1.87$ cm

b) An ISA 90,60,8 mm is connected to 10 mm gusset plate to act as tension member as shown in fig.(1) Find Tdb_1 and Tdb_2. Also write it's Block shear strength.

Slenderness ratio	70	100	140	180	220
f_{cd} (MP_a)	152	107	66.2	43.6	30.6

c) i)Draw typical stress –strain graph of mild steel. Label all important points in it.

ii) State IS : 800-2007 recommendations for maximum & minimum values of pitch & edge distance for bolted connection.

P.T.O.

Section – II

Marks

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

a) Enlist four varieties of steel beams.
b) Enlist two modes of restraining the flange of beam laterally.
c) State two differences between slab base & gusseted base.
d) Define and illustrate with a diagram a redundant frame.
e) Classify ISMB 300.
f) Draw a diagram showing compound fink truss.

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

a) A simply supported beam has span 6.8 m. It is subjected to ultimate load of 20 kN/m over active span. Design the beam for flexure. Check for shear & deflection not required. Select section from Table below.

Section	Z_e (cm^3)	b_f (mm)	t_f (mm)	t_w (mm)	h_1=d (mm)
ISMB 250	410	125	12.5	6.9	199
ISMB 300	599	140	13.1	7.7	245.8
ISMB 350	779	140	14.2	8.9	293.6

b) Design suitable slab base for a column ISHB 450 to transfer an ultimate load of 900 kN. Bearing capacity of soil is 350 kN/m^2. Concrete of grade M10 is used. b_f= 250 mm. Draw diagram showing design details.
c) i)Draw two-views of a gusseted base. Label the components.
ii) Draw diagram showing details of joint at roofing material, purlin & roof truss.

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

a) Determine critical panel point wind load for Pratt trusses of span 20m, spaced 2.8 m. take basic wind speed as 28 m/s. $k_1=k_2=1$, $k_3=0.9$. C_{pi} = ± 0.5, C_{pe} = -0.6 for wind parallel to ridge & C_{pe} = -0.6 (windward), -0.4 (leeward) for wind perpendicular to ridge. Show loads in a diagram.
b) For the beam in Q.5 (a), assuming ISMB350 as the section, apply check for i) Shear ii) deflection. I_{xx}= 12630.3 cm^4 E= 200 GPa.
c) Enlist components of a plate girder. Draw cross section & L-section of a welded plate girder & label its components.

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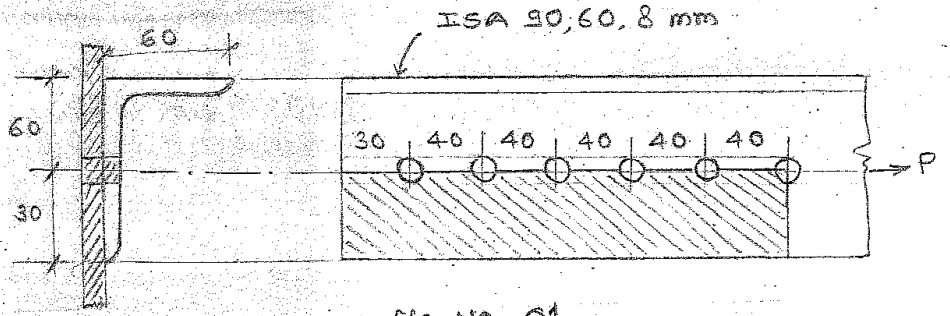

Fig. NO. 01

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EVEN TERM END EXAM APRIL/MAY. -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **SECOND** PROGRAM : **COMMON**
COURSE CODE :- **CCE202/0101/0102**
COURSE NAME :- **COMMUNICATION SKILL**
MAX. MARKS : **40** TIME : **2 HRS.** DATE :- **06 / 05 / 2016**

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) Draw a well labelled diagam illustrating the process of communication.

b) Enlist any four examples in which written communication is used.

c) Enlist four advantages of oral communication.

d) Explain two principles of effective written communication.

e) Define Haptics.

f) Enlist any four advantages of OHP.

Q.2 Attempt any **FOUR** (Answer the following question in 12-14 sentences) (16)

a) State i) Mechanical Barrier ii) Organizational Barriers.

b) Explain with sutiable example i)Upward communication.ii)Horizontal communication.

c) Enlist four tips for prepared speech.

d) State any four precautions one should take when making a presentation.

e) State and explain any four interview techniques.

f) State the guidelines on preparing presentation i) Thinking about audience ii) Good slide show design.

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

a) Explain types of communication. i) Verbal- Non-verbal ii) Oral – Written.

b) Following is the opinion of 100 parents about the new pattern of board exam of students X. In this problem the data is given in %.

i) In favour of new pattern – 60 ii) Against new pattern – 30 iii) No comments -10

Prepare a pie-chart.

c) Write an application along with your resume to Modern Automobile Factory, Pune-8 for the post of Junior Engineer.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CEE306/CE304/C305/1305** COURSE NAME: **HYDRULICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **07/05/2016**

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 viscosity and surface tension.

b) Differentiate between ideal fluid and real fluid.

c) State the Pascal's law.

d) A diver works at a depth of 100m below the sea surface (specific gravity 1.1). Find pressure intensity at this depth.

e) Define pressure and center of pressure.

f) Differentiate between steady flow and unsteady flow.

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

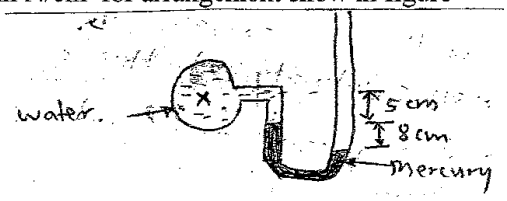
a) A liquid weights 20KN and occupies 3.95m^3. Find its specific weight, mass density and specific gravity.

b) Convert i) 15 N/cm^2 in meters of water.
ii) 3.5 m of mercury in N/m^2

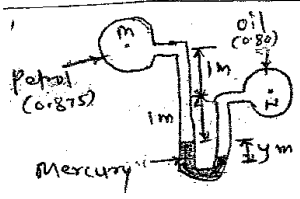
c) Find intensity of pressure in N/m^2 at base of container when oil of specific gravity (0.85) stands for 0.625m on water of 1m height. Draw the pressure diagram for given case.

d) Define the terms- uniform flow, laminar flow, turbulent flow, discharge.

e) Find pressure at 'X' in N/cm^2 for arrangement show in figure



f) Two pipes M and N contain petrol of specific gravity 0.875 and oil of specific gravity 0.80 respectively. A differential mercury manometer is connected to pipe as shown figure. Find difference of mercury levels (y) if pressure difference between N and M is 5 N/cm^2



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

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

b) An isosceles triangular plate of 3m base and 3m height immersed vertically in water such that its base is at depth of 4.5m from free surface. The apex of plate is vertically below its base. Determine total pressure and center of pressure.

P.T.O.

c) An partition wall 4m long divides storage tank. On one side, there is oil of specific gravity 0.80 upto 2.5m depth. On other side, there is turpentine of specific gravity 0.87 upto depth of 1.5m. Determine resultant pressure and there position on partition wall.

d) State Bernoulli's theorem. Give their mathematical equation form. Give the assumptions involved.

e) A horizontal pipe carrying water tapers from 20cm diameter at A to 10cm diameter at B in a length of 2m. The pressure at A is 100 N/cm^2. If discharge is 600 lit/min. Calculate pressure at B in N/cm^2 if loss of head from A to B is 10cm.

f) A pipe 300m long has slope 1 in 100 and tapers from 1.2m diameter at higher end to 0.60m diameter at low end. The discharge of water following through pipe 900 lit/sec. The pressure at high end is 7 N/cm^2 and that at low end is 11 N/cm^2. Determine direction of flow and loss of head.

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

a) What is nomogram?

b) What is wetted perimeter? Draw sketch.

c) What us most economical section?

d) What is float?

e) What is delivery head in case of pump?

f) How H.P of a pump is calculated?

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

a) Find the loss of head due to friction in a pipe of 1 meter diameter and 15 kilometers long, the velocity of water in the pipe long. The velocity of water in the pipe is 1m/s. take coefficient of friction as 0.005.

b) Two reservoirs are connected by three pipes laid in parallel, their diameters are d, 2d & 3d respectively & they are of the same length 'l'. Assuming 'f' to be the same for all pipes, what will be the discharge through each of the larger pipes, if the smallest pipe is having discharge of $1m^3$/sec.

c) A compound pipeline 1650m long is made up of pipes 45cm diameter for 900 meters, 37.5cm for 450 meters & 30cm for 300 meters is required to be replaced by a pipe of uniform diameter. Find the diameter of the new pipe, assuming the length to remain the same.

d) Write the expression for minor losses in pipe flow for sudden contraction sudden expansion, for bend, & for exit of a pipe.

e) Water at the rate of 0.1 m^3/s through a 1 m diameter verified sewer pipe is half full. Find the slope of the water if Manning's N is 0.013.

f) A trapezoidal channel with side slopes of 1 to 1 has to be designed to convey 10 m^3/s at the velocity of 2 m/s so that the amount of concrete lining for the bed & sides is the minimum. Calculate the area of lining required for 1m length of the canal.

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

a) An open channel of most economical channel section having the form of a half hexagon with horizontal bottom is required to give a maximum discharge of $20.2m^3$/s of water. The slope of the channel is 1 in 2500. Taking Chery's constant C=60, determine the dimensions of the cross section.

b) What is pitot tube? State how it works with formula.

c) What is notch? State its types.

d) A rectangular constant notch 2.5m meters wide has a constant head of 40cm. Find the discharge over the notch in lit/sec, if coefficient of discharge for the notch is 0.62.

e) A horizontal venturimeter 160mm x 80mm used to measure the flow of an oil of specific gravity 0.8. Determine the deflection of the oil mercury gauge, if the discharge of the oil is 50 lit/sec.

f) A centrifugal pump is required to lift water against a total head of 40m at the rate of 50 lit/sec. Find the horse power required of the pump if efficiency of pump is 62%

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM APRIL/MAY. -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEE310/CE208/C208/1208**
COURSE NAME :- **TRANSPORATION ENGINEERING**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **09 / 05 / 2016**

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) Give importance of transportation Engg.
b) Write down objects of camber (any two)
c) Define overfalsing sight distance.
d) Define i) Flexible Pavement. ii) Rigid Pavement.
e) Give any two advantages of tunnel.
f) What do you mean by shaft?

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

a) Explain superelevation with its neat sketch. Give its objects also.
b) Draw cross-section of road in cutting. Give IRC values for camber for different types of roads.
c) Explain i) Prime coat ii) Tack coat.
d) Explain constuction procedure for bituminous bound macadum.
e) Draw neat sketch of alternate bay method and continuous bay method and explain in brief.
f) How will you transfer alignment of tunnel through shaft?

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

a) What are various factors affecting on alignment of road?
b) What are different types of gradients? Explain in brief with its IRC values.
c) What are various types of joints in concrete roads? Explain in brief with neat sketch.
d) Explain construction procedure for W.B.M. road with neat sketch.
e) Write down advantages and disadvantages of tunnels.
f) Explain construction of shaft in brief.

P.T.O.

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

a) State any four purposes of providing railway station.

b) Define 'block station' and 'non block railway stations'.

c) What is fixtures and fastening? Enlist any four types of fixture and fastening.

d) What do you mean by steeper density?

e) Define 'scour' and 'afflux' of bridge.

f) Differentiate between cause way and culvert.

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

a) Give any four requirements of ideal permanent way of railway.

b) Explain working of locomotive yard with a neat sketch.

c) Draw a neat-labelled sketch of left hand turnout.

d) What is coning of wheel? Why it is essential?

e) Draw plan and section showing component parts of bridge.

f) Explain the term simple suspension bridge with a neat sketch.

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

a) What is creep of rail? Give their any four causes.

b) Define i) Main line ii) Loop line iii) Check rail iv) Stock rail.

c) Give the any four functions of ballast.

d) Enlist any eight factors affecting site selection for bridges.

e) Give classification of bridges.

f) What is abutments? Give their types.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CEE308/CE204** COURSE NAME: **SURVEYING -I**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **11/05/2016**

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 i) Magnetic meridian ii) Arbitrary meridian

b) What is the principle of compass survey?

c) State the principle of chain survey.

d) Define surveying.

e) State any two objects of surveying.

f) Draw conventional symbol for i) Excavation ii) Embankment

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

a) Convert the following

RB's to WCB i) N$63^0$15' W ii) S$63^0$15' E and

WCB's to RB's iii) $207^0$45' iv) $114^0$30'

b) State the function of the following in prismatic compass

i) Brake pin

ii) Brass ring

iii) Lifting pin and lever

iv) Horse hair

c) Explain the method of chaining on a sloping ground.

d) A road actually 1410m long was found 1460m when measured by a defective 30m chain. How much correction does the chain need?

e) Classify surveying i) based on instruments and ii) object base.

f) Explain with neat sketch i) Tie Line ii) Check Line

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

a) Following are the bearings of the sides of a closed compass traverse. At what stations is local attractions suspected? Compute the correct bearings of the side of the traverse.

Line	F.B	B.B
AB	$325^0$30'	$145^0$30'
BC	$67^0$00'	$243^0$00'
CD	$194^0$15'	$20^0$15'
DA	$219^0$00'	$37^0$00'

P.T.O

b) Explain with sketch principle of optical square.

c) The following Fore bearings were observed in running a compass traverse. Find the back bearing and interior angle if the traverse. Apply check.

Line	Fore Bearing
AB	$50^0 30'$
BC	$120^0 15'$
CD	$183^0 00'$
DA	$292^0 45'$

d) Differentiate between direct ranging and indirect ranging?

e) What are the causes of compensating and cumulative errors?

f) What is meant by closing error in a closed traverse and how is it graphically adjusted?

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

a) What is datum surface and bench mark?

b) What do you mean by change point? Why is it necessary?

c) What do you mean by contour interval?

d) Define the terms back sight (B.S) & fore sight (F.S)

e) What is the concept of zero circle?

f) List the various types of bench mark.

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

a) List the various types of leveling works. Explain any one type in detail.

b) State the uses of contour plan.

c) Draw the neat labelled sketch of polar planimeter and explain in brief the procedure of finding out area of the figure by using planimeter.

d) Write a short note on Auto level.

e) Explain in brief the temporary adjustments of the dumpy level.

f) Compare between the H.I method & Rise-fall method of calculating reduced levels.

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

a) i) Write a short note on leveling stages.

ii) Describe in brief the digital planimeter.

b) Explain the specific characteristics of contour lines.

c) The following consecutive readings were taken with a level and a 4m leveling staff on a continuously sloping ground at common intervals of 30m.

0.825 (on A) 1.305,1.745, 2.450, 3.950, 0.455, 1.380, 2.055, 3.650, 0.590, 1.350, 1.950, 2.930 (on B)

The R.L of A was 425.000m. Make the entries in a level book and calculate the R.L of all the points. Apply usually checks. Determine the gradient of AB.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **CEE406/CE207/C207/1207**

COURSE NAME :- **CONCRETE TECHNOLOGY**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **12 / 05 / 2016**

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 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 properties of fresh concrete.

b) Define workability of concrete.

c) Enlist any four methods of compaction of concrete.

d) Define curing of concrete.

e) Define fineness modulus of aggregates. And also state necessity of it.

f) What is significance of fineness of cement?

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

a) State various ingredients of cement with their functions.

b) Explain any four types of cements with their uses in construction field.

c) Explain laboratory test to find impact value of aggregate with diagram of apparatus used for it.

d) State different factors affecting workability of concrete.

e) Explain necessity of curing of concrete and enlist methods of curing.

f) Explain any two admixtures used in concrete with their necessity and applications.

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

a) Write short note on superplasticizer.

b) Write any four precautions to store cement.

c) Explain Abrastion test on aggregates with necessity of conducting test.

d) Enlist and explain any four properties of aggregates.

e) Explain in brief the transportation of concrete.

f) Explain workability test according to slump cone test.

P.T.O.

Section – II	Marks

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

a) Define concrete mix design and state its importance.
b) Define formwork and why it is used in concreting?
c) Draw the graph showing relationship between water cement ratio and strength of concrete.
d) State any two precautions for hot weather concreting.
e) State any two methods for non destructive testing.
f) Define Ready mix conrete and polymer concrete.

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

a) Explain in detail IS code method of concrete mix design.
b) Enlist various methods of concrete mix design and state their applicaations.
c) Explain requirement of good form-work.
d) Explain the various properties of hardened conctete.
e) Explain the procedure for cold weather concreting.
f) Explain laboratory test for concrete cube testing.

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

a) Define characteristic strength of concrete. Explain grades of concrete and their suitability.
b) What is under water concreting? State its field situations and also state precautions taken.
c) Explain the quality control of concrete on field.
d) Explain rebound hammer test for concrete.
e) Define mass concrete. Explain the field situations and precautions taken for it.
f) Define shotereting and explain its application.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CEE301/1201/C201/CE201** COURSE NAME: **APPLIED MATHS**
MEE301/2201/M201/ME201
SME301/SM201/S201
MTE301/MG201/MT201

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **16 /04/2016**

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) *Evaluate* : $\int \frac{\sin(\log x)dx}{x}$

b) *Evaluate* : $\int \frac{(x-4)^2}{x^2}dx$

c) *Evaluate* : $\int (x.e^x)dx$

d) *Evaluate* : $\int_0^{\frac{\pi}{2}} \sin^{11} x\,dx$

e) *Evaluate* : $\int_2^3 \frac{dx}{x(x-1)}$

f) Find the mean value of $y = x$ *between* $x = 0$ *to* $x = 1$

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

a) *Evaluate* : $\int \frac{\sec^3 x \tan x}{3+\sec x}dx$

b) *Evaluate* $\int \frac{dx}{5-3\sin x}$

c) *Evaluate* $\int x.\tan^{-1} x\,dx$

d) *Evaluate* $\int (e^{3x}\sin 4x)dx$

e) *Evaluate* $\int \frac{5x-4}{x^2-8x+12}dx$

f) *Evaluate* $\int \left\{\frac{(x^3+2x^2+6)}{x^2+x-2}\right\}dx$

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

a) *Evaluate* $\int_0^1 \frac{dx}{\sqrt{x+1}+\sqrt{x}}$

b) *Evaluate* $\int_0^{\frac{\pi}{2}} \frac{\sin x\,dx}{(1+\cos x)^2}$

c) *Evaluate* $\int_0^{\frac{\pi}{2}} \frac{dx}{1+\sqrt{\tan x}}$

d) *Evaluate* $\int_2^{11} \frac{\sqrt{13-x}}{\sqrt{x}+\sqrt{13-x}}dx$

P.T.O.

e) Find the area of the Ellipse $\frac{x^2}{16}+\frac{y^2}{9}=1$ by using definite integration.

f) The instantaneous value of an alternating current in amperes is given by I=20sinwt+sin3wt. Find the mean value of current over the range $t=0$ *to* $\frac{\pi}{w}$

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

a) Find order and degree of the differential equation $\sqrt[3]{\frac{dy}{dx}+y}=\sqrt[4]{\frac{d^2y}{dx^2}}$

b) Solve $\frac{dy}{dx}=e^{x-y}+xe^{-y}$

c) Form A differential equation from the equation $y=Ae^{3x}+Be^{-3x}$

d) Find mean and median for the following data 7,14,9,12,8

e) Find range and coefficient of range

Marks	25-26	27-28	29-30	31-32	33-34	35-36
No. of Students	2	11	12	10	4	1

f) Find the probability of getting a sum of 14 when 2 six faced dice are rolled?

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

a) Solve the D.E $3e^x\tan y\,dx+(1-e^x)\sec^2 y\,dy=0$

b) Solve the D.E $\frac{dy}{dx}=\cos(x-y)$

c) Find mean deviation from median for the following data

Class interval	0-10	10-20	20-30	30-40	40-50
Frequency	5	8	15	16	6

d) If A and B are two events such that $p(A)=\frac{2}{3},\quad p(B)=\frac{1}{2},\quad P(A\cap B)=\frac{5}{12}$ *find* $p(A'\cup B')$ *and* $p(A'\cup B')$

e) A room has 3 electric lamps. From a collection of 15 electric bulbs of which only 10 are good, 3 are selected at random and put in the lamps. Find the probability that the room is lighted by at least one bulb.

f) A particle starting with velocity 6m/s has an acceleration (1-t^2) m/s^2. When it does first comes to rest? How far it then travelled?

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

a) Solve the D.E $(x^4-2xy^2+y^4)dx-(2x^2y-4xy^3+\sin y)dy=0$

b) Solve the D.E $x\log x\frac{dy}{dx}+y=2\log x$

c) Solve the D.E $\frac{dy}{dx}-\frac{\tan y}{x+1}=(x+1)e^x\sec y$

d) Find mean deviation from mean for the following data

Marks obtained	10-20	20-30	30-40	40-50	50-60	60-70
No.of.students	4	6	10	18	9	3

e) Find variance and the coefficient of variance for the following data

Class interval	0-10	10-20	20-30	30-40	40-50
Frequency	3	5	8	3	1

f) In two factories A and B, engaged in the same industry, in the area, the average weekly wages (in Rs) and S.D. are as follows.

Factory	Average Wages	S.D
A	34.5	5.0
B	28.5	4.5

Which factory A or B is more consistent?

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEE410/CE307/C311/1311**
COURSE NAME :- **TOWN & COUNTRY PLANNING**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **16 / 04 / 2016**

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) What do you mean by Ribbon development?

b) Define the term town and country planning.

c) Enlist any four forms of town & country planning.

d) What is density zoning?

e) What is Master plan?

f) What is meant by neighbourhood planning?

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

a) Explain any four objects of town planning.

b) Discuss in detail use zoning.

c) State any four essential features of neighbourhood unit.

d) Discuss nay four factors to be examined at the time of site selection for public buildings.

e) Explain types of recreation system with an examples.

f) Listout the agencies associated with housing and explain any one.

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

a) Explain satellite type of growth of town with a neat sketch.

b) Explain any four principles of neighbourhood planning.

c) Explain any four effects of slums on town life.

d) What is town survey? What are the usual topics covered in it?

e) State the importance of neighbourhood planning.

f) Enumerate the data required for the preparation of master plan.

P.T.O.

Section – II

Marks

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

a) What is land acquisition act?

b) Define MRTP Act.

c) Define floor space index.

d) Define floating floor space index.

e) What are different types of villages?

f) Define low cost housing.

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

a) State any four objectives of land Acquisition Act.

b) What are categories of MR and TP Act?

c) Discuss necessity of planning law and legislation.

d) Explain the framework of village Panchayat.

e) What provisions are made regarding fire protection of building?

f) Explain the term 'Set back' with a neat sketch.

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

a) Explain applicability of bye-laws.

b) What is importance of bye-laws?

c) Why village planning is necessary?

d) Write any four general principles of rural housing design.

e) Enlist different types of agro industries.

f) Explain any four principles of village planning.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM APRIL/MAY. -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEE302/CE206/C206/1206**
COURSE NAME :- **BUILDING CONSTRUCTION**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **18 / 04 / 2016**

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) Classify rocks as per geology.

b) State the purpose of providing lintel.

c) State any two functions of foundation.

d) What is meant by through stone?

e) State the types of ashlar masonry.

f) What is scaffolding?

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

a) State any four properties of good timer.

b) What is mortar? State any four functions of mortar.

c) State any eight requirements of good building stone.

d) What is meant by timbering and strutting? State any four types of it.

e) Draw a neat sketch of RCC column footing.

f) Draw a neat sketch of raft foundation in plan and in section.

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

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

b) State any eight requirements of good brick work.

c) Draw the plans for alternate courses of $1\frac{1}{2}$ brick thick wall in English Bond.

d) Draw a neat sketch of double scaffold.

e) Draw a neat sketch of rolling shutter.

f) State any four types of hinges. Draw a neat sketch of any one hinge.

P.T.O.

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

a) What is role of POP in plastering work?

b) Enlist any four means of vertical communication.

c) Enlist any four latest flooring material available in market.

d) State any two thumb rules for deciding rise, trade combination.

e) State any two necessity of pointing work.

f) State any four requirements of good roof.

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

a) Explain any four factors affecting selection of flooring material.

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

c) Explain the term termite proofing.

d) Enlist any four types of external finishes. Explain any one.

e) Explain the method of waterproofing for R.C.C. slab.

f) Draw the neat labeled sketch of s/c and show following component parts –

i) Newel post ii) going iii) Nosing iv) Waist slab v) Balluster vi) Landing vii) Riser viii) Trade.

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

a) Draw the neat labeled sketch of R.C.C. dog legged staircase showing plan & section.

b) State any four necessities of rebarring techniques.

c) Write short note on i) Guniting ii) Grouting.

d) Enlist any four repairing techniques of cracks.

e) Explain the procedure of surface preparation for white wash.

f) Explain the tremix floor with their any four advantages.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM APRIL/MAY. -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIRST** PROGRAM : **CE/ME/SM/MT**
COURSE CODE :- **CCE101/X102/X108/R103/R104**
COURSE NAME :- **ENGINEERING PHYSICS**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **18 / 04 / 2016**

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 o request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

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

a) Define refraction and state Snell's Law.

b) Give the formula for dispersive power and mention each term in it.

c) Define modulus of rigidity and give its SI unit.

d) Define breaking stress and factor of safety.

e) What is SHM? Give any one example.

f) Define coefficient of viscosity and give its SI unit.

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

a) Show that the refractive index of the material of a prism is $\mu = \dfrac{Sin\left(\dfrac{A+\partial m}{2}\right)}{Sin\left(\dfrac{A}{2}\right)}$

b) Give any four application of viscosity.

c) Define angle of contact and give its significance.

d) State any four characteristics of transverse wave.

e) A wire of diameter 3mm and length 4m extends by 2.5mm when a force of 10N is applied. Find the Youngs modulus of the material of wire.

f) A capillary tube of diameter 1mm is dipped in water. How few will the water rise in the tube if surface tension of water is 7.2×10^{-2} N/m and density of water = 1×10^{3} Kg/m^{3}.

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

a) Using stress-strain graph explain the behavior of wire under continuously increasing load.

b) i) Derive the relation between velocity frequency and wavelength of a wave.
ii) What are free oscillations? Give one example.

P.T.O

c) Define resonance. Give any three examples of resonance.

d) What is capillarity action? Mention any three examples of capillarity action.

e) The refractive index of a prism is 1.54 and its angle is 60^0. Find the angle of minimum deviation.

f) A force of 8N is required to move over a solid horizontal surface of area $0.25m^2$ with a velocity of 0.05 m/s. If the thickness of liquid layer is 2mm. Calculate the coefficient of viscosity.

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

a) Define Echo and reverberation.

b) State and explain Ohm's Law.

c) Give full form of LASER.

d) What are ultrasonic waves?

e) State plank-Einstein photoelectric equation with meaning of symbols.

f) Calculate the specific resistance of a wire 6m in length, 0.4mm in diameter and having a resistance of 30Ω.

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

a) Define photon. Write its three characteristics.

b) Define the terms i) Nanotechnology ii) Nanoscale
iii) Nanometer iv) Nanoopraticles.

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

d) State and explain properties of Laser.

e) Give four applications of X-rays.

f) A concrete hall of volume $2500m^3$ has total surface absorption of 205. Find reverberation time.

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

a) What is Wheatstones network? Obtain the condition for balance of Wheatstones network.

b) Give four applications of photoelectric effect.

c) Explain population inversion.

d) Describe how X-rays are produced by using modern Coolidge X-ray tube.

e) State four requirements of good acoustics.

f) State any four applications of nanotechnology in electronics.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CEE402** COURSE NAME: **DESIGN & DRAFTING OF RCC STRUCTURE**

MAX. MARKS: **80** TIME: **4 HRS.** DATE: **20/04/2016**

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) Draw typical stress-strain graph for concrete.

b) Draw a diagram showing typical reinforcement detailing of T-shaped cantilever retaining wall.

c) State two assumptions of limit state of collapse (flexure)

d) Calculate value of neutral axis constant for materials M20-Fe500 grade.

e) State conditions under which a double reinforced beam is provided.

f) Calculate effective flange width if an L beam if span 4m with web 300mm wide & slab120mm thick.

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

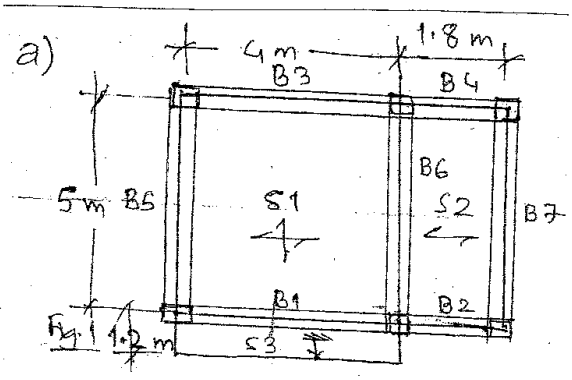
a) A simply supported beam having span 3.8m has effective cross-section 230mm x 480mm with bottom reinforcement as 3 bars of 20mmϕ-fe500 grade. Determine ultimate load carrying capacity concrete grade M25.

b) Design for flexure balanced single reinforcement cantilever beam having span 1.8m carrying a total ultimate load of 30KN/m. Assume materials M20-Fe415 grade. Assume b=230mm.

c) Determine ultimate moment of resistance of a beam having effective section of 230mm x 350mm with 3-16ϕ as tensile steel & 2-12ϕ as compression steel. Assume materials M20-Fe415 grade. Take $f_{sc}=0.87f_y$

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

a) For the plan as shown in fig.1, determine loads transfered from supported slabs on beams. i) B_1 ii) B_6 Total ultimate loads on slabs S_1, S_2, & S_3 are 10KN/m^2 & 6KN/m^2 respectively.



b) Determine ultimate moment of resistance of a T-beam having following data: b_f=1600mm, b_w=300mm, A_{st}=800mm^2, d=410mm. materials M25-Fe500 grade. Slab is 120mm thick.

c) Design for flexure a doubly reinforced balanced beam of effective cross-section 230mm x 360mm for an ultimate design bending moment of 95KNm. Assume materials of grade M20-Fe415. Take $f_{sc}=0.87f_y$, d'_c=35mm.

P.T.O

Section – II

Marks

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

a) Define development length.

b) State IS specification for minimum & maximum reinforcement for column.

c) Define magnitude & intensity of earthquake.

d) Draw a neat diagram for ductile detailing for footing.

e) Enlist various losses in prestressing.

f) State any two differences between pretensioning & post-tensioning system of prestressed concrete.

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

a) Design the shear reinforcement for a beam with width of beam 350mm,mm, effective depth of beam 550mm. shear force acting on beam is 125KN. f_{ck}=25N/mm^2 f_y=415 N/mm^2 & % of steel used is 1.67 Take τ_{cmax}=3.1 N/mm^2, τc=0.767 N/mm^2 & use 2 legged 8mm diameter stirrups.

b) State any four reasons for providing minimum shear reinforcement in the form of stirrups in beam.

c) A simple supported one way slab on a room of diamension 9m x 4m. Total factored load acting on slab is 13.50 KN/m^2. Assume M.F =1.5, use concrete grade of M15 &steel of Fe250, width of support is 300mm. effective cover to the reinforcement is 20mm & diameter of bar used is 12mm. find area of main steel required for slab. Check for shear, deflection is not required.

d) Draw a neat diagram of reinforcement detailing in section & plan of oneway continuous slab.

e) Design a RCC square column to carry an axial load of 1600 KN. effective length of column is 3.15m use M20 concrete mix & Fe415 steel grade. & Assume 1% of Ag of steel for longitudinal bars. Take bar diameter 20mm. Also design the transverse steel & take the check for minimum eccentricity.

f) i) compare prestressed concrete with R.C.C (any four points)
ii) draw a neat sketch of column and footing for ductile detailing provision an per IS 13920-2000 for EQ.

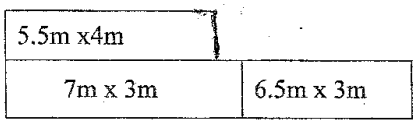
Q.6 Attempt any **TWO** **(16)**

a) An RCC beam 350mm wide & 500mm effectively deep is reinforced with 4 bars of 25mm diameter. It having a u.d.l. of 60KN/m over the span of 6.5m. Design the shear reinforcement.use M20 grade of concrete and Fe415 grade steel. Use 8mm diameter 2 legged stirrups & Assume two bars are bentup. Take τ_{cmax}=2.8N/mm^2

Pt %	τc N/mm^2
1.0	0.62
1.25	0.67

b) A column of isolated sloped square footing has following data.
Load on column =600KN Size of column =200mm x300mm
Safe bearing capacity of soil =150KN/m^2, Concrete mix M20 ,Grade of steel Fe415
Consider 10% self weight of footing by bending moment criteria & take check for oneway shear & two way shear & find steel required for footing & also development length required. If τ_{bd}=1.2 N/mm^2 for mild steel in tension. Use 12mm diameter bars. & draw a neat diagram of footing in plan & elevation with diamensions.

c)



Refer above plan of a residential building. Identify types of each room slab & Design two way slab of them. Using M20 grade concrete & Fe415 steel. Corners of slab are free to lift. Take live load 2KN/m^2 & floor finish 0.5KN/m^2. Also take check for deflection. The effective cover is 25mm& use 10mm diameter bars values of bending moment coefficients are as below. Take M.F=1.4 for p_t=0.35%

ly/lx	1.3	1.4
αx	0.093	0.099
αy	0.055	0.051

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CEE305/CE306/C312/1312** COURSE NAME: **SOIL MECHANICS & FOUNDATION ENGG**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **20/04/2016**

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 soil.

b) Define water content & degree of saturation.

c) Define uniformity coefficient & coefficient of curvature.

d) State Darcy's law.

e) Define soil stabilization.

f) State shear strength equation with meaning of each term.

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

a) What is the importance of soil mechanics?

b) Calculate dry density, saturated density, submerged density & bulk density of soil at 15% water content, if G=2.6 & e=1.0

c) Explain mechanical analysis of soil.

d) List out factors affecting permeability of soil & explain any one of them in detail.

e) Enlist compaction methods in field & explain any one in detail.

f) Explain direct shear strength test with neat sketch.

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

a) A natural soil deposit has a water content of 6% & its corresponding bulk density is 17KN/m^3. What is its saturation water content & dry density of soil if G=2.7

b) Find the shrinkage limit of a soil with following observations:

i) Weight of dry soil pat=20.59gms.

ii) Weight of mercury displaced b the dry soil pat =166gms

iii) Specific gravity of soil=2.75

c) Enlist applications of flow net.

d) Enlist different methods of soil stabilization & explain any one of them in detail.

e) What is particle size distribution curve? What is the meaning of D_{60}, D30, &D_{10}?

f) What is Mohr's circle? In what way it is useful?

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

a) Define distributed and undistributed soil sample.

b) State the concept of earth pressure.

c) Define safe bearing capacity of soil.

d) State use of piles.

e) Define cofferdam.

f) State the different types of machine foundation.

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

a) State the criteria for deciding location and number of pits and bores.

b) Explain in brief different methods of site investigation.

c) Explain in brief Rankines theory of earth pressure.

d) Explain in short different types of shallow foundation with neat sketch.

e) Explain in short plate load test.

f) Explain in brief foundation on sloping ground.

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

a) Write short note on "foundation settlement & perssible settlement.

b) Draw a neat sketch of under reamed pile and pile cap.

c) Write short note on well foundation.

d) Explain in brief soil support method while excavation for deer foundation.

e) Write short note on "coffer dam"

f) Explain in brief requirement of machine foundation'

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST** PROGRAM: **CIVIL/METALLURGY**

COURSE CODE: **CCE108/X107/R110/0110** COURSE NAME: **ENGINEERING DRAWING-II**

MAX. MARKS: **80** TIME: **4 HRS.** DATE: **21/04/2016**

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 **Draw the free hand sketches of any two of the following.** **(08)**

a) British standard with worth (B.S.W) thread.
b) Eye foundation Bolt.
c) Double U butt welding Joint.

Q.2 **Fig.1 shows pictorial view of an object Draw.** **(16)**

1) Front view in the direction X (05 Marks)
2) Top view (05 Marks)
3) Side view (04 Marks)
4) Diamensions (02 Marks)

(Use first angle method)

Q.3 **Draw any one of the following** **(16)**

A) Fig.2 shows a pictorial view of an object using first angle method of projection, draw the following views.

i) Sectional F.V. along with B-B (06 Marks)
ii) Top view (04 Marks)
iii) Side view (04 Marks)
iv) Diamensions (02 Marks)

B) Fig.3 show Isometric view of a C.I.Block draw following views

i) Sectional F.V in direction X (sections-A-A) (06 Marks)
ii) T.V (04 Marks)
iii) L.H.S.V (04 Marks)
iv) Diamensions (02 Marks)

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

a) Fig.No.1 shows front view and right hand side view of an object. Draw its following views, by first angle projection method

i) Missing Top view. (04 Marks)
ii) Sectional front view, section along AA (04 Marks)

b) Fig. No.2 shows front view and side view of an object. Draw its following views, by first angle projection method.

i) Missing Top view (04 Marks)
ii) Sectional front view section along AA (04 Marks)

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

a) Fig. No 3. Shows Top view and front view of an object .Draw its isometric view, taking 'O' as an origin.
b) Fig.No.4 shows front view and Right hand side view of an object. Draw its isometric view, taking 'O' as an origin.
c) Fig. no. 5 shows front view and Right hand side view of an object. Draw its isometric view taking 'O' as an origin.

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

a) Draw the development of the lateral surface of the part 'P' of the square pyramid as shown in fig.no.6
b) Draw the development of the lateral surface of the part 'P' of the cone as shown in fig.no.7
c) The projections of a square prism with a hole drilled in it, are given in fig.no.8. Draw the development of lateral surface of the prism.

P.T.O.

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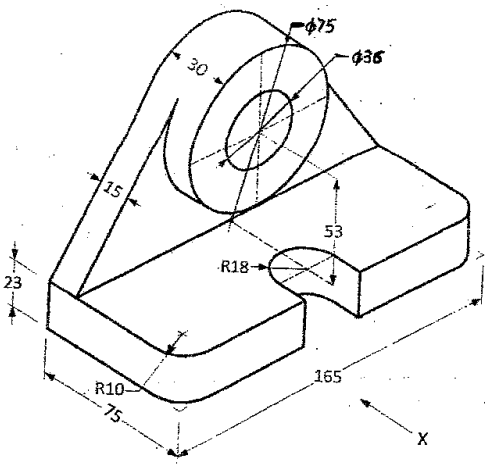


Fig. 1

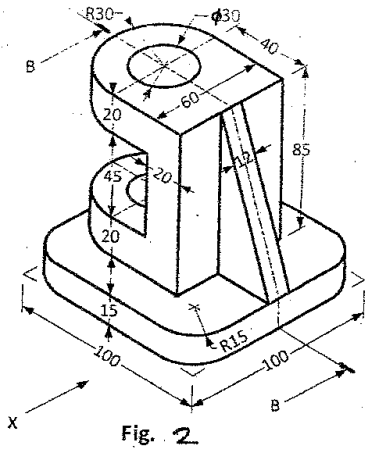


Fig. 2

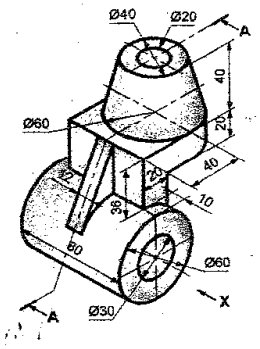
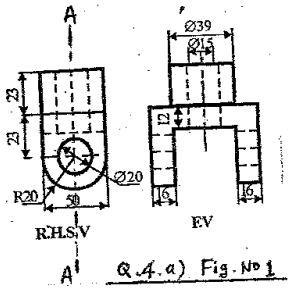
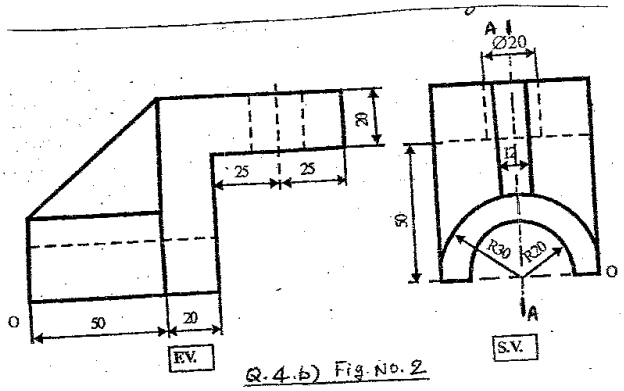


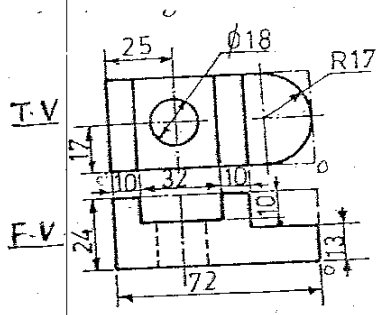
Fig. 3



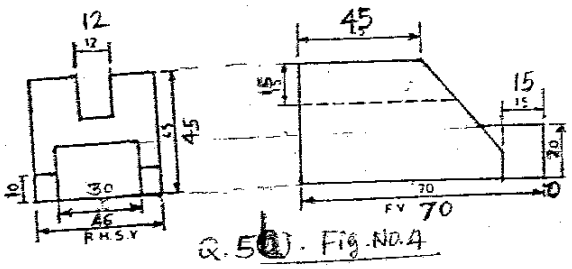
Q.4.a) Fig. No 1



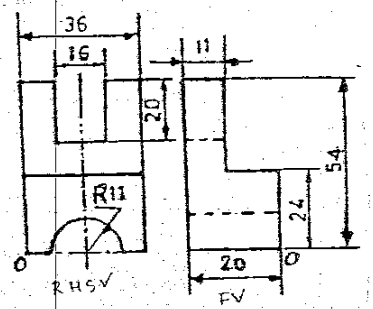
Q.4.b) Fig. No. 2



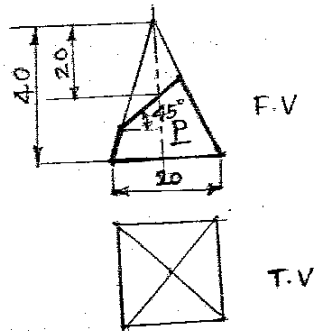
Q.No.5-a) Fig.No.3



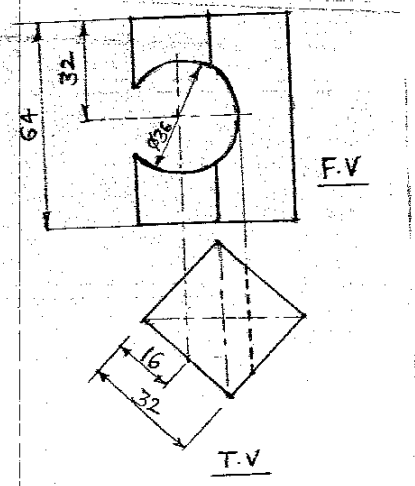
Q.5(b). Fig.No.4



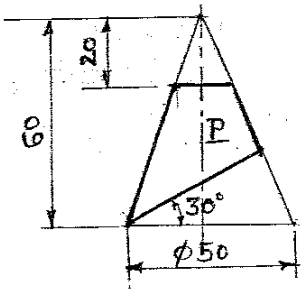
Q.5.c). Fig.No.5



Q.6.a) Fig.No.6



Q.6.c). Fig.No.8



Q.6.b) Fig.No.7

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EVEN TERM END EXAM APRIL/MAY. -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEE309/CE205/C205/1205/C205**
COURSE NAME :- **SURVEYING - II**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **21 / 04 / 2016**

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 transiting?
b) Which errors are eliminated by repetition method?
c) What is error of closure?
d) What is principle of tacheometry?
e) What is use of analatic lens in case of tacheometer?
f) How tacheometer can be used on level?

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

a) What are different errors in theodolite traversing?
b) Write the procedure of measurement of magnetic bearing.
c) Give fundamental axes of theodolite and their relationship.
d) The interior angles of a closed traverse PQRST are as following $< P = 78^0 40'15"$, $< CQ = 104^0 45'20''$, $< R = 85^0 35'40"$, $< S = 150^0 40^0 30" < T = 120^0\ 18^0\ 15"$ If the observed bearing of the line PQ is $220^0\ 25'30"$. Calculate the bearings of the remaining sides of the traverse.
e) A theodolite traverse is run from A to G and the deflection angles are as following .
at station B – $320^0 16'$L
at station C – $18^0 34'$R
at station D – $22^0 12'$L
at station E – $42^0 24'$R
at station F – $52^0 42'$R
Calculate the bearing of remaining sides of the transverse, give that forward bearing of AB=$110^0 6'$. Check your calculations.

f) Find the length and bearing of a line PQ, the co-ordinates of two points P & Q are as

Pont	Co-ordinates
P	975.50, 830.200
Q	1189.70, 579.30

P.T.O.

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

a) Describe the transit theodolite giving essential parts and their function.

b) How is theodolite traverse survey is balanced? How is it plotted?

c) As there was an obstacle in the line EA, the following traverse ABCDE was carried out. Determine the length and bearing of a line EA.

Line	Length (m)	W CB
AB	458.00	$198^0 59'$
BC	262.50	$282^0 14'$
CD	160.00	$320^0 13'$
DE	398.5	$35^0 13'$

d) What do you understand by tacheometry? Under what situation you could adopt it?

e) Write the fieldwork of tacheometric survey.

f) How vertical and horizontal distances are calculated with help of tacheometer when staff is held vertical?

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

a) What is meant by orientation of plane table?

b) State the methods of plane tabling.

c) Define the term-Degree of the curve.

d) State the expressions for
i) apex distance ii) tangent length with meaning of terms used.

e) In relation to total station define the term azimuth mark.

f) What is meant by remote sensing?

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

a) Enlist the accessories of plane table with their use.

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

c) State ay four advantages and four disadvantages of plane table survey.

d) Explain the temporary adjustments of total station.

e) State any four parts of total station with their use.

f) State any four special features of digital theodolite.

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

a) State any four uses of total station.

b) Draw a sketch of simple curve and show on it the following point of intersection, versed sine, length of curve, long chord.

c) Two straights meet at a chainage of 1800m at an angle of intersection of 125^0. Taking radius of curve as 200m, calculate
i) tangent length ii) length of long chord iii) length of curve
iv) Chainage of first tangent point.

d) Calculate ordinates at 10m interval to set curve by ordinates from long chord method given that length of long chord is 80m and Radius as 125m.

e) State the procedure of remote sensing.

f) State and explain any four applications of remote sensing.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **CIVIL ENGINNERING**

COURSE CODE: **CEE307/CE210/C301/1301/C301**

COURSE NAME: **MECHANICS OF STRUCTURES**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **22/04/2016**

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) State any two basic requirements of structures.

b) Draw a neat labeled diagram of retaining wall.

c) State Hooke's law.

d) Define Resilience and modules of resilience.

e) A circular bar of 20mm diameter is subjected to a load 40KN. calculate the stress induced in bar if the load is applied suddenly.

f) Define the point of contra flexure.

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

a) Explain with sketch the basic structural action i) Tension ii) Compression iii) Flexure iv) shear

b) Write a short note on various material used for civil engineering structures.

c) Draw stress- strain curve for mild steel under tensile loading. Show salient points on the graph.

d) A metal rod 24mm diameter and 2m long is subjected to an axial pull of 40KN. if the elongation of the rod is 0.5mm. Find the stress induced and the value of Young's modulus.

e) A concrete column 400mm square reinforced with 4 steel bars of 16mm diameter carries an axial load of 800KN. Determine the stress induced in each material. $E_s=15E_c$

f) For a given material E=110GPa modulus of rigidity C=43GPa.Find the Bulk modulus (K) and Poissons ratio.

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

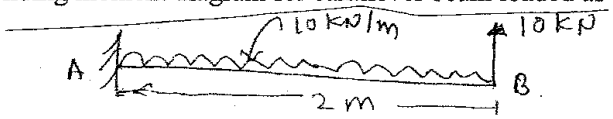
a) A steel rod 20mm in diameter is 200mm long. It is subjected to an axial pull of 40KN. Calculate the strain Energy stored in the rod if the load is applied (i) gradually (ii) suddenly Take E=2010 GPa.

b) A bar of 20mm diameter and 1m length is subjected to a load of 1KN which is dropped from a height of 500mm on to the collar attached at the lower end of bar. Determine the instantaneous stress induced due to this impact load if E=200 X 10^3MPa

c) A simply supported beam of span 7m carries a udl of 2KN/m over 4m length from Left support and a point load of 5KN at 2m from right support. Draw SFD.

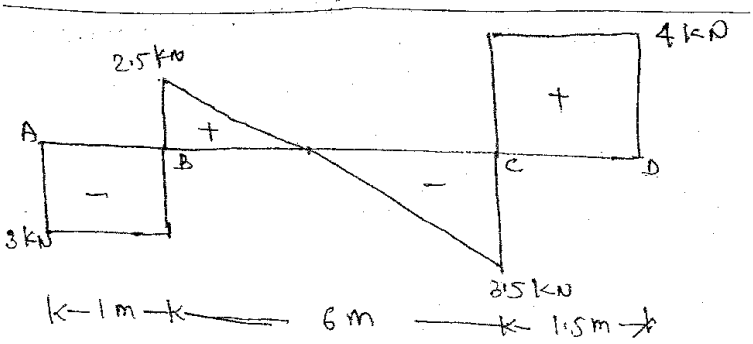
d) Draw BMD for Q.No.3 (c)

e) Calculate the Bending moment diagram for cantilever beam loaded as shown in fig.



P.T.O.

f) A SF diagram for the loaded beam is an shown in fig. Determine the loading on the beam.



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

a) Define radius of gyration & state its unit.
b) State perpendicular axis theorem.
c) Define section modulus & state its unit.
d) Draw shear stress distribution diagram for inverted 'T' section.
e) Define longitudinal stress.
f) State two ways of failure of thin cylinder when subjected to internal pressure.

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

a) Find the MI of a square section about its diagonal resting on one of its corner having diagonal of 400mm in length.
b) Calculate MI of a T-section about centroidal x-x & y-y axis. Top flange is 1200 x 200mm & web is 1800mm x 200mm. Total height is 2000mm.
c) A cantilever beam of rectangular section supports udl of 5KN/m. The span of the beam is 3m. If the maximum bending stress is 100N/mm^2 & the depth of the beam is 1.5 times the width, determine the size of the beam.
d) A rectangular beam has depth 300mm. At a certain section, the maximum shear stress is 10MPa. Calculate the shear stresses at 75mm & 50mm top layer N.A.
e) A thin cylindrical shell of 1m diameter with 10mm thickness 3m length is subjected to internal pressure of 2N/mm^2. Determine change in length, change in diameter & change in volume.
f) For the cylindrical shell of 1m diameter, the circumferential & longitudinal strains are 19×10^{-5} & 2.9×10^{-5} respectively. Calculate the change in diameter & change in volume per 'm' length of shell.

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

a) Find I_{xx} & I_{yy} for an unequal angle 125 x 75 x 10mm.
b) Calculate MI of a rectangle 60 x 200mm about its 200mm base.
c) Find the bending stress at 25mm layer below the top edge of rectangular section 80mm wide & 200mm deep. If maximum bending moment is 4 KN.m
d) A beam of triangular cross section having base width of 100mm & height of 150mm is subjected to a shear force of 15KN. Find the value of maximum shear stress & sketch the shear stress distribution along the depth of beam.
e) A cylinder of 1m diameter & 25mm thickness contains a fluid under pressure of 'p' N/mm^2. If the change in volume per meter length of the cylinder is observed to be 6.28×10^5 mm^3, calculate the value of 'p'. E=200GPa & μ=0.25
f) A cylindrical shell is 3m long 1m internal diameter & 15mm metal thickness. Calculate circumferential strain & longitudinal strain if cylindrical shell is subjected to internal pressure of 1.5N/mm^2.

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEE404/CE303/C304/1304**
COURSE NAME :- **ESTIMATING AND COSTING**
MAX. MARKS : **80** TIME : **4 HRS.** DATE :- **22 / 04 / 2016**

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 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) Define the term estimating.

b) Enlist methods of approximate estimates used for buildings.

c) State the units of measurement for i) plaster ii) U.C.R. masonry.

d) State any two purposes of preparing approximate estimates.

e) Enlist the data required for preparing detailed estimate.

f) What do you mean by centage charges?

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

a) Write a note on district schedule of rate book.

b) Explain plinth area method for finding approximate estimate of buildings.

c) Write note on approximate estimation of irrigation project.

d) Give modes of measurement for

i) R.C.C. coping ii) skirting iii) flooring in rooms iv) Dressed stone masonry.

e) Explain in brief revised estimate.

f) Explain the term provisional sum.

Q.3 Fig. No. 1 Shows plan of building and section of wall. Work out quantities of any four and enter them in standard measurement sheet. (16)

a) Excavation for foundation

b) P.C.C. (1:4:8) in foundation only.

c) U.C.R masonry in foundation and plinth in C.M. 1:6.

d) B.B. masonry in superstructure in C.M. 1:5.

e) R.C.C. in lintels over doors and windows take 15cm bearing in walls on either side.

f) Mosaic tile flooring.

P.T.O.

Section – II Marks

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

a) Define rate analysis.

b) Enlist any four data required for rate analysis.

c) Define task work.

d) Give the task work for
   i) Half brick work in partion wall
   ii) Random rubble stone Masonry in foundation and plinth.

e) Enlist any four types of specifications.

f) Give the current market rates of i) Cement ii) Male-mazdoor.

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

a) Draft the detailed specifications for u.C.R. masonry in plinth in c.m.1:6

b) Prepare the rate analysis for P.C.C. 1:4:8 for the foundation bed.

c) Calculate the quantity of earthwork for canal in cutting from the chainage 30m, to 210m with the following data Bed width of canal = 10m Side slope of canal is 1:1

Ch in mts.	30	60	90	120	150	180	210
Depth of cutting in mts.	1.6	1.8	2.0	2.5	2.8	3.0	3.2

Use mean area method.

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

a) Prepare the rate analysis for the first class brick Masonry in super structure in c.m. 1:6.

b) Draft the detailed specification for R.C.C. in slab work with water proofing compound.

c) Calculate the quantity of earthwork for an earthen dam from the chainage 200m to 300m from the following data. Top width of Embankment = 3mts. R.L. of top of embankment is 105.000 mts. Side slopes on both sides 2:1 [H:V]

Ch in mts.	200	220	240	260	280	300
Depth of cutting in mts.	100	98	95.5	94.2	95	96

Use trapezoidal formula.

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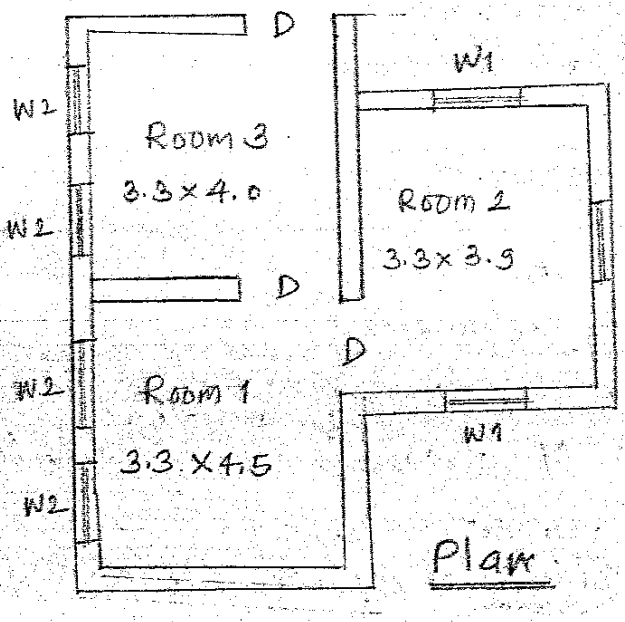
Take all wall thickness as 0.30 mt.



Plan

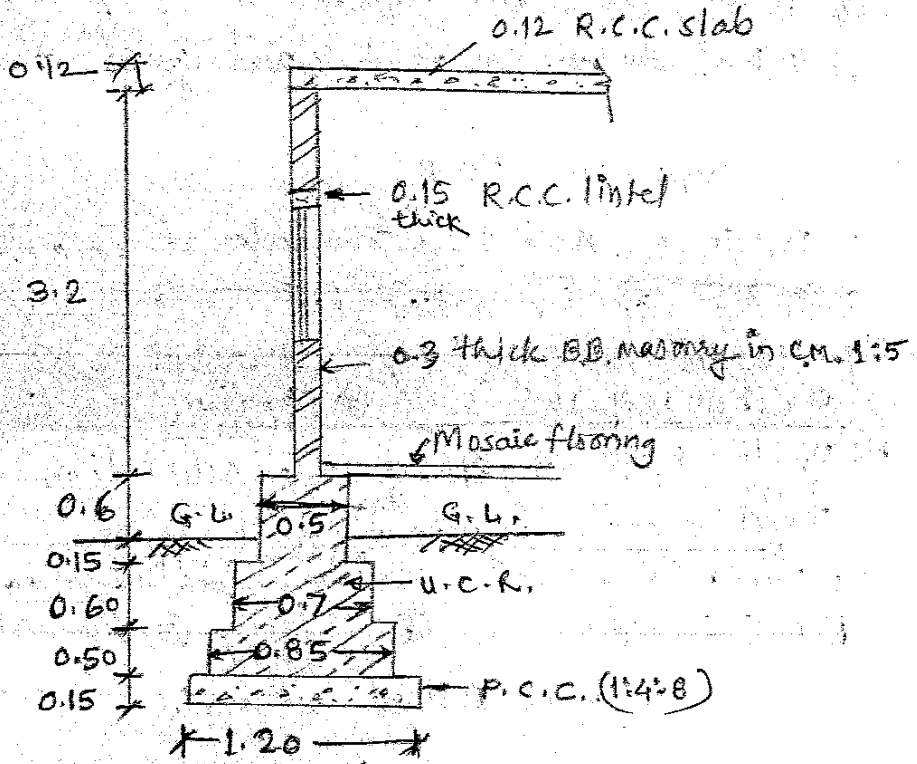
schedule of D & W

D = 1.2 × 2.1 m

W1 = 1.4 × 1.2 m

W2 = 1.0 × 1.2 m

Fig no - 1



Section (All dimensions are in m)

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: **FOURTH** PROGRAM: **CIVIL ENGINNERING**

COURSE CODE: **CEE401/CE301/C302/1302** COURSE NAME: **ANALYSIS OF STRUCTURES**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **23/04/2016**

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) Define principal stresses & principal planes.

b) Define core of section.

c) State the condition for no tension for a solid circular section of diameter'd'.

d) State any two assumptions in the theory of torsion.

e) State torsional equation with meaning of terms in it.

f) State four end conditions for effective length of column with neat diagram.

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

a) At a point in a strained material there are two mutually perpendicular stresses of 500N/mm^2 & 400N/mm^2 both tensile. They are accompanied by a shear stress of 100N/mm^2 find. i) Principal stresses & its position ii) Max shear stress & planes.

b) A rectangular column is 200mm wide & 100mm thick. It carries a load of 180KN at an eccentricity of 100mm in the plane bisecting the thickness. Find the maximum & minimum intensities of stress at the base & draw stress distribution diagram.

c) A column having diameter 200mm & length 3.5m. Both ends of columns are hinged. Find Euler's crippling load. Take E=2 x 10^5 MPa. Also find safe load if factor of safety is 2. Also find safe load by Rankines formula if δ_c=350 MPa & $a = \frac{1}{16000}$

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

a) At a point in a beam there is a tensile bending stress of of 100N/mm^2 in the horizontal direction accompanied by a shear stress of 40 N/mm^2. Find the principal stresses at a point and position of principal planes & maximum shear plane & stresses use Mohr's circle method.

P.T.O

b) A masonary pillar of diameter 800mm is subjected to a horizontal wind pressure of intensity 2000N/m^2. & coefficient of wind resistance is 0.67. Density of masonary is 2300kg/m^3 determine the maximum permissible height of piller so that no tension is developed at the base and also draw stress distribution at base

c) Find the torque that can be applied to a shaft of 100mm diameter, if permissible angle of twist is 2.5^0 in the length of 5m. Take C=80KN/mm^2. Also find torsional shear developed in shaft.

Section – II

Marks

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

a) State two advantages of fixed beam.

b) State Claperon's theorem of three moments.

c) Define Stiffness factor.

d) Calculate maximum deflection in terms of EI for a cantilever beam of span 2m with load of 3KN at free end.

e) State principle of superposition.

f) Draw diagram showing two varieties of continuous beam.

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

a) A beam ABCD is fixed at A & B & carries load of 20KN/m over active span with loads of 15KN & 10KN at B& C respectively. AB=BC=CD=2m. Draw BMD & SFD.

b) A continuous beam ABCD is fixed at A & simply supported at C & D. it carries load of 15KN/m over CD and a load of 12KN at B. AB=BC=2m, CD=3m. Draw BMD using theorem of three moments.

c) Solve Q.5 (b) using moment distribution method.

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

a) Draw BMD for the continuous beam as shown in fig.No1 using theorem of three moments.

b) Solve Q.6 (a) using moment distribution method.

c) A simply supported beam ABCD carries loads of 10KN & 15KN at B & C respectively. AB=CD=2m, BC=3m. Using Macauley's methods, determine maximum deflection in terms of EI.

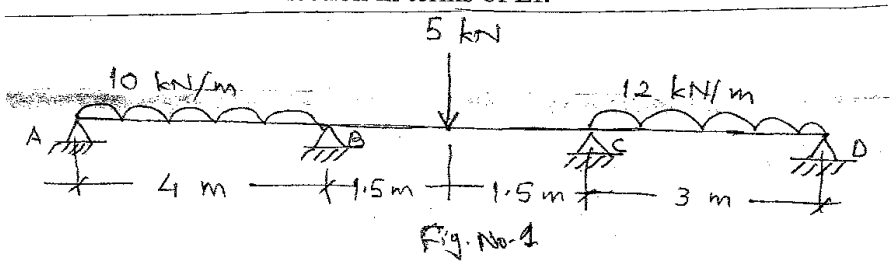

Fig. No-1