Total No. of Printed Pages:2

SUBJECT CODE NO:- K-12

FACULTY OF ENGINEERING AND TECHNOLOGY

S.E. (All Branches) Examination Oct/Nov 2016

Engineering Mathematics -IV

(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
i. Questions numbers 1 and 6 are compulsory.
ii. Solve any two questions from remaining of each section.
iii. Figures to the right indicate full marks.
iv. Assume suitable data, if necessary.

Section A

Q.1 Solve any five:- 10

a) Find the analytic function $f(x) = u + i\vartheta$, whose imaginary part is $\vartheta = \sin hx \cos y$.

b) Find the harmonic conjugate of $u = 4xy + x + 1$.

c) Evaluate $\int_0^{1+\pi i} e^z dz$.

d) Evaluate $\int_{0,1}^{(2,5)} (3x + y)dx + (2y - x)dy$, along $y = x^2 + 1$.

e) Find the residue of $f(x) = \frac{1}{(z^2-1)^3}$ at each pole.

f) Find the image of the circle |Z| = 1, under the transformation W =$\log z$.

g) Solve $\frac{\partial^2 u}{\partial x^2} = 0$, where $u\ (0, y) = y^2$,and $u(l, y) = 1$.

OR

Find the z- transform of $K^2, K \geq 0$.

h) Solve $\frac{\partial u}{\partial x} = 4\frac{\partial u}{\partial y}$, where $u\ (x, 0) = 4e^{-x}$.

OR

Find the z – transform of $f(K) = 4^K, K < 0$
$= 3^K, K \geq 0$

Q.2 a) If $u = a\ (1 + cos\theta)$, find ϑ so that $u + i\vartheta$ is analytic. 05

b) Evaluate $\int_c \frac{(e^z sin2z-1)}{z^2(z+2)^2} dz$ where c is $|z| = \frac{1}{2}$. 05

c) Solve$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$, subject condition $u(0, y) = 0$, $u(\pi, y) = 0$, $u(x, 0) = 100$ and u(x,∞)=0 05

OR

Find the z- transform of $\sin h\frac{K\pi}{2}$. 05

Q.3 a) Show that $u = e^x cosy + x^2 - y^2$ is harmonic. Find harmonic conjugate, also find corresponding analytic function. 05

b) Evaluate $\int \frac{z+2}{z} dz$, where c is left half of the circle |Z| =2. 05

c) Solve $\frac{\partial^2 y}{\partial t^2} = a^2 \frac{\partial^2 y}{\partial x^2}$, subject to the conditions $y(0, t) = y(l, t) = 0$, $y(x, 0) = 0$ and $\left(\frac{\partial y}{\partial t}\right)_{t=0} = \lambda x(l - x)$. 05

OR

Find the inverse Z – transform of $\frac{z^2}{z^2+9}$ 05

Q.4 a) Find the image of the circle |Z-3| = 5 under the transform W=$\frac{1}{Z}$. 05

b) Evaluate $\oint_c \frac{2Z+1}{Z^2-Z-2} dz$, where C is |Z| =3, by Cauchy residue theorem. 05

c) Solve $\propto^2 \frac{\partial^2 u}{\partial x^2} = \frac{\partial u}{\partial t}$, with the boundary conditions $\frac{\partial u}{\partial x}\ (0, t) = 0, \frac{\partial u}{\partial x}\ (l, t) = 0$ and $u(x, 0) = Kx$. 05

OR

Solve $Y_{K+1} - Y_{K-1} = u(k), y(0) = 0$, by Z- transform. 05

Q.5 a) Find the bilinear transformation which maps the points Z=0, $-i$, $2i$ into the points W= $5i$, ∞ , $\frac{-i}{3}$ respectively. 05

b) Expand $f(z) = \frac{z^2-1}{(z+2)(z+3)}$ in a Laurent's series for 2< |Z| < 3. 05

c) Evaluate $\int_0^{2\pi} \frac{d\theta}{13+12cos\theta}$, by residue theorem. 05

2016

Section B

Q.6 Solve any five:- 10

a) Find the Laplace transform of $\frac{sin4\,t}{t}$.

b) Find the Laplace transform of $\left[\frac{d}{dt}\,(t^3e^{-3t})\right]$.

c) Find the Laplace transform of $[a\,cos^2\,2bt]$.

d) Find the inverse Laplace transform of $\frac{1}{s}\left(\frac{s-a}{s+a}\right)$

e) Find the inverse Laplace transform of $\left[\frac{s}{(2s+1)^2}\right]$.

f) Find the inverse Laplace transform of $\frac{Se^{-2s}}{S^2+25}$

g) Find f(x) , if its Fourier sine transform is $e^{-a\lambda}$.

h) Find the Fourier transform of

$$f(x) = 0\,, \infty < x < a$$
$$= x\,, a \le x \le b$$
$$= 0\,, x > b$$

Q.7

a) Evaluate $\int_0^\infty \frac{e^{-t}\,sin\sqrt{3t}}{t}\,dt$. 05

b) Find the inverse Laplace transform of $\frac{1}{2s}\log\left(\frac{s^2+36}{s^2+16}\right)$ 05

c) Solve $\frac{\partial u}{\partial t} = K\,\frac{\partial^2 u}{\partial x^2}$, subject to the conditions 05

1) u= 0 , when x =0, t $\geq$ 0
2) $u = e^{-ax}$, when t =0 , x > 0 and
3) $u(x,t)$ Is bounded.

Q.8

a) Find the Laplace transform of $e^{4t}\int_0^t t\cos t\;dt$. 05

b) Find inverse Laplace transform of $\frac{s}{s^4+8s^2+16}$ by convolution theorem. 05

c) Find the Fourier sine transform of $\cos hx - \sin hx$ 05

Q.9

a) Find the Laplace transform of periodic function. $f(t) = \left(\frac{\pi+t}{2}\right)^2, 0 < t < 2\pi\ and\ f(t) = f(t+2\pi)$. 05

b) Solve $\frac{d^2y}{dt^2} - 6\frac{dy}{dt} + 9y = t^2, e^{3t}, y(0) = 2, y'(0) = 6$ by Laplace transform method. 05

c) Solve the integral equation $\int_0^\infty f(x)\sin px\,dx = 1-p\,, 0 \le p \ge 1$ 05

0, P>1

Q.10

a) Express the following function in terms of Heaviside unit step function and hence find their Laplace transform. 05

$f(t) = (t-a)^4, t > a$
$= 0, 0 < t < a$

b) Solve $\frac{dx}{dt} + y = 0\,, \frac{dy}{dt} - x = 0\,, x(0) = 1\,, y(0) = 0$ 05

c) Find the Fourier transform of $f(x)$, where 05

$f(x) = \cos x\ , if\ 0 < x < 1$
$= 0$, Otherwise.

Total No. of Printed Pages:1

SUBJECT CODE NO:- K-33
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(Civil) Examination Oct/Nov 2016
Building Construction & Drawing
(Revised)

[Time:Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Question no.1 and Question no.6 are compulsory.
ii) Solve any two questions from remaining four from section A and one questions from remaining four from section B.
iii) Use separate drawing sheet for solving Q. No.6 of section B.

Section A

Q.1 Attempt any five out of seven. 10
a) Enlist the different components of a framed building in order of Construction.
b) List out the details which are provided in a submission drawing.
c) Specify the soil condition Where pile foundations is recommended
d) What is the difference between water Proofing and damp proofing.
e) Draw a neat sketch showing the height of sell, Lurtel weather shed and slab in a typical residential building.
f) A depression provided in a slab for providing toilet over it is called as?
g) What is head room?

Q.2 a) What do you understand by energy efficient building? Explain 10
b) With neat sketches explain different types of raft foundation? 05

Q.3 a) Differentiate between load bearing structure and framed structure. 07
b) What are the various methods of damp proofing? Explain any two with sketch. 08

Q.4 a) With the help of neat sketch, explain cavity wall construction. 08
b) What are the causes of facture of foundation? 07

Q.5 a) Write a detailed note on termite proofing. 07
b) With the help of neat sketches, discuss the material required and construction procedure adopted for a load bearing wall carrying two floors over it. 08

Section-B

Q.6 A family consulting of four adults and two children needs to construct a house on a plot admeasuring 10m x 12m. The maximum ground coverage (BUA) allowed is 75% of plot area. By providing suitable front, side and back margins, develop the working drawing [plan , section through stair, and Elevation] in a scale of 1:50. Provide schedule of openings and construction notes also. 25

Q.7 a) Discuss the types of stairs and then suitability with neat sketches. 08
b) Write a short note on wall cladding. 07

Q.8 a) Discuss the importance of safety in construction. 08
b) Write a note on construction joints in a columns and slabs. 07

2016

ηTotal No. of Printed Pages:2

SUBJECT CODE NO:- K-63
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(Civil) Examination Oct/Nov 2016
Fluid Mechanics- II
(Revised)

[Time:Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 & Q.No 6 are compulsory.
ii) Solve any two questions from the remaining questions in each section.
iii) Assume suitable data if necessary.

Section A

Q.1 Solve any five from following. 1 0

i. Define instantaneous velocity.
ii. Draw neat diagram of compound pipes .
iii. Enlist the minor losses.
iv. What do you mean energy dissipation?
v. Give the classification channels.
vi. What do you mean by repeating variables?
vii. A 2.5 m ship model was tested in fresh water and measurements indicated that there was a resistance of 45N when the model was moved at 2 m/s .work out the velocity of 40 m proto type
viii. Define critical depth as applied to flow in an open channel.
ix. If v =2.1 m/s ,Ym = 1.6 m , S0 = 1:1000 find out chezy's constant C.
x. What do you mean by turbulence?

Q.2 a) Explain with neat sketch hydro dynamically smooth and rough pipes. 07

b) Obtain general velocity distribution equation for turbulent flow in pipes. 08

Q.3 a) A pipe of 300 m long and 200mm in diameter is carrying water. The loss of pressure head measures in 3.0m . 07
Take F =0.008. Find out the rate of flow through the pipe.

b) What is siphon? Where it is used? Explain it is action. 08

Q.4 a) Obtain an expression Chezyls formula for finding discharge through open channel. 07

b) A rectangular channel of 12.0m wide discharges 30 m^3/s of water at a section, where the depth is 1.5m . 08
Find ,
i) Specific energy of water flowing through the channel.
ii) Critical depth and critical velocity.
iii) Minimum specific energy.

Q.5 a) The velocity and flow over a model of spillway are 2.5m/s and 4m^3/s respectively. Find out the velocity and 07

discharge over a proto type which 30 times the model size.

b) Enlist the various dimensionless numbers. 04

c) Give the dimensions in M, L, T system for the following. 04
   i) Dynamic necessity
   ii) Flow rate

Section – B

Q.6 Attempt following (Any five) 10
   i. Define axial flow reaction turbine.
   ii. What is impulse momentum principle.
   iii. Define overall efficiency for centrifugal pump.
   iv. Define semi closed and open impeller.
   v. What are the important component parts of reaction turbine?
   vi. Enlist the factors considered for selection of a particular type of turbine.
   vii. Define suction stroke in case of reciprocating pump.
   viii. What do you mean by runway speed?
   ix. What is the principle of hydraulic ram?
   x. It Q = 1.2m^3 /sec, N =800 rpm and H =16m , find out specific speed of the pump.

Q.7 a) Show that when a jet of water impinges on a series of curved vanes , maximum efficiency is obtained when the vane is semi-circular in section and the velocity of vane is hall that of jet. 07

b) A 80mm diameter jet having a velocity of 30 m/s strikes a flat plate, the normal of which is inclined at 45^0 to the axis of the jet . Find the normal force exerted on the plate. 08
   i) When plate is stationary
   ii) When plate is moving with a velocity of 15 m/s in the direction of jet away from the jet .

Q.8 a) Explain with neat sketch working of Francis turbine. 07

b) A turbine develops 7350 KW under a head of 25 meter at 135 rpm. Calculate the specific speed of the turbine and type of turbine. 08

Q.9 a) A centrifugal pump while running at 1000 rpm discharges 140 Lit/sec against a net head of 20m. The $\eta_{mano} = 80\%$, vane angle at outlet is 40^0 and velocity of flow 3.5 m/s ,estimate outer diameters of impeller and its width. 08

b) Draw net sketch of i) Ideal indicator diagram and ii) Actual Indicator diagram. 07

Q.10 a) Explain with neat sketch working of Hydraulic intensifier. 05

b) What is a air vessel? Explain it is working. 05

c) Explain working of hydraulic lift. 05

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-93
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (Civil) Examination Oct/Nov 2016
Surveying - II
(Revised)

[Time:Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 and 6 is compulsory.
ii) Answer any two questions from each section from remaining.
iii) Figures to the right indicate full marks.
iv) Assume suitable data if necessary.

Section A

Q.1 Answer the following (any five) 10

1) State different objectives of geodetic surveying.
2) What is the principle of triangulation?
3) Give mathematical expression for spherical excess
4) What is meant by base net?
5) State the different methods to determine the most probable values.
6) Define mean square error and residual error
7) Explain weight of observation with example
8) List out various types of signals.

Q.2 a) State and explain Laws of weight. 07
b) Derive the formula for the correction to be applied when observation is made on the bright line. 08

Q.3 a) Discuss briefly corrections to be applied in base line measurements. 07
b) Explain any one method to compute the sides of spherical triangle. 08

Q.4 a) Explain the method of transferring tunnel alignment to underground 07
b) An angle has been measured under different field conditions with the results as follows. 08

28^0 24' 20"	28^0 24' 00"
28^0 24' 40"	28^0 24' 40"
28^0 24' 40"	28^0 24' 20"
28^0 25' 00"	28^0 24' 40"
28^0 24' 20"	28^0 25' 20"

Find
i) Es
ii) Em

Q.5 Write short notes on (any three) 15

1) City surveying
2) Route surveying
3) Satellite station and reduction to centre
4) Axis signal correction
5) Adjustment of a geodetic quadrilateral

2016

Section B

Q.6 Answer the following (any five) 10

1) Enlist different types of horizontal curve with neat sketch.
2) What is a 3^0 curve?
3) What are the elements of a compound curve?
4) State the difference between the techniques of reciprocal levelling and reciprocal trignometrical levelling.
5) Explain modulation in EDM.
6) Express mathematical expression for apex distance in simple circular curve
7) State different methods of setting out of horizontal curve by chain & tape method.
8) What is a transition curve?

Q.7 a) Explain the various methods of determining the length of transition curve. 07

b) Describe briefly the elements of a reverse curve. 08

Q.8 a) Explain phase comparison in detail. 07

b) The following reciprocal observations were made from two points P and Q 08
Angle of elevation of Q at P= $1^0 5' 21''$
Angle of depression of P at Q=$1^0 0' 50''$
Height of instrument at P=1.35m
Height of signal at P=6.10m
Height of instrument at Q=1.38m
Height of signal at Q= 6.21m
Horizontal distance between P and Q=4860m

Q.9 a) Derive the expression for setting out of simple circular curve by offsets from chord produced 07

b) Two tangents intersect at a chainage of 1000m the deflection angle being 30^0, calculate all the necessary data for setting out a circular curve of radices 200m by the method of offsets from chord produced. Taking peg interval of 2o m. 08

Q.10 Write short note on (any three) 15

1) Ideal transition curve
2) Geodemeter
3) Superelevation in curve
4) Electromagnetic waves and their properties
5) Lemniscate curve.

Total No. of Printed Pages:3

SUBJECT CODE NO:- K-160
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(CIVIL) Examination Oct/Nov 2016
Theory of Structure-I
(Revised)

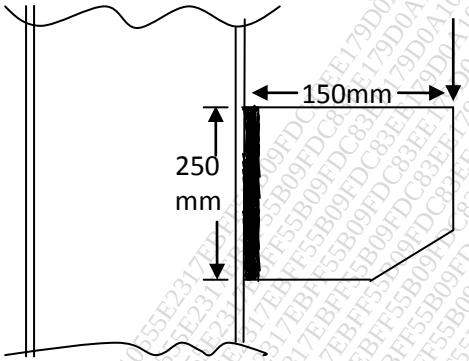
[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Attempt any three questions from each section.
ii) Assume suitable data if necessary.

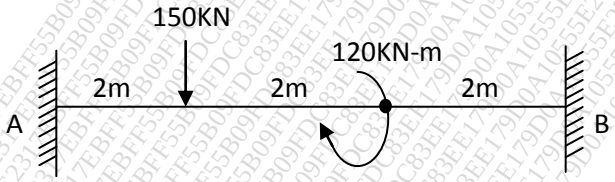
Section A

Q.1 Find the size of the fillet weld required to connect the backed plate to the column as shown in fig: 01. The permissible stresses in weld is 110 N/mm^2 08



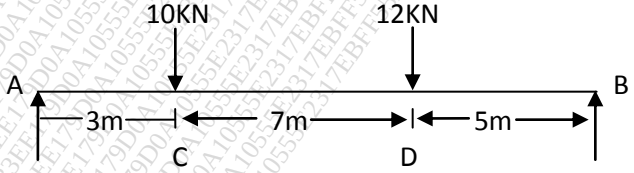
b) Explain different type of welded joint with real sketch. 05

Q.2 Draw the SFD & BMD for the fixed mean shown figure:02 14



fig=02

Q.3 For girder 15m long simply supported at the end, carriers two point load as shown in figure:03, calculate the deflection of beam under the point 'C' using Macaulay's method take E= 200 GPa I=$160 \times 10^6 mm^4$ 13

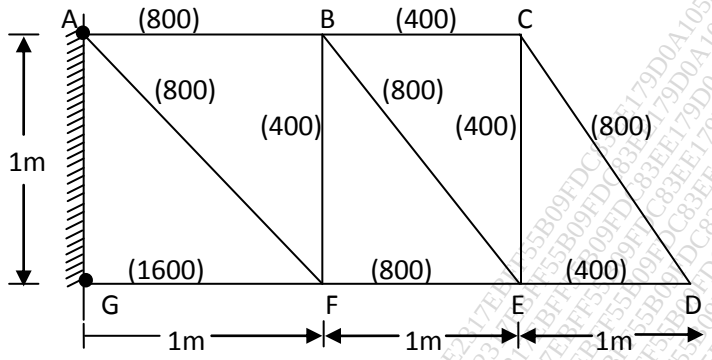


fig=03

2016

Q.4 Find the vertical deflection at the joint 'D'. For the truss shown in fig: 04. The cross sectional area of member in mm^2 is shown in brackets. 13

Take E=200KN/ mm^2



fig=04

Q.5 Write note on following (<u>any two</u>) 13

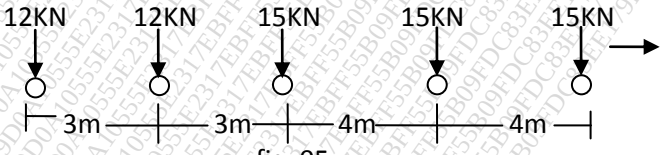
i) Williot diagram

ii) Castigliano's theorem

iii) Types of weld

Section B

Q.6 A locomotive crosses the ginder of spam 24m. Using influence diagram methods determine maximum B.M. under the central load. 13



fig=05

Q.7 Draw the SFD & BMD for a continuous beam shown in figure: 06 14

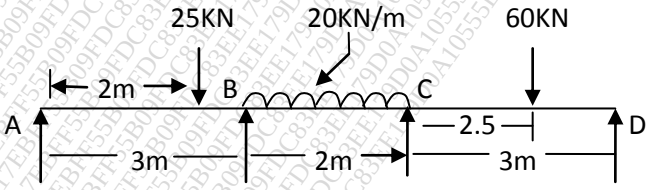


figure: 06

Q.8 A three hinged parabolic arch of span 24m and central rise of 6m carries UDL of 30KN/m over the left half spam and a point load of 145 KN at 16m from left support. Find normal thrust, radial shear, & BM at distance of 6m from left support. 13

Q.9 A suspension bridge with three hinged stiffing girder of spam 150m & central dip of 15m. The width of load way supported by the girder is 6m. The dead load is 8 K/m^2 of floor area & live load of 10KN/m^2 covers whole span. Find the sheer force & bending moment at 35m from left support. 13

2016

Q.10 Write a note on following (any two) 13

i) Influence line diagram method

ii) Eddy's theorem

iii) Calpeyron's three moment theorem

Total No. of Printed Pages:3

SUBJECT CODE NO:- K-185
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(ALL-BRANCHES) Examination Oct/Nov 2016
Engineering Mathematics - III
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B
i. Q.No.1 and Q.No.6 are compulsory.
ii. Solve any two out of Q. 2, 3, 4 & 5.
iii. Solve any two out of Q. 7, 8, 9& 10.
iv. Use of Non-programmable calculator is allowed.
v. Figures to the right indicate full marks.
vi. Assume suitable data, if necessary.

Section A

Q.1 Solve any five 10

a) Find C.F. of $\frac{d^2x}{dt^2} + 3a\frac{dx}{dt} - 4a^2x = 0$
b) Solve $(D^3 - 3D^2 + 3D - 1)y = 0$
c) Find P.I of $(D+2)(D-1)^2y = e^{-2x}$
d) Find P.I of $(D^2 - 4)y = x^2$
e) If the probability of a defective mobile phone is 0.2, find the
   I. Mean
   II. The standard deviation for the distribution of mobile phones in a total of 200.
f) Suppose 3% of bolts made by machine are defective the defects occurring at random during production if bolts are packaged 50 per box find Poisson approximation to it that a given box will contain 5 defectives.
g) There is no skewness in the distribution if ----------.
h) Draw the electrical circuit that gives damped free oscillations.

Q.2 a) Solve $(D^2 + 13D + 36)y = e^{-4x} + cos2x$ 05

b) Find the Karl Pearson's coefficient of skewness for the following 05

Years under	10	20	30	40	50	60
No. of persons	15	32	51	78	97	109

c) An alternating $emfE \sin \omega t$ is applied to an inductance L and capacitance C in series. Show that ,the current in the circuit is $\frac{EW}{(n^2-w^2)L}(coswt - cosnt)$ where $\eta^2 = \frac{1}{LC}$ 05

Q.3 a) Solve by method of variation of parameters. $(D^2 + 2D + 1)y = 4e^{-x}\log x$ 05

b) Apply the method of the least squares to fit a parabola $y = a + bx + cx^2$ for the data. 05

X	-1	0	0	1
Y	2	0	1	2

c) Solve $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = \sin(logx^2)$ 05

Q.4 a) An underground mine has 5 pumps installed for pumping out storm water. The probability of any one of the pumps failing during the storm is $\frac{1}{8}$. what is the probability that 05

I. At least 2 pumps will be working

II. All pumps will be working during a particular storm.

b) A body executes damped forced vibrations given by the equation $\frac{d^2x}{dt^2} + 2K\frac{dx}{dt} + b^2x = e^{-kt}\sin wt$. solve the equation for both the cases, when $w^2 \neq b^2 - k^2$ and $w^2 = b^2 - k^2$. 05

c) Solve $(2x+1)\frac{d^2y}{dx^2} - \frac{dy}{dx} + \frac{y}{2x+1} = \frac{3x+4}{2x+1}$ 05

Q.5 a) The first four moments of a distribution about the value 4 of the variable are −1.5, 17,-30 and 108. Calculate the first four moments about the mean and find β_1 and β_2. 05

b) Solve the equation $EI\ \frac{d^2y}{dx^2} + Py = \frac{-wl^2}{8}\sin\left(\frac{\pi x}{l}\right)$ for a strut of length 'l' freely hinged at each end. Prove that the deflection y at the centre is $\frac{wl^2}{8(Q-P)}$ where $Q = \frac{EI\pi^2}{l^2}$ 05

c) Solve by general method $(D^2 + 3D + 2)y = e^{e^x}$ 05

Section – B

Q.6 Solve any five 10

a) Find the first approximate value of the root $(ie.\ x_1)$ by Newton – Raphson method for $\log_e x - x + 3 = 0$.

b) Find the values of x, y, z in the first iteration by Gauss Seidel Method for

$8x + 3y + 2z = 13$

$x + 5y + z = 7$

$2x + y + 6z = 9$

c) Find f(1) for data

X	0	2	3
F(x)	-4	2	14

d) Find grad ∅ at (1,1,-1) if $\emptyset = e^{2x-y+z}$.

e) Prove that $\bar{F} = (y^2 cosx + z^3)i + (2y\ sinx - 4)j + (3xz^2 + 2)K$ is conservation field.

f) If $\bar{A}(t) = ti - t^2j + (t-1)K$

$\bar{B}(t) = 2t^2i + 6tk$

Evaluate $\int_0^2 \bar{A}.\bar{B}\ dt$.

g) If $\bar{r} = xi + yj + zk$ then find $\nabla.\bar{r}$.

h) Write formula of Runge Kutta IVth order method to solve $\frac{dy}{dx} = f(x,y), y(x_0) = y_0$

Q.7 a) Find the root of the equation $e^{-x} - x = 0$ by Newton –Raphson method (correct to three decimal places). 05

b) Find the directional derivation of $\emptyset = xy^2 + yz^3$ at the point (2,-1, 1) in the direction of the normal to the surface $xlogz - y^2 = -4$ at (-1,2,1). 05

c) If $\bar{F} = (5xy - 6x^2)i + (2y - 4x)j$, evaluate $\int_c \bar{F}.d\bar{r}$ along the curve C in $x - y$ plane, $y = x^3$ from the point (1, 1) to (2, 8). 05

Q.8 a) Solve by Gauss Seidel method 05

$28x + 4y - z = 32$

$x + 3y + 10z = 24$

$2x + 17y + 4z = 35$

2016

b) Verify Green's theorem for $\bar{F} = x^2 i + xyj$ and C is a triangle having vertices A (0, 2), B (2, 0) and C (4, 2). 05

c) Find $\nabla^4(e^r)$. 05

Q.9

a) Given that $\frac{dy}{dx} = 2 + \sqrt{xy}$ and y(1)=1 find approximate value of y at $x = 1.2$ using Euler's modified method (take $h = 0.2$) 05

b) Use Lagrange's interpolation to find the value of y when x=10 for the data given below. 05

X:	5	6	9	11
Y:	12	13	14	16

c) Using stoke's theorem evaluate $\int_c [(x + y) + (2x - z)dy + (y + z)dz]$ where C is the boundary of the triangle with vertices (2,0,0) (0,3,0) and (0,0,6). 05

Q.10

a) Evaluate $\int_c \bar{F}.d\bar{s}$ where 05
$\bar{F} = yi + xj + z^2 k$ over the cylindrical region bounded $by\ x^2 + y^2 = 9, z = 0$ and $z = 2$.

b) From the following table find the value of $\frac{dy}{dx}$ at $x = 2.03$. 05

X:	1.96	1.98	2.00	2.02	2.04
Y:	0.7825	0.7739	0.7651	0.7563	0.7473

c) Use fourth order Runge Kutta method to find y at $x = 0.1$ given that $\frac{dy}{dx} = 3e^x + 2y, y(0) = 0\ and\ \ h = 0.1$. 05

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-308
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(Civil) Examination Oct/Nov 2016
Concrete Technology
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Figures to the right indicate marks.
ii) Assume suitable data if necessary in mention clearly.
iii) Q.1 & Q.6 are compulsory. Attempt other two from each section.

Section A

Q.1 Answer the following questions. (any five) 10
a) What are different types of manufacturing of concrete how they are different from each other?
b) What is the effect of moisture content in aggregates?
c) What are the ingredients of cement give their percentages?
d) What is the classification of aggregates?
e) What are field tests conducted on cement?
f) What are different types of cements?
g) What is workability of concrete? Explain.
h) What are water proofing materials?
i) What is formwork where they are used?

Q.2 a) How mix proportioning of concrete ingredient are done explain in details. 06
b) What are physical of fresh concrete. 05
c) What is curing & its significances. Various method of curing. 04

Q.3 a) What does it mean by high strength concrete & high performance concrete? 05
b) What are different tests conducted on cement explain any one. 06
c) What is compaction of concrete explain necessity of it. 04

Q.4 a) What is segregation, bleeding and fracture of concrete. 06
b) What are destructive & non destructive testing of concrete explain any one method. 05
c) What are different elements of formwork? Explain shipping line of various elements of form structure. 04

Q.5 Write short notes: [Any Three]. 15
a) Placing of concrete.
b) Mixing of concrete.
c) Properties of aggregates.
d) Setting times of cement.
e) Water cement ratio.

Section B

Q.6 Answer the following questions [Any Five] 10

a) What is fiber reinforced concrete.
b) What is light & heavy density concrete.
c) What is short cute or gunniting of concrete.
d) What is self compacting concrete.
e) What is mix design of concrete.
f) What is sulphate attack.
g) What are different method of mix design.
h) What is aerated concrete.
i) Factors affecting feazing & thawing.
j) Use of various wastes in concrete.

Q.7
a) What is code method of mix design explain in detail. 06
b) What are recommendation of all method of mix design. 05
c) What is high density concrete. Explain. 04

Q.8
a) What is hot wreathing concrete. Explain in detail. 06
b) What does it mean by strength, mean strength, variance, standard deviation & coefficient of variance in Mix design. 05
c) What is durability & factors affecting durability of concrete? 04

Q.9
a) What are concrete repairs? Explain various methods of repairs. 06
b) What is sulphate attack & corrosion of reinforcement? 04
c) What is carbonation & explain its significance. 05

Q.10 Write short notes [Any Three] 15

a) Pumping of concrete.
b) Ready mix concrete.
c) What is special concrete?
d) Low temperature concreting.
e) Handing of concrete.

Total No. of Printed Pages:3

SUBJECT CODE NO:- K-210
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(CIVIL) Examination Oct/Nov 2016
Strength of Materials
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

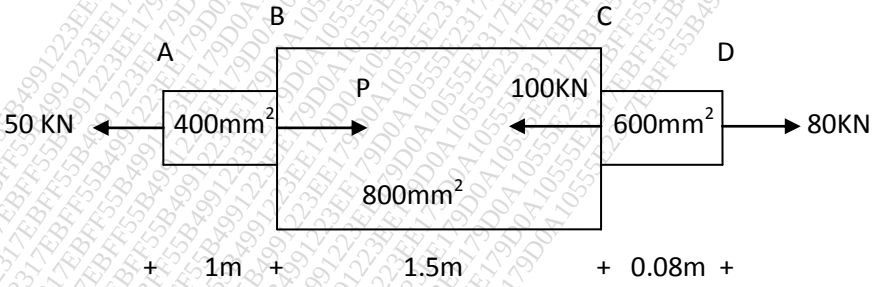
N.B i) Question No.1 and Q.No.6 are compulsory. Attempt any two from remaining for each section.
ii) Figure to the right indicates full marks.
iii) Assume suitable data if necessary.

Section A

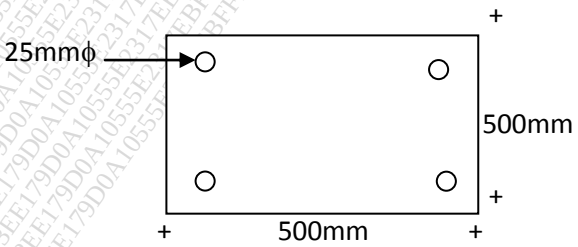
Q.1 Attempt any five 10

1. Define elastic body.
2. Define Poisson's ratio.
3. Define modulus of elasticity.
4. Define bending moment.
5. Explain point of contra flexure.
6. What do you mean by section modulus?
7. Draw stress strain diagram for ductile material.
8. Define modular ratio.

Q.2 a) Find unknown force 'P' necessary for equilibrium & determine total elongation of bar. Take $E = 210 \times 10^3$ n/mm^2 08



b) A reinforced concrete column 500mmX500 mm in section is reinforced with four steel bars of 25mm diameter one in each corner. The column is carrying a load of 1000KN. Find the stress in concrete & steel bar. Take $Es = 210 \times 10^3$ n/mm^2 & $Econ = 14 \times 10^3$ n/mm^2 07



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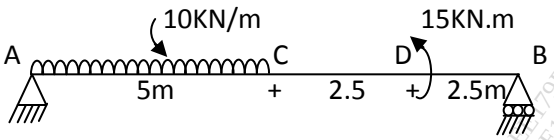
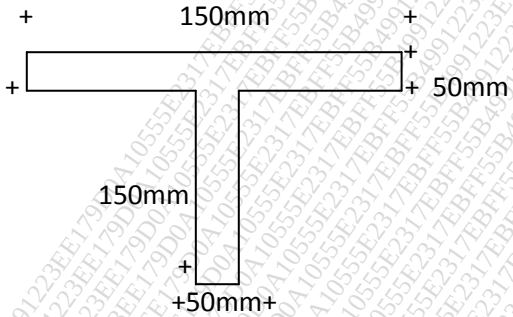
Q.3 a) Explain types of supports. 03

b) Draw S.F.D, B.M.D & maximum bending moment for the beam shown in figure. 12



Q.4 The C/S of a beam is shown in fig. determine maximum tensile & compressive stress occurring in the beam C/S for bending moment of 3.4Kn/m for S.S.B 15



Q.5 a) A bar of length of 10m elongates through 8mm under the action of axial pull of 5KN. if diameter of bar is 25mm. Find stress strain & modules of elasticity. 07

b) Derive flexural formula. 08

Section -B

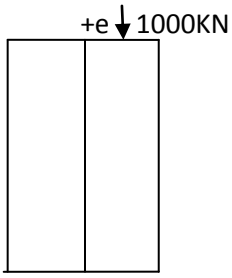
Q.6 Attempt any five. 10

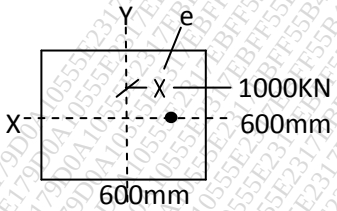
a) What is angle of twist?
b) Write down the torsional formula.
c) Define principal plane.
d) Write formula for power transmitted by shift.
e) Define column.
f) Define Hoop stress.
g) Types of loading in strain energy.
h) Write down assumptions in theory of torsion.

Q.7 a) A hollow circular shaft 200mm external diameter& 160mm internal diameter , transmitting power at 180 RPM the angle of twist at a length of 2m is found to be 0.55^{o} calculate power transmitted & maximum shear stress. Take $G=0.8 \times 10^{5}$ N/mm^{2} 08

b) A vertical bar of uniform c/s area 400mm^{2} and 1.5m long is fixed at top end & is provided with a circular disc at the bottom. if a weight of 500 N falls on the disc from a height of 100mm. Determine the stress developed in the bar & what will be the strain energy stored in bar. E=200Gpa. 07

Q.8 a) A short masonary pillar is 600mm × 600 mm in section, the pillar carries a point load of 1000KN acting on the centroidal axis of the section shown in fig. and at eccentricity of 80mm from the longitudinal axis find the minimum & maximum stress in the section 08

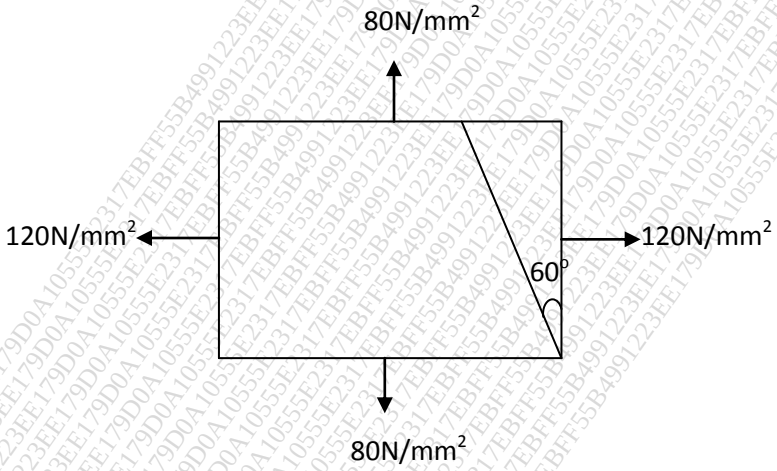




b) 07

A boiler shell 2m diameter 4m long is subjected to internal fluid pressure of 2N/mm^2. If maximum tensile stress allowed in steel is 100N/mm^2 find thickness change in diameter length & volume of the shell. Take E=200Gpa μ =0.25

Q.9 The principal stresses at a point across the perpendicular plane are 120N/mm^2& 80N/mm^2 both positive. find normal stress tangential stress, resultant stress & angle of obliquity across a plane passing through point inclined at 60^o to the plane of 120N/mm^2 15



Q.10 A 1.5m long column has a circular C/S of 50mm diameter. One of the end of the column is fixed and the other end is free considering factor of safety as 3, calculate safe load using. 15

1. Rankin's formula when $Ec = 560N/mm2$
   $\propto = 1/1600$
2. For Euler's formula E= 1.2× 10^5 N/mm^2

2016

Total No. of Printed Pages:2

SUBJECT CODE NO:- K-241
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(CIVIL) Examination Oct/Nov 2016
Fluid Mechanics-I
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 and Q.No.6 are compulsory.
ii) Solve any two questions from the remaining questions from each section.

Section A

Q.1 Solve any five. 10

i) Define the term vapour pressure.
ii) If specific gravity of a liquid is 0.75, find out specific volume.
iii) What do you mean by buoyant force?
iv) Give the Euler's equation of motion.
v) Draw a neat sketch of inclined – single column manometer.
vi) Define hydrostatic pressure.
vii) What do you mean by flow net?
viii) Define forced vortex flow.
ix) Define path line and streak line.
x) What do you mean by fluid dynamics?

Q.2 a) An individual differential manometer containing an oil of sp.gr.0.8 is connected to find the difference of pressure at two points of a pipe containing water. If the manometeric reading is 40cm, find the difference of pressures. 07

b) Obtain the expressions for total pressure and centre of pressure. 08

Q.3 a) Derive an expression for the metaceritric height by experimental method. 07

b) Determine the total pressure and depth of centre of pressure on a plane rectangular surface of 1.0m wide and 4.0m deep, when it's upper edge is horizontal and 08

i) Coincides with water surface
ii) 1.5m below the free water- surface.

Q.4 a) The velocity components in a fluid flow are given by 08

$$u = 2xy, \quad v = a^2 + x^2 - y^2$$

i) Show that the flow is passive
ii) Derive the relative stream function

b) In a pipe of 300mm diameter the maximum velocity of how is found to be 3.0m/s. If the flow in the pipe is laminar. 07

Find:
The average velocity and the radius at which it occurs.

Q.5 a) Distinguish between rotational flow and irrational flow. Give one example. 05

b) State and prove Pascal's law. 05

c) Explain pressure transducers. 05

2016

Section B

Q.6 Attempt any five from following 10

i) Enlist types of boundary layer.
ii) Define momentum correction factor.
iii) Draw neat diagram of submerged rectangular weir.
iv) Define coefficient of velocity and coefficient of contraction.
v) Classify the mouthpieces on the basic of their position and shape.
vi) Distinguish between notch and weir.
vii) Draw neat sketch of border's mouthpiece.
viii) Define displacement thickness.
ix) Explain briefly the potential head and velocity head.
x) Differentiate between orifice and notch.

Q.7
a) Explain the construction and working of venturimeter. 05
b) Draw neat diagram of pitot. Explain its working and obtain an expression for stream velocity. 05
c) Water is flowing with a velocity of 15m/s and under a pressure of 300kpa. If the height above the datum is 30m, calculate the total energy per unit weight of water. 05

Q.8
a) Derive an expression for time emptying a rectangular tank through an orifice at its bottom. 07
b) An internal mouthpiece of 150mm diameter is discharging under a constant head of 5.0m. Find the discharge through mouthpiece, when, i) the mouthpiece is running free, ii) the mouthpiece is running full. 08

Q.9
a) A rectangular channel 1.5m wide has a discharge of $0.2m^3/s$, which is measured by right-angled V-notch. Find the position of the apex of notch from the bed of the channel if the maximum water depth should not exceed 1.0m. Take Cd=0.62. 08
b) Obtain an expression for discharge through three stepped notch. 07

Q.10
a) Explain with neat sketch boundary layer separation. 05
b) Explain pressure drag and friction drag. 05
c) Explain with neat sketch velocity of approach. 05

Total No. of Printed Pages:3

SUBJECT CODE NO:- K-274
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(Civil) Examination Oct/Nov 2016
Surveying-I
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 and Q.No.6 are compulsory.
ii) Solve any two questions from the remaining questions from each section.
iii) Assume suitable data, if necessary.
iv) Figures to the right indicate full marks.

Section- A

Q.1 Solve any five. 10

1) Define the following terms.
   (a) Subsidiary station
   (b) Tie station
2) Differentiate between chain surveying and compass surveying.
3) Define:- True Meridian and magnetic meridian.
4) Write the statement of three point problem.
5) Enlist the accessories used in plane table surveying.
6) What is magnetic declination?
7) What are the advantages of plane tables surveying?
8) What are contours?
9) Define – i) Line of collimation
   ii) Bench Mark.
10) What is local attraction?

Q.2 A) In traverse, following observations are taken. At which station do you suspect local attraction and find out the corrected fore bearings and Back bearings of lines. 08

Line	FB	BB
AB	68°15’	$248^0$15’
BC	148°45’	$326^0$15’
CD	224°30’	$46^0$00’
DE	217°15’	$38^0$15’
EA	327°45’	$147^0$45’

B) Describe the two peg method of permanent adjustment of a dumpy level. 07

Q.3 A) A line was measured by 20m chain which was accurate before starting the day’s work. After chaining 900m the chain was found to be 6 cm too long. After chaining total distance of 1575 m. The chain was found to be 14 cm too long. Find the true distance of line. 08

B) Explain the various methods of orientation in plane table survey. 07

Q.4 A) Write the statement of two point problem. Explain the solution of two point problem in details. 07

B) Describe with the help of sketches characteristics of contours. 08

Q.5 A) The following reciprocal observations were made during the testing of a dumpy level. Distance between A and B=200m, find out, 08

1) The collimation error.

2) The true RL of B.
3) Whether the line of collimation is inclined upwards or downwards.

Instrument	Staff Reading at		Remark
is at	A	B	RL of A=450.000m
A	1.725	2.245	
B	2.145	3.045	

B) Describe the method of reciprocal levelling with neat sketch. 07

Section – B

Q.6 Solve any five. 10

1) Enlist the fundamental lines of transit theodolite.
2) What is the least count?
3) State the prismoidal rule and trapezoidal rule.
4) State the principle of stadia method.
5) What is the zero circle of the planimeter?
6) What are the tachometric constants?
7) What is the mass diagram?
8) What are the lifts and leads?
9) Define the consecutive and independent Co-ordinates.
10) State the Bowditch rule.

Q.7 A) Derive an expression for the area of two level section. 08

B) The area enclosed by contours lines at 5 m intervals for a reservoir up to the face of a proposed dam, are shown below. 07

Value of contour	1005	1010	1015	1020	1025	1030	1035
Area	400	1500	3000	8000	18000	25000	40000

Taking 1005 m and 1035 m as the bottom most and highest water levels respectively. Determine the capacity of reservoirs by-

1) Trapezoidal Rule
2) Prismoidal Rule

Q.8 A) Explain the methods of traversing by theodolite. 07

B) The traverse data given in the table contains the lengths and interior angles of the traverse. The bearing of line PQ was measured as S 36°12' 30''ϵ. check the traverse for angles and closing errors. Find the correct latitudes and departures by the Bowditch rule. 08

Line	Length	Station	Included Angle
PQ	102.8	P	131°14' 30''
aR	98.4	Q	84°19' 25''
RS	110.8	R	116°35' 25''
ST	82.8	S	119°58'05''
TP	113.29	T	87°54' 05''

Q.9 A) Explain the method of repetition for the measurement of horizontal Angle. 07

B) The following observations were taken with tachometers, fitted with an anallatic lens, the staff being held vertical. The constant of tachometer is 100. Calculate the RL of station B and the distance between A and B. 08

Inst. Station	HI	Staff station	Vertical Angel	Reading	Remark
P	1.255	BM	-4°20'	1.325, 1.825, 2.325	RL of BM=255.75m
P	1.255	A	+6°30'	0.850, 1.600, 2.350	
B	1.450	A	-7°24'	1.715, 2.315, 2.915	

Q.10 Write the short notes on:- (Any three) 15

1) Theory of anallatic lens.
2) Prismoidal correction.
3) Gale's Traverse table.
4) Methods of interpolation of contours.
5) Measurement of deflection angle.