CIVIL ENGINEERING

ONE MAltKB QUI!STION8

1. A mlld steel specimen Is under uniaxial tensile stress Young's modulus and }~eld stress for mild steel are 2 x 10$MPa and 250 MPa. respectivety. The maximum amount of strain energy per unit volume thai.can be stored in this specimen without permanem set is
   a. 156N mm/rnnr'
   b 15.6 Nmmlmm'
   c. 1.56 Nmmlnuil'
   d. 1),156Nmnvmm'

2. A reinforced concrete structure has 10 be constructed along st sen coast, The minimum grade <lf concrere 10 be 'used as per lS: 456-2(lO() is
   a. M 15
   b. M 20
   c. M 25
   d. M 3(1

   In the design of a reinforced concrete beam the requirement for bond is not gening sausfied. The economical option to sntisfied the requirement lor bond is by
   a bundling of bars
   b. providing smaller diameter bars more in number
   e providing lurger diameter linrs less in number
   d. providing same diameter bars more in number

   The shape of Mℓ cross-section, which has the. talest shape factor, is
   a, I't!cl;lng ulat
   b. l-scotion
   C. diamond
   d solid circutar

5. Group symbols assigned to silry sand and clayey sand are respectively
   a. SS<und CS
   b. SM and CS
   c. SM lind SC
   d. MS and CS

6. When a reraining wall moves away lrom the baekjjll, the pressure exerted on the wall is 101111<ed
   a, passive earth pressure
   b. swelling pressure
   c. pore pressure
   d. active earth pressure

7. Compacnon by l'lbrnlo<{y roller is the best method.of compaction in case of
   n, moist silly sand.
   b well graded dry sand
   c. clay of medium compressiblliry
   d. slit of high compresSibility

   Two pnrnary air pollutants are
   a. sulphur OXIdeand ozone
   b. nilrogeh oxide and pero~yacei¥l"ilrnle
   c, sulphur oxide and hydrocarbon
   d. 01.,01 10 and peroxyacetyhutrate

11. TWo biodegradable components 0f municipal solid waste are
    a. plastics and wood
    b. cardboard and glass
    c. leather anellili cans
    d food wastes and garden In mmi'1g5

10. A flood wave with a known fnflQlv hy(lrogftrph is routed through a Ilirge reservoir The outflow hydrognipll will hare
    a. iiitenuated peak mth reduced lime base
    b. attenuated peak with Increased lime-b3Se
    c. increased peak with Increased rime-base
    d. mcreased peak with reduced time-base

tl. A stable channel is to be designed for a discharge Qf Qml/s \111h sln Jacror f as per Lacey s method. The mean no" velocity (nvs) III Utechannel is obtained b)
    a *(Qf\/14(})116*
    b. (Qf'J40)'"
    c, (Q1f/140)11~
    d. \JAK(Q~f)'13

12. 'n18 base WIdth o',," elementary profile or ~ grnl'il), dam of height H is b The specific gravity of the materinl of the dam

I.Sa and uplift pressure coefficient is K. The cllITeoLre)Jjli'ClllShip for oo tension lit the.heel is' given by

a. $\frac{b}{H} \quad \frac{I}{.JO\text{-}K.}$

b. $\frac{!}{H} = .JO\text{-}K$

c. $\frac{b}{H} = \frac{}{G\text{-}K}$

J. $\frac{b}{S} \quad \frac{I}{: K.JO\text{-}K}$

13 The. specific gravity ai'pa.VUlg bitumen as per TS ; 73-19921ies between

a. J.IO and 1.06
b. IJJfi and 1,02
c. J ,02 and 0:97
d. 0.97 and 092

A. combined value of flakfne~'s and elongation index. is to 'be deternuned for ~ sample of aggregates, 11,e sequence in which the two tests are conducted is

a. elongation index lest followed by flakiness. index rest on the whole 'Sample
b. flakiness Inde;>t test followed by elongarion i"d~ t~L on I.be \vl\olt! sample'
'" flakiness index lest, followed by elongation index test on nen-flaky aggregates
d. elongation index test followed by flakiness index test all non-elongated aggregates

15. The capacities of "One-way L~ III wide sjde.w:U;k (persons l)et how)" 'ani! "One-way 2-Ianc urban rood (pCU per hour. with no frontage access, no standing vehicles 8111 lvelY lito e' cross llaffic)'- are respectively

a. 1200 9)1d240Q
b. Jil.00 and 2.0QO
c. 1200 and 1500
d. 2000 oml1200

16. The shape, "rU,1' STOP sl&ll accerdingto TRC ; 67~2-001is

a. circular
b. trianguler
c, octagonal
(I. rectangular

17. The We of Wrveyi:qg in. which the curvature bf the earth i~taken.into UOC\10nt is called

a. Geodetic surveyfng
b. Plane surveying
c. Preliminary surveying
d. Topographical !:luvt'jling

J8. A pel's. n standiug on the bank of a canal dreps n stone on the water surface. fie notices (hat the dismrbance on the water surface is not traveling upstream, TIUs is becausethe fiowill tho canal Is

a, sub-critical
b. super-critical
c. steady
d. uniform

19. The [ll'odilCl&f matrices (PQ)-Jpl~

a. p-l
b. Q-'
c. p-lq-ip
d. PQ p.'

20. The general solution of ~ ,y = 0 18

a, y =Pcoe x+Q'sin x
b. y=PCCISX
f', y=P.iP x
d. j'=Psjn~

1WO MARKS QUEsnONS

11. Cross-section, of. a column gOnsistinl!, of two steel smps, each 9f thickness I- and WIdth b is ~J10\vD mthe ngtl're below, Tlre critical loads 0f l;lte column ",ith perfeel bond and wifu.oot bond between th,e strips are P and p. respeotive),y. The ratio P/Po is

a'. :1
h. 4
c: 0
d. 8

22. A r.igill bm;Gfi of lengih Lis Sllp'ported liy a. binge. 1WQ. n sp~ of stiffness X !is

shown in the .fig:ure below. TIle buckling J d, P"" (or the bar will be

.–

L,

a. 0.5 KL
b. 0:8 KL
c. 1.0 KL
tl. 1,2 I:<1,

23 The maximum shear stress In.a solid shaft ot circular cross-section having diameter subjected to a torqUe'T.iS: 1. If the torque-is increased by four tilnes and the diameter of tile 'sha_1tJ$ increased by two times, tile maximum shear stress ill thli shaft will U6

a. 2't
b. •
c. .../2
d. /4

24. A VertiCail'O.d.PQ of lengtli L is fixed at its fop end P aud LOll a J)\I1I!!e- fixed, ~I\ Ole bottom end Q. A. weight IV Is- ,dropped vertically from a height I1(<J.-)inlto the flange. TIle axial stress In. the rod can be roducedby

a. increasing the length of tile rod
b. decreasing the length. of'Ihe rod
c. decreasing tlte area of' cross-section of the rod
d. incr....~ingthe modulus of elllS~c1ty of the material

'T1re maximum (ensile stress lit the Sell:UOll X.,X shown in tlle f{gure b.elow is V

f,~·.⊀

1M. •

a. 8,P / hd
b. 6P / /Ji{
c. IP- / 1:(7
d. 2P / Qd

26. The stepped cantilever is subjected to moments, M -asshown.in the figure below The vertical deflection at the free end (neglecting tlte selfweight) is

(.:- ;Z. §M-

MD

. La L/2. -

c. Nil} / 2E1
d. Zero

Datafor linked answer \lue51.ions Q!27 & Q..28 are give,1tbelow, Solve lhe 'problems and choose the. correct answers.

Beam om is. supported hy fur,)e pontoons ·as shown in the figtl1t' below. Tile horizontal cross, seclional area o('e,,,,h ponlocn is 8 ll?, the flexural rigidity of the beam is 100()0 kN·rn² and the nnir weight o(w$ljlr 's·l.O ~/.r,?

27. 'When the.nuddle.pentoon [s removed, the deflection at ti will be

a. OSm
b. 0.4 m
c. 0.6m
d. O.S>n

28, Wheli the middle pontoon is brought back. 1.0 IL. position as shown in U", figure above, ille reaction ~Il:l will be

a. 8.610'1
b. ts '7 liN
c. L9.2kN
d. 2~.2kN

29. The dWI!e of S\lJ.ijind~t~lacy of the rigid. frame llaviJlg two intel1ral binges !lS< shown itl Ol~tlgurebe()\v is

flr---.;Jr---."

'A. ..: ~f

a. 8
b. 7
c. (I
d. 5

30 The uretubers E,) "nu P ıı a steel truss shown *in* the iigure below un: subjected 10 teuiperature rise "C 30 'C. The coefficielll of thermal expansion of ~t~el Is 0.1)1)(I()12 per 'C per unil leugih. The displacement (mrn) (If joint F. ("Inlh C I", jilin I H lilong the direction HE ofthe truss, is

a. I).2~5
b. 0.,589
c. 0.764
d. 1.02(.

31. The ·,pon(s) to be loaded uniformly IQr maximum positive (upwnrcl) reaction at sUPP".rt P as ~hown ill the li!lllre below, is(urc)

A -| ii; · ;a.
T

a. PQ (111'
b. PQ and QR
c. QR ondRS
d. PQandl~

32. Un-fnctored maxnuum bending moment. at n section of a reinforced concrete beam re~utliu!! fr~1t1l u I'mme Unf-)'Ri, '11'0 50;80.120 Wld I80 kNlU under dead. live, wind and eruthquuke leads r~l"'cti vely_ The designmoment (kN lll) II. per JS:451J-2000 fur tile limit state of collapse (flexure] i~

a. 195
b. 250
c. 345
d. 372

33. A rClllfurced concrete column contains [ongitudine] stee] equal to I pewool 011 no) cross-sectional area of the .('l umn, Assume modular ratio as 10. The loads carned (using the elastic theory] by the. longlmdinnl steel and lb. uet are" 0f concrete. are P, und p. respectively. The ratio PI expressed as per cent is

a. 0.1
b. 1
c. 1.1
d. 10

34. A pre-tensioned concrete member of section 200 111m25() nom contains, tendons of aren .500 mUll at centre of gmviry uf lice section, 'floc prestress ııı thlt tendons is 10(10'Nlmm². Assunung modular ratio as 10. the stress (NIIDlII') 10 concrete is

a. 11
b. 9
c. 7
d. 5

nata for Q. 34 &: Q. 36 are civen below. 'sell"" lite problem .and choose lit. correct answers.

A reil1.t)lrced cOil~rele IX1ilO, or rectuugular cress section uf Ilrendlh 23(1 nun aile! effective depth JOO 111mis subjected to , maximum lactored .hbtlr |oriic of .120 !:N. The grades ,,(couerete. mulu .steel 'llll>1 stirrup steel are M20. F0415 and 1",.250 .w..'Poolivelr- For the area ..f malo steel provided. the dllll,gn shellr $II1)llglll uS per IS • ~5ti-200() i~ 0.48 Ninlln~. The beam is designed tor collapse limit stare.

35. The spacing (mm I of 2-legged 8 mm 51 Irups to be prv,/;uetl is

a. 4\)
b. 115
c. 2SI)
d. 400

36. In uddlU'lIL the beam is subJCCI00 to n to"lll;: whose Inctored value Is 01.W kNIII. Thl! SIIITUIIII have 10 be. previded to carry u shear (kN) equal to

a. 50.42
b. 130.56
c. 151.67
d. 200.98

37 Rivets and bolts ,'tJ~recled 10 both shear ~'tres(~vVal)and uxiul rensile stress (<rl~~' shall be so proportioned Ihm (be stresses d<.l n,)! exceed the respective 01",\Vahl. *stresses* t,~ nnd t:J aad the value <;f

(r: """ + 0" _-) does not exceed

a, 1.1)

b. 1,2

e. 1.4.

d, 1.8

38, A conunuous beiun IS loaded as shown ill the figure below, Assuming u plustic moment CUPllCity equal to M.lhe miuimum 10Qdat which the beam Il'ouid collapse is

o-

L ~tQ!14~0!U2~

0. 4M, / C

b. 6M. / I.

c. SM" / L

d. 1011/, / L

The liquid limit (LL)- plastio limu (PL) and sbJinllagllclimlt (SL) of a cohesive soil .>lis,t), Ih,: relation

a, lJ.>PI. SI.

b. LL>PL>SL

e. LL <; I'L-' SL

d, t.t, < PI. >S1.,

40. ,\ fl)llling 2m .' I in tXcl'\~" uni I(>nn pressure 0f 150kNlm' on the S<:ril Assnming 0 load'dfsporSic," "f1 \'<lrliC3.Il~ I hnr!7.cmlul. Ih~iJVC(ll~6 vurlicol ~ll'C,'is (kNlml)·nt I,a m below the f"I'lil1!! is

a, SO

b. 75

c. 80

d, 100

~1. f\ direct ,h~r lost was conducted (>n .a cohesiorrless soil (c = 0) specimen nuder n normul !lreS;~,| 20() kNlm% Tho ~1",~ci111~jl tbi"id or a shear .1lC$S (If 100 kNII11~,The ungle of inl~m1l1 friction of the soil (degrees) i~

a, 26,6

b. 29,5

c. 30,0

d. 32,(,

42. A pile o(0.50 m.dinmeter and of lengtll 10 ID iS emb«ddo<;iin u deposi t \t1 t'clay, n'B undrained strengfh parameters 0l' the clay are cohesion = 60 kN/m' and ihe Ul!!.lc of intemol friction ~ 0, The skin frictiOn capacity (kN) of tbe pile for on ndhesion lberurofO.6, I~

a. 671

b. 565

c. 183

d III~

4:3, A sarurnted cloy stratum draining both al Ih~ 'IOp and b\>llom IInd~rlll'll.~50 percent consolidation in 16 yeats under JUI applied load, It' au additional drninage lnyer were present nr 1110 middle>uf the cloy stratum, 50 percent consolidaticn wonld occur in

n, 2y~

~, 4 y.oors

c. 8 years

d, 16 *yoars*

A 'l-"SI pink 31) "111 , 3() em resUJIS tip 11 sand deposit scnlcs by 10 mill under u cerialn loading. inl~lll>ity. A li.Klll1lgL50CUl x 200 1;01 resting 00 the-same sun" d"P\J.;1 and loaded to the !;Lillie loud Intensity seules. by

a, 2.0 "11)

b. 30,2mtn

c. 27.8111111

d_ 5'0.0 mm

45, f\ volume 0f 3,0" loG m' 0f groundwnter wm; pumped out [rol\l uu unconfined aquifer uniformly t'rom an area of 5 ~u. The pumping lowered 11,. water lable from initiui level of 102 in to !ll) m. Tho!specific yield 0l' the aquifer is

a. ()2Q

h. 0,30

c. 0.40

d ().5()

Oat" for linked answer questions Q• J6 & 0.47 ur~ 'lIVen "•low. S"I". tI,e problems 111d choose die correct "'1~1'el'$.

The gm)lttd conditions at a sije are shown in the 'tiSlite below.

46. The saturated unit weight of me sand (kN/m1 is
a. *I!*\
U. 18
c. III
d. 24

~7 'Tlle total stress; pore 'water pressure and effective stress (kN/ril~at the point P are, T"IIP"clivet)'
a. 75, 50, and 25
h. 90, 50.and40
c. 105, 50 and 55
d. 12.0.50·and 70

Data for 1inked-auswer.questions.Q, 48 &Q.49

the correct answers.

A column is supported. o:r) a footing as shown ill the figure below TIle water table is at 8 deRth of 10.m'below UJe base of the rooting.

TIle net ultimate bearing capacity (kNllD~ of the-footing based o11 Terzaghi's bearing ~ap8ciiy equation is
'" '2t6
b. 4~2
c. 630
.t. 846

Tile safe load ()(N) that the -roofing o8ll caoyWi:1h,a factor ofsafcty3 is.
s; 282
l). 648
c. 9~5
d. 1269

le wsstewater sample l'OIltai(lij' 1Q-~-'-ru mo)l1 of Off ions at lIS·C. The plf l'f [his sample'll;
a. 8.6-
b. 8.4
c.).15
d. 5A

5L Match Lisr-I (Estimation mefhod) with List-Il (C<>.rrej!polldiJ~ indicator) and select tlie correct answer using the codes _given billow .tln! list!

List·J
P. Azide mQ<1fieJ Winkler method for dissolved oxygen
Q..Dlchromate method tor-chemical p->'ygen demand
R. IIDTA littimetrlo' method for hardness
S. Mehrer Argentometric-method f.)r chlorides

Lu~·ll
L Eriochrome Black T
•. Fermin

4. Starch

	p	Q	R	S
a.	:1	2	I	4
b.	'|	2	1	3
c.	4	I	2	:3
d.	4	'2	3	I

52. Determine the correctness. qi. otherwise of the. foUo'iytnl!- As"~11jon. [A1 ana the Reason. [R)
Assl'rtion; The. crown ◁)f ihe outgoing larger diameter sewer ls always matched. with me .crown of incoming smaller diameter sewer.
Reason; n, eliminates bnckhlg Itp of sewage ill the incoming smaller diameten ¥'wer.
a. BoUl [A] and [R]IIre true ml,([[R] is Ule correci reason fOI !A]
b. Bolli [A] Slid [R] are true.but [Rj is not, I:heecrrectreason f0r ⌈A]
c, Both [Aland [RJ are false
d. TA| L-irue bul [R]i.s fulse

53. The 3·da.y BOD ofawaste water sample is obtained :18 19.0nlg/l (wid; k = 0.01 J(1). T_heultimate oxygen demand (mg!) of 1lI~ sample "Ul-bee

a. 3800
b. 475
c. 27j
d.],90

54. A water treatment plant is required to process 2S800 lTI'la lif raw Water (depsit)' = 100.0 .~g/Jn3, kinematic vi'cosity = 1040 m^2/s).. The t8~1id t1lf'ing tank jiUpl'"LS u "elQCj~y gradient of !lQI) s^{-1} to bJ~i\(1. 3Smgl.1 of alum "itl! !lie flew fQ~]] deLentfoli lime of 2 minutes, The power jnllllr(W)Te'j1rlred 1<lrr'rrpicl TTlixtngls

a. 32.4
b. 36
c.)211
d. 32400

55 Match List-l O'ermi.nQ1osy) wifh List-It (DcfinitionrBrief Description) and select the correct a:ilsw~ using tile codes gi.~t below the Jl.$:

't,ist-l

P. Primary treatment
Q. SeoQTll1ary treatment
R.llr6t operation
'S. Unirprocess-

Ll~t-rr

1. Contaminant removal by physical, forces
2, Involving biological and/OJ) chemical reaction
J. COn\(ersjoil of soluble organic .matter to biomass
'l. Removal of solid materials from incoming waste water

Golles:

	P	.Q	R	S
8.	4	3	I	2-
11.	4	3	2	I
c,	3	4	2	1
d.	1	2	3	4

A weir on a permeable foundation with. downstream sheet llile is shown in Ole figure below, 'The exit gradient ss per KllΕlsla's .m~!;hod;

'lit.]■-.......j ···

S, 1 lli.6:0
b. 1 ill j,Q
c. 1 ln 3.4
d. lj.ll2.5

~1 'Water emergesHom an ogee llpWWay wltb, veJQC~= 13:72 *mls* and depth = .0.3 m at Its loe. Tire lail watet clepth required to form a hyarau~.c jump at.the toe IS

a. bA8.tt1
b, 5,2i1nl
c 3.24111
d. 2241T1

58. An outlet irrigates an: area of 2.0 ha. The discharge. *Ql.)* requited at litis outlet to meet the eV!lPIJQ'.ul! tjlirationrequitemerlf of ZOmm occurring uniformly in '20 days neglecting other field losses ~

a. 2.52
b. 1.31
c. 2.0J
d. 1.52

59. A. n,innllnholltis provided with an average eQiry width i,lf SA m, widdl of weaving section as J;l in. and le(iglh of the weaving section between channelizing islands as 35m.The9fosSingl]:\)flic;andtotal ·traffic on, the ",ea'ling section are lOoo'llfld 2000' E'CU per' "our respectively, Tlie nearest rounaea capacity of dill roundabout (i,tl PCW per l (JUt) is

a. 33Q0
b. 3:1'Q0
c. 4500
d. 52.00

60. Design parameters fot π .signalized intersection 8flHhllVIl "'.Ul~6gui~ below .. The green ifnle calcalaied, for major and minor roads 'lre,341D1d ISs, teSpective]y.

d. :WOlI vehicles per hour and 411kill per bour

The plan of 3 survey plotted to It scale of LOm '0 L em 1~reduced in such a way ihar 11line oti~loaUy J Oem long now measures gem, The area of 'he reduced plan is measured as 81 em) The aClual area (n,)) of the survey IS

n'. 10000

b. 65,,1

c. loon

d. 656

TIle lengths and beanngs of a closed traverse P(RSP nee ,;"ve" below

Line	L'lIlelblllll	Beatine(WCB)
Po	200	(10
Q~	1OOP	4~
RS	907	ISO"
SP	?	1

The rrusaing. lengdt and bearing, respectively or the IlneSP are

a, 2()7 m IIILI :170·

b. 707 m and 270"

c: 707 ruand t80·

d 'Xl7 m ~lld 270·

The critical li1l1evolume on the major mad ¢hm'ges-Io 444) vehicles per hour per lane and cite c1 itical lane VOIUIIIC on the uunor (()Ud remain unchanged, 'The green time w;11

a, Increase for the major read and remain same tor the m100r mali,

b. increase .r0t. (he Insjer road and decrease for the minor read

o decrease for both the- roads.

d. remain nnchanged for borh 'he roo(rs,

6L It i. prnpescd II) widen Md .11OllgU(tD an existiog 2-lane 'NJ:l section as • divided lughway; The existing. traffic in one direction Is 2500 commercial vehicles (CV) per ihy, The COIISlrUclJOnwsll lake: 1 year. Tj,e design CBR of 5011,subgrade IS found 10 be S pur COO~ Ol,,,..: traffic growth mlc fur CY = S percent. vehicle damage factor = 3.5 (standard .axles per CY). design HI" = to· years and tratlio distribution factor = 0_75. The cumulative srmndard axles (OS."" computed Me

a. J)

b. 37

c. 6S

d. 70

62. A linear relationship .is observed between speed and density on a certain secnon.ofa htshlvay The· free flow .speed is observed. 10 be SOkOl per hour and the jam density is estlmated us H)I) vehicles per 1ctn Iength Based on fhe- above relaiicnship, tile m..,i",11111 now expected 011 tlris section Wld the speed at the maximum !low will respectively be

a, -SOOOvehioles per hour and 80km per Itoul

b. 8000 vehicles per ~o"r ilrld 2~5km pLT bour

c 2000 vehicles per hour and SOkm per hour

65 The foal length of the object gla~~ or II tacheometer is 200 mID. the distance between 'he vertical axis- "I' the- tacheomerer noll the flJ)u"l)) centre of the Qbjecl glass is 100111111111ld the spacing. between the upper .and lower line of the diuphrngrn axis is 4111n. With tbe hue o~ collimation perfectly horizontal, the staff intercepts are 1 m (top). 2 ru (",iddle), prod 3 m (bottom). 11re,horizontal distance (m) between the staff and ille mstrument srution L~

a. 11)0.3

b. lQ3,O

c. 1.50.0

d. 153,0

66. A rood is provided wi III a horizontal circular cIOve having, deflecnon angle of 55° and centre line radius of 250 m, A rransuion curve is to be provided at each end ()f die circular curve of $uch 11 Iength fhar the rate of gain of radial acceleration is O.~ m/~1.11.. speed of 50 km per bout LenSll' of Ihe rransirion CI,...e requi red 81 each of1be 'ends is

a. 2,57 m

b, 33.33 m

e, ?5.73 m

d. 1(,66.67 m

lfT. (\ lisht house l)f J20 m heigh. is just visible abo,'e the borizon from ii ship. l'he correei distance (III) between lila ship odd tho I.ighl house) considering combined correction for ~llf\l.hlre and refr~~li<ln,i ~

a, 39,(I\I~

b, 41..216

e. 3909R

d, 4m(>

O~tn ((lr linl(e~ u"sIYer q"."l"I"n,< Q. ti8 & Q.ti9 are ghel1 \Jc"/,~. l'111\Wh" l"OblCII" ~nd chollS~ Ihc ('orrCl!I ulI5wers..

A borizonlru circular curve with • centre- line radius of 20() m provided on • 2·10l1e2'way Sli section, me width 0l' the '2.I"ne road is 7.0 m. Design speed for this section is 80 km pet hour. The brake reaction time is 2.40, and the, coeJl'oienlli· of friction in, longitll<Jjn<ll iUI" l.!eral directions '(lre tl.~55and 0,1.5. respectively.

~~. Tho SB~ stopping slg.hl diRt:mco COi the section is

a, 221 m

b. 195 m

I!.. [25m

IL. 65 m

69. TJJI$set-back distance from III:. cenll" lin. of ihe iuuer lillie is

a, 7.93 m

I>. 8.10 m

c. 9.(iO!m

J. '1.77 m

70. The [low of "'lor (mas. d,,,uity 1000 *k,gtm'* and kinematic viscosily = tOm',.) in a commercial pipe. havllIg equivalent roughness "" as 0.12 uirn, yield. .11 ."emse shear ."""'.Ith" pipe boundary = *6(1) Nim',* 1111\value of k"l)'(1i' hei~ the Ihkl(11es~ of ':lmin~' $uh-I'yer) for Ih\~ l,il)o1\

n, 0.2)

I>. !J.50

e, **6,0**

d. ItO

71. A riv...... reach of 2.0 kill loug wilh mlll<lluum-Oood discharge (If 101100m,l/s i.. tl) be phYSIcally modeled III the laboratory where 'lil:l::imurn ..vmbble discharge is 020 mll~. rIII , gcomelricnlJ) similar model h.'~'lI 011 cqu.Lity of froude number, the length (If th~ river reach (m) In the model is

~. 25.4

b. 2S.1)

c. 20.)

d, IN.V

n.f" liir *Q.7'l* IIIII Q.73 are givell below. Soh·e Ihe 1"obleIJl5 .lId choose ctlrn'Ci :l11l'wers.

A rectangular channel, 6.0 m ,~Id" carries • di..charge of lG.<l Oll,. under uniform flow condition wilh normal depth of Ltl0 m, l'>'lnnnin!(s ',,1. ().1115.

72. The: h/ng;ludimli .101"' "nhe chsnnel is

a. 0.000585

b. O.0004K5

c. (1.()QO~85

d. O.()()0285

73. A hump is to be provided on the channel bed, The maximum lleighl of Ute hump without Jrocting tho upstream flow condition **is**

... ().SUm

b. 11.40m

c. (lSO m

d. (),20",

74. The channel widOI Is to be contracted 'tlre minimum width 10 which the channel elm btl COD.IrIIo|cd withoul lIffoounl! the upstream How condition L.

a 3.0m

b. 3:Mm

c. 4.1",

d ~,jm

Data ror linked .answer questions Q.75· lll1d Q.76 are giwn beluw, Scll.e the problems and choose correct aU1SW,lr,a.

1\0 automobile witb projectJld aren '2.6 Iii! is running on " mad with o ~U of 120 km *por* hOlit. The mass d"n~'ty "od the .kinema. ic ~f.le"'lily of air ale 12kgllU-and 1.5 lO'~ m'l., lCSp""tivel ~._The' 0"31:coefficient is 0.31).

75. The drag force 01 lthe automcbile is

a. 620N
b. 6()()() N
c. 5~ON
II. 520 N

76. Ihe metric horse l'IJWer required 10 overcome IJ,e drag forec is
p. ~3.23
b. 31.23
e 23..23
d. 21).23

77.

7!1. "1lle""I""ol' fHr.-r-J1)£b-:'(I' is
a; 13.5
h. 27.0
c. -10.5
d. 54.0

79. Three values of x and y are 10 be fitted in a straigbt line in the form y – a + bx by the method of leaSl ~qunte!;. Given l:x = 6. —>ı = 21. l:.~l=14 lind t~y= -16, the values (If ~ '011 b <lte resrecti.vc(y
a, 20nd.:.'l
b. 1 nod 2
c, ~nodJ
,L 3anel 1.

S(). Solution.of $\frac{dy}{<4}=\frac{x}{J'}$ 01 x - lund y -,[3 is
a, x - 'Y~ -2
b. s+ /=4
c, :f - y1 ~ -2
l.l. X·+i=4

81. If probability denrlty function of. random variable X i~
f\x) = ,,' for -I S x s I. aod
–0 for any cthervafue of x
then, the percen••ge llrob.bility
p(-~s."J)i~
u. 0.2-17
b. 2.-17
c. 24.7
d. 247

82. TIl. Eigen values or the matrix [P] = [4 5; 2 -5] ar..,
n. -7 alld 8
b. ~llnd 5
C. 3 aud 4
d. I and 2'

83. A person 011• hip bas • choice bel ween private car and public lrunsport. 'Ihe ltmb.bilitl' of using. private car is 0.45. \vhil~ using the public transpon, l'urther choices available arc bus and metre, out of wbicb ale probability 01' commuting by • bUll is 0.55. In such 11 .<ituaIlOn. the probability' (rounded up 10 1\\'0 decimals) of ~iJll!- a car, bus and metro. l'C~JlecLi\lcly would be
•. 0.45,0.30 and 0,25
b. U.45,0.25 and 0.]0
c. OA5,().5S "",1 0.00
d. 0.45,0.35 snd 0.20

84. Th,Hailowlng simultnneous equati<))l'
x+Y+1.=3
.x~2y·3z~4
X + 4y l- kz = (,
wHI NOT have a unique ."I"lil'n fork "'l".llo
a. 0
It. 5
c. 6
d. 7

85, The inner (dot) product of two vectors P !!tid Q i, zero, The angle (degrees) between the two vectors ls
a. 0
b. 30
c. !!O
d. 12ll