B.Tech.-III Sem.

TU-319

B.Tech. Examination, Dec. 2014

Ag Engg.

H.M.T.

(BT-328(N))

Time : Two Hours]   *[Maximum Marks : 50*

Note: Attempt any **five** questions. Each question carries equal marks.

1. (a) Write short note on any **two**:   6
    (i) Laws of radiation
    (ii) Thermal conductivity of material.
    (iii) Fourier law of heat conduction.

    (b) A Carbon steel plate (Thermal conductivity=45 W/m°c) 600 mm × 900mm ×25 mm is maintained at 310°C. Air at 15°C blows over the hot plate. If convective heat transfer coefficient is 22 w/m²°C and 250 W is lost from the plate surface by radiation, calculate the inside plate temperature   4

P.T.O.

2. Derive an expression for heat conduction in Cartesian coordinate. 10

3. An exterior wall of a house may be approximated by a 0.1 m layer of common brick ($k=0.7$ w/m°c) followed by a 0.04 m layer of gypsum plaster ($k=0.48$ w/m°c). What thickness of Wosley packed rock wool insulation ($k=0.065$ w/m°c) should be added to reduce the heat loss or (gain) through the wall by 80%. 10

4. (a) Write short notes on any **two**: 6

    (i) Concept of black and grey body

    (ii) Stefan-Boltzmann's law of thermal radiation

    (iii) Physical significance of Nusselt Number

  (b) Explain bubble Growth and collapse in boiling with neat sketch. 4

5. Derive an expression for forced convective heat transfer through a conduct using dimensional analysis. 10

6. (a) Explain log mean Temperature difference (LMTD), heat exchanger effectiveness and number of transfer units (NTU). 6

  (b) In a parallel flow double pipe heat exchanger, water flows through the inner pipe and is heated from 20°C to 70°C. Oil flowing through the annulus is cooled from 200°C to 100°C. It is desired to cool the oil to a lower exit temperature by increasing the length of the heat exchanger. Determine the minimum temperature to which the oil may be cooled. 4

7. Derive an expression for calculating the log mean temperature difference (LMTD) for parallel flow heat exchanger. 10

8. (a) Write short notes on any **two**: 4

    (i) Thermal diffusivity

    (ii) Difference between Biot and Nusselt number

    (iii) Duhring's rule

(b) The effective temperature of a body having an area of 0.12 m² is 527°c. Calculate the following: 6

   (i) The total rate of energy emission

   (ii) The intensity of normal radiation

   (iii) The wavelength of maximum monochromatic emissive power.

9. Derive an expression for general mass transfer equation in Cartesian coordinates.   10

10. From the following data, calculate the diffusion coefficient of CO_2 in air at a temperature of 25°C and atmospheric pressure. 10

CO_2 (Gas A): $\sigma = 3.996\,A°$: $\frac{\varepsilon}{k} = 190k$

Air (Gas B) : $\sigma = 3.167\,A°$: $\frac{\varepsilon}{k} = 97k$

The table given below may be used to estimate collision integral Ω

$\frac{kT}{\varepsilon}$	2.00	2.10	2.20	2.30
Ω	1.075	1.057	1.041	1.026

B.Tech. III Sem.

TU-320

B.Tech. Examination, Dec. 2014

AG. ENGG.

Mathematics-III

[BT-329(N)]

Time : Three Hours]   *[Maximum Marks : 100*

Note: Attempt any **five** questions. **All** questions carry equal marks.

1. (a) Express the function shown in the diagram in terms of unit step function and obtain its Laplace transform.   10

   (b) Compute $L\{f(t)\}$, if

   $$F(t) = \begin{cases} \sin t, & 0 < t < \pi \\ 0, & \pi < t < 2\pi \end{cases}$$

   where f(t) has period 2π.   10

2. (a) Find $L^{-1}\left[\dfrac{1}{\sqrt{p}\,(p-a)}\right]$ by the convolu-

tion theorem and deduce the value of

$L^{-1}\left[\dfrac{1}{p\,\sqrt{(p+a)}}\right]$

(b) Apply convolution theorem to prove

that $B(m,n) = \displaystyle\int_0^1 x^{m-1}\,(1-x)^{n-1}$

$dx = \dfrac{\overline{|m}\ \overline{|n}}{\overline{|(m+n)}}, m>0, n>0$

3. (a) Solve $(D^2+1)y = t\cos 2t$, $y=0$, $\dfrac{dy}{dt}=0$

when $t = 0$.   10

(b) Solve $(D^3-D^2+4D-4)y = 68e^t \sin 2t$,

$y=1$, $Dy=-19$, $D^2y=-37$ at $t=0$ 10

4. (a) Show that the function $Z|Z|$ is not ana-

lytic anywhere.   10

(b) Show that the transformation

$w - i\dfrac{1-z}{1+z}$ transforms the circle $|Z|=1$

---

onto the real axis of the w-plane and interior of the circle into the upper half of the w-plane.   10

5. (a) Using Cauchy's integral formula evalu-

ate $\dfrac{1}{2\pi i}\displaystyle\int_c \dfrac{e^{zt}}{z^2+1}\,dz, t>0$ where c is the

circle $|z|=3$.   10

(b) Evaluate using residue theorem

$\displaystyle\int_c \dfrac{4-3z}{z(z-1)(z-2)}\,dz$ where c is the circle

$|z|=3/2$.   10

6. (a) Evaluate by contour integration

$\displaystyle\int_0^{2\pi} \dfrac{\cos 3\theta}{5-4\cos\theta}\,d\theta$ 10

(b) Evaluate $\displaystyle\int_0^\infty \dfrac{\cos mx}{x^4+a^4}\,dx$, using complex

variable.   10

7. Find the fourier series for $f(x)$ in the interval

$(-\pi, \pi)$ where $f(x) = \begin{cases} \pi+x, & -\pi < x < 0 \\ \pi-x, & 0 < x < \pi \end{cases}$ 20

8. Prove that   20

   (i) $\Delta + \nabla = \dfrac{\Delta}{\nabla} - \dfrac{\nabla}{\Delta}$

   (ii) $\mu = \sqrt{1 + \dfrac{\delta^2}{4}}$

   (iii) $\Delta^2 \cos 2x = -4\sin^2 h \cos(2x + 2h)$

   (iv) Evaluate $\Delta^2 \left[\dfrac{5x + 12}{x^2 + 5x + 6} \right]$, the interval of difference being 1.

9. (a) Find the obsolute, relative and percent-age errors if x is rounded off to three decimal digits. Given x=0.005998. 10

   (b) Find the cubic polynomial which takes the following values: 10

      y(0)=1, y(1)=0, y(2)=1, y(3)=10

      Hence or otherwise, obtain y(2.5)

10. (a) Find the value of y at x=5, given that:

      x : 1   3   4   8   10

      Y : 8   15 19 32   40   10

   (b) Prove that $\underset{bcd}{\overset{3}{\Delta}}\left(\dfrac{1}{a}\right) = -\dfrac{1}{abcd}$ 10

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B.Tech.-III Sem.

TU-83

B.Tech. Examination, Dec. 2014

Ag. Engg.

Fluid Mechanics

BT-319

Time : Three Hours] *[Maximum Marks : 100*

Note: Attempt any **five** questions. **All** question carry equal marks.

1. (a) Explain the Newton's Law of viscosity.

    10

   (b) Define laminar turbulent flow. What factor decides the types of flow in pipe?

    10

2. (a) Define absolute pressure, Gauge pressure and vacume pressure. 10

   (b) Explain different types of manometers.

    10

P.T.O.

3. (a) Differentiate between stability conditions for immersed & floating bodies.

10

(b) Define: 10

(i) Total pressure

(ii) Centre of pressure

4. (a) What is source and sink flow? 10

(b) Derive an expression of continuity equation of fluid flow in 3D, With neat sketches. 10

5. A venturimeter having a diameter of 75mm at the throat and 150mm diameter at the enlarged end is installed in a horizontal pipe line 150mm in diameter carrying oil of sp gr. 0.9. The difference of pressure in between enlarged end and the throat is 175mm mercury as recorded by a U-tube differential manometer. Determine the discharge through the pipe. Assume the coefficient of discharge of the meter as 0.97. 20

6. (a) State the assumption's made in Bernoulli's equation. 10

(b) Derive an expression for the discharge over a rectangular notch. 10

7. (a) What are the causes loss of energy in a pipe? 10

(b) Derive an expression for loss of head due to sudden enlargement. 10

8. (a) Discuss the importance of model study in fluid flow problems. 10

(b) Explain 10

(i) Euler's Number

(ii) Mach Number

(iii) Reynold Number

9. Using Buckingham's π-theorem of diamensional analysis, show that the boundary shear stress to in turbulent flow through a rough is given by $\tau o = \rho \gamma^2 \phi \left(\dfrac{\rho VD}{\mu}, \dfrac{k}{D} \right)$ where ρ, V, D, H and K are fluid density, average ve-

locity of flow, pipe diameter, fluid viscosity and height of roughness respectively. ϕ is a functional Constant notation. 20

10. (a) In a rough pipe of diameter 0.6m and length 4500m, water is flowing the rate 0.6m³/sec. if the average height of roughness is 0.48 mm, find the power required to maintain this flow. 10

(b) Explain: 10

(i) Minor 4 major losses in pipe flow
(ii) Water hammer.

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B.Tech. III Sem.

TU-321

B.Tech. Examination, Dec. 2014

Ag. Branch

Computer Science

BT-330(N)

Time : Two Hours] [Maximum Marks : 50

Note: Attempt any **five** questions. **All** questions carry equal marks.

1. Explain the characteristics of computer. Differentiate between hardware and software.

2. Explain and draw the block diagram of computer.

3. Explain various functions that can be done by using MS-Word.

P.T.O.

4. Define the term computer Network. What are different ways of data communication discuss in brief.

5. What is a flow chart; draw a flow chart to compute largest of two given numbers.

6. Write a program in any computer language to swap two numbers.

7. What do you mean by structured programming. Explain how debugging and testing is done in programming.

8. (a) What is base of a number system? What is the value of base for decimal, hexadecimal, binary & octal number system?

   4

   (b) Write short note on: 6

   (i)   EBCDIC

   (i)   ASCII

9. What is operating system. List various functions of the operating system.

10. Write short notes on the following:

   (i)   Viruses

   (ii) Functions

   (iii) DOS

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B.Tech.-III Sem.

TU-322

B. Tech. Examination, Dec. 2014

Ag. Branch

Electrical Engg.

BT-331(N)

Time : Three Hours]   *[Maximum Marks : 100*

Note : Attempt any **five** questions only.

1. Determine the current I in the circuit of Fig.(a) by using   10+10=20

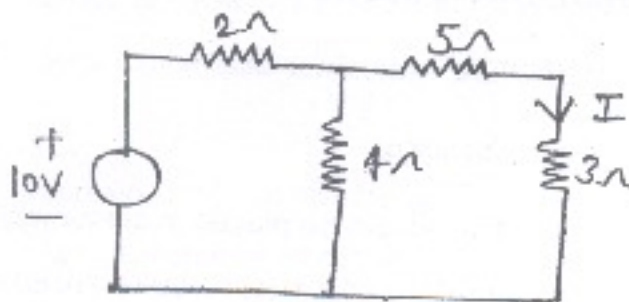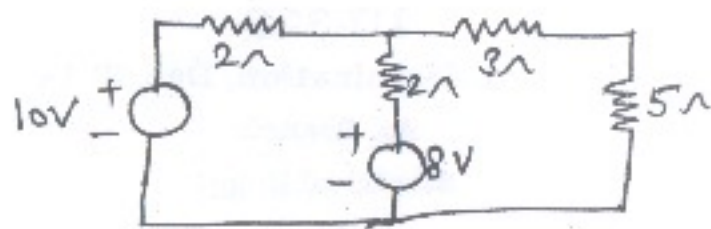   (a) Thevenin's Theorem

   (b) Source Transformation

Fig. (a)

P.T.O.

2. Give statement of Norton's Theorem and Find current I of Fig. (b) 20

3. Draw the circuit of series R–C with Phasor diagram and explain it. 20

A 100V, 80W lamp is to be operated on a 240V, 50Hz supply. Calculate the value of

(a) Non-inductive resistor

(b) Pure inductance and

(c) Capacitor

that would be placed in series with the lamp in order that it may be used at its rated voltage.

4. Explain the following : 10+10=20

(a) One wattmeter method of power measurement

(b) Two wattmeter method of power measurement

5. Explain the construction of single-phase transformer, and calculate the secondary voltage and the volts per turn. If a transformer with 800 primary turns and 200 secondary turns is supplied from a 100V ac supply. 20

6. What is Hystersis and eddy current losses. Also explain force between parallel conductor. 20

7. Explain the following : 20

(a) Resonance in circuit

(b) Transient and steady state response of circuit.

8. For the circuit of Fig. Determine the total impedance, total current, overall power factor and total power.　　20
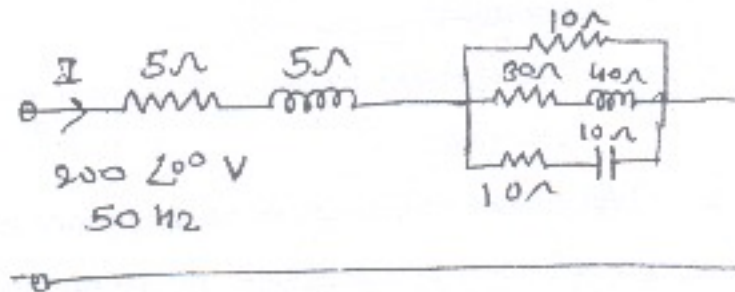

Fig.

9. Explain "Superposition theorem". What are the application of Superposition theorem.

20

10. Explain the following :　　$10+10=20$

    (i)　KVL and KCL

    (ii)　Current Magnification

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B.Tech.- III Sem.

TU-323

B.Tech. Examination, Dec - 2014

Ag. Branch
HORTICULTURE

BT-332(N)

Time : Two Hours]   *[Maximum Marks : 50*

Note: Attempt any **five** questions. All questions carry equal marks.

1. What is irrigation? Explain the different methods of irrigation.   10

2. Define Pruning. What are the principles of pruning and also discuss the different method of pruning?   10

P.T.O.

3. Discuss the recipe and manufacturing procedure of Mango Pickles with appropriate flow chart. 10

4. Write down the basic principles of fruit preservation. Describe the chemical methods of preservation. of fruits and vegetables. 10

5. How much types of soil available in India? Describe their suitability for horticultural crops accordingly. 10

6. Define the Propagation. What are the merits and demerits using sexual propagation? 10

7. What is the effect of Fertilizers on plants? Discuss the various methods involved in application of fertilizer. 10

8. What is the need of weed management? Discuss the negative effect of weed on horticulture crops and their preventive methods. 10

9. Explain the different methods of plant layout system with suitable diagram. 10

10. Write short notes (any **four**) : 10

   (a) Green house

   (b) Floating garden

   (c) Processing garden

   (d) Grafting

   (e) Fertigation

   (f) Grading

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B.Tech. III Sem.

TU-324

B.Tech. Examination, Dec. 2014
AG. ENGG.
Food Science
[BT-333(N)]

Time : Two Hours]   [Maximum Marks : 50

Note : Attempt any **five** questions. **All** question carry equal marks.

1. What are proteins. Write down main functions of protein and explain structure of protein.

    10

2. What do you understand from spoilage of food material. Discuss it's effect on commercial value of food products.   10

3. Explain various methods used in biochemical separations.

    10

P.T.O.

4. Describe the role of nutrients in the food material. 10

5. What is the difference between amabolic and catabolic pathways. Write down their significance in human body. 10

6. Describe various types of micro-organism, which are responsible for spoilage of food materials. 10

7. Discuss the need of storage of food material. Classify various grain storage structures. 10

8. Write short notes on any two of the following : 5×2=10

   (I) Essential oils   (ii) Lipids

   (iii) Fats

9. Differentiate between any two of the following : 5×2=10

   (i) Enzyme and co-enzyme

   (ii) Fungi and bacteria

   (iii) Lipid and proteins

10. What do you understand from ripening process of fruits. Discuss various biochemical changes observed during ripening. 10