FACULTY OF ENGINEERING

B.E. 4/4 (ECE) I - Semester (Main) Examination, November 2015

Subject : Microwave Engineering

Time : 3 hours   **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1 Sketch E & H field distributions of TM wave in parallel planes.   2

2 Differentiate between dominant mode and degenerate modes in a circular wave guide.   3

3 A rectangular wave guide with dimension of 3 x 2 cms operates in the TM_{11} mode at 10 GHz. Determine the characteristic wave impedance.   3

4 What is a T-junction and list out the types?   2

5 List out the high frequency limitations of conventional tubes.   2

6 What is Bunching in a Klystron amplifier?   3

7 Give the operating principle of two cavity klystron amplifier.   2

8 A reflex klystron operates at a peak mode of n = 2 with bean voltage V_0= 300v, beam current I_0 = 20mA, signal voltage V_1=40v. Determine i) the input power
ii) The output power   iii) Efficiency.   3

9 What is Gunn Effect?   2

10 An IMPATT diode has a drift length of $2\mu m$. Determine the operating frequency of the IMPATT diode if the drift velocity of silicon is 107 cms/sec.   3

PART – B (50 Marks)

11 a) Discuss the propagation of TE waves through a parallel plane.   5
   b) Give the characteristics of TE and TM waves in parallel conducting planes. 5

12 a) Derive expression for propagation of TM waves in Rectangular and Circular Wave guides.   7
   b) When the dominant mode is propagated in an air filled rectangular waveguide, the guide wavelength for a frequency of 9000 MHz is 4 cms. Calculate breadth of the guide.   3

13 a) Derive the Scattering matrix of a Directional coupler.   5
   b) In an H-Plane Tee junction, 20mW power is applied to port 3 that is perfectly matched to the junction. Calculate the power delivered to the load 60   and 75   connected to ports 1 and 2.   5

14 a) Explain the operation of a Two Cavity Klystron amplifier with its mathematical analysis and write its applications.   7
   b) Define Magnetrons and differentiate between O type and M type magnetron. 3

..2

15 a) What is the principle of operation of a Varactor diode explain its construction and derive the expression for figure of Merit.   5

   b) Explain briefly about the construction of a PIN diode with its equivalent circuit.   5

16 Write a short note on any **two** of the following :

   a) Cavity resonators   5

   b) Isolators   5

   c) Microstrip lines   5

17 a) What is mode jumping in a cavity magnetron and how it can be overcome?   4

   b) A two cavity Klystron amplifier has the following characteristics : voltage gain = 15 dB, input power = 5 mW, R_{sh} of input cavity = 30k , R_{sh} of output cavity = 40k , R_L (load impedance) = 40k . Determine i) the input RMS voltage ii) the power delivered to the load.   6

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FACULTY OF ENGINEERING

B.E. 4/4 (Prod.) I - Semester (Main) Examination, November / December 2015

Subject : Production Drawing Practice

Time : 3 Hours   **Max. Marks: 75**

Note: Answer all questions from Part-A and Part-B.

PART – A (25 Marks)

1   What are the elements of Production Drawing?

2   What is interpretation of roughness lay symbols shown below: Show with neat diagrams?

   (i) C   (ii) R   (iii) X   (iv) $\nabla\nabla\nabla$ (v) ∇. What is roughness value and number of (iv) and (v)

3   Determine limit dimension for clearance fit between mating shaft dia. 40 mm. Provide minimum clearance of 0.1mm with tolerance on the hole is 0.025mm and shaft tolerance is 0.05mm on the basis of the hole basis system.

4   Give 5 examples of shrink fits and 5 examples of force fit in industrial practice.

5   Classify these fits on the basis of shaft or hole basis system

   (i) H7g6   (ii) H7k6,   (iii) H806.,   (iv) H8c11, (v) h8C3 and state the type of fit.

6   Sketch the contents of (i) Title block, (ii) process sheet in Production Drawing sheet.

7   What is meaning of the following symbols in production drawing?
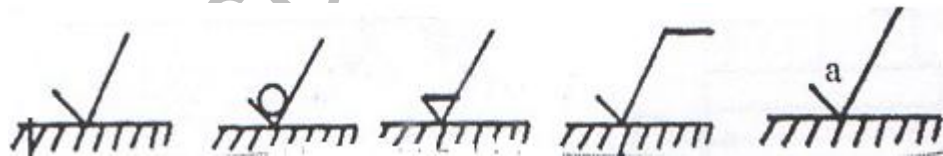
8   Draw MMC and LMC condition for hypothetical values of hole and shaft diameter.

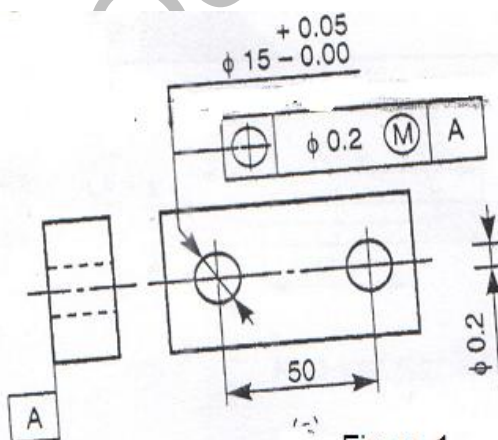9   Interpret and draw geometric tolerance of the figure 1 and figure 2 given below:
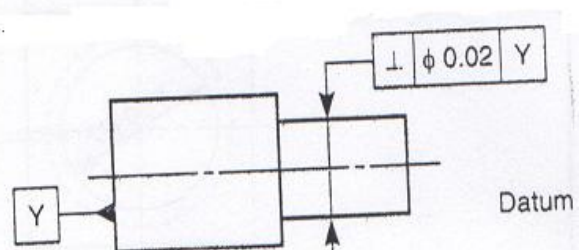

Figure 1   Figure 2

10 Interpret and draw geometric tolerance of the figure 3 given below.

Figure 3

PART – B (50 Marks)

11 Draw the assembly of tool post shown in figure 4.

Figure 4

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FACULTY OF ENGINEERING

B.E. 4/4 (AE) I – Semester (Main) Examination, November 2015

Subject: Automotive Pollution and Control

Time: 3 Hours   **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (25 Marks)

1 What is the effect of carbon monoxide on human health?	2
2 What are the main causes for emission formation in I.C engines?	2
3 How the two stroke engines are responsible for pollutant formation?	3
4 Give the effect of load and spark timing on HC, CO and NO_x emissions.	3
5 What is meant by evaporative emission control? Give an example for it.	3
6 Give the role of fuel cells in emission control.	2
7 Explain the working principle of a typical fuel cells.	2
8 What is fuel modification?	3
9 Draw the Japanese driving cycle used in emission testing.	3
10 Which instrument is used for the measurement of nitric oxide emission?	2

PART – B (5x10 = 50 Marks)

11 a) How the transient operation of the turbo charged diesel engines will affect the emission formation? Explain it in detail.   5

    b) Explain the effects of various air pollution on the environment.   5

12 Write down the HC and CO formation in S.I. engine with necessary graphic illustrations.   10

13 a) Discuss the performance of thermal rectors with respect to reactor volume and engine air fuel ratio.   5

    b) Write short notes on control of emission using secondary air injection method.   5

14 a) Brief about mass of residual gas and EGR and how EGR effects on NO and HC emissions.   5

    b) Mention advanced combustion systems of SI engine explain multi point injection system.   5

15 a) What is meant by a dilution tunnel? What for it is used?   5

    b) What is the principle of gas chromatograph used for emission measurement?   5

16 a) Write short notes on maintenance and inspection cost in automobile.   5

    b) Discuss economic consequences of catalytic converter.   5

17 Write short notes on the following:

    a) What are the requirements of automobile fuels?   4

    b) Chemiluminescent analyzer (CLA) works with neat diagram.   3

    c) Two stroke engine pollution control.   3

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FACULTY OF INFORMATICS

B.E. 4/4 (IT) I – Semester (Main) Examination, November 2015

Subject : Middleware Technologies

Time : 3 hours   **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1	Define the term "Middleware".	3
2	What is a client server computing.	3
3	Describe WSDL briefly.	2
4	Explain briefly struts frameworks.	3
5	Differentiate between stateful session bean and stateless session bean.	2
6	What is an "Intranet"?	2
7	List basic steps in writing a java program using JDBC.	3
8	What is the role of an interface in CORBA?	2
9	What is the difference between view state and session state?	3
10	Define CLI.	2

PART – B (50 Marks)

11 a) Explain life-cycle of a servlet.
    b) Differentiate between RPC & MOM.   5+5

12 a) What are the necessary components of the EJB architecture?
    b) Explain difference between session bean and entity bean.   5+5

13 Explain CORBA and networking model.   10

14 Explain in detail
    a) COM   b) DCOM   5+5

15 Describe overview of .NET architecture.   10

16 Explain building an application with CORBA.   10

17 Write a short notes on :
    a) SOAP   b) SOA   c) WSDL   3+4+3

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