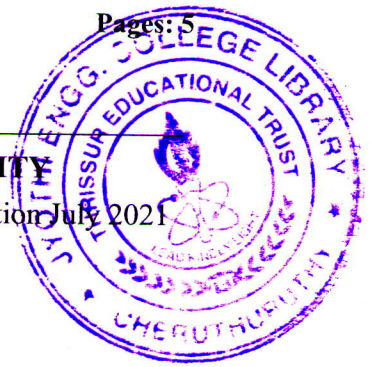Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Sixth Semester B.Tech Degree Regular and Supplementary Examination July 2021

Course Code: MR352
Course name: COMPREHENSIVE EXAM (MR)

Max. Marks: 50   Duration: 1Hour

Instructions: (1) *Each question carries one mark. No negative marks for wrong answers*
(2) *Total number of questions: 50*
(3) *All questions are to be answered. Each question will be followed by 4 possible answers of which only ONE is correct.*
(4) *If more than one option is chosen, it will not be considered for valuation.*
(5) *Calculators are not permitted*

PART A- COMMON COURSES

1. Unit normal to the surface $z = y$ in the positive direction is ....
   a) $\hat{j} + \hat{k}$ b) $-\hat{j} - \hat{k}$ c) $\hat{j} - \hat{k}$ d) $-\hat{j} + \hat{k}$

2. Particular integral of the differential equation $y'' + 2y' + y = e^x$ is ....
   a) $\dfrac{e^x}{2}$ b) $\dfrac{e^x}{3}$ c) $\dfrac{e^x}{4}$ d) $\dfrac{e^x}{6}$

3. The straight lines which are drawn from various points on the contour of an object to meet a plane are called as _____
   a) connecting lines   (b) projectors   c) perpendicular lines   (d) hidden lines.

4. Where do the projection lines converge in a perspective sketch?
   a) The horizon line   (b) The ground line   c) The vanishing point   (d) The eye point

5. The principle of transmissibility of force states that when a force acts upon a body its effect is
   a) Same at every point in its line of action   (b) Same at every point of the body along any direction   c) Different at different point in its line of action   (d) Nullified by the internal forces present in the body already

6. A free body diagram should contain all the external forces, support reactions and the _____ of the body under consideration.
   a) Internal forces   (b) Internal moments   c) Self weight of the body   (d) None of these

7. What makes the best practice available to everyone, thereby ensuring efficiency and safety
   a) Drawings   (b) Standards and Codes   c) Tolerance Limit   (d) Material Cost

8. Which of the following components in a "House of Quality" drives the entire QFD process?

a) Roof matrix   (b) Product characteristics   c) Relationship matrix   (d) Customer requirements

9. Biodiversity cannot be conserved by

a) Seed bank   (b) Deforestation   c) Botanical Garden   (d) cryopreservation

10. Which of the ISO 14000 series of standards focuses on Life Cycle Assessment

a) 14010   (b) 14020   c) 14030   (d) 14040

PART B- CORE COURSES

11. How systematic errors are eliminated?

a) Frequent measurement   b) Replacement of instrument   c) Finding mean of reading   d) Finding variance of reading

12. A zero order system is the one in which output changes instantaneously as the input changes. The example of zero order system is

a) Potentiometer   b) Liquid - in - glass thermometer   c) Accelerometer   d) Transducer

13. Which transducer is known as 'self-generating transducer'?

a) Active transducer   b) Passive transducer   c) Secondary transducer   d) Analog transducer

14. What temperature does the dark red color generally deal with?

a) 950 F   b) 1150 F   c) 1175 F   d) 1300 F

15. Up to which accuracy small gap gauges can be measured by using slip gauges?

a) ± 0.001 mm   b) ± 0.002 mm   c) ± 0.003 mm   d) ± 0.004 mm

16. What is the name of screw thread which is formed on a cone?

a) Parallel screw thread   b) Straight screw thread   c) Tapered screw thread   d) Cylindrical screw thread

17. The specific gravity of water is

a) 9810   b) 746   c) 13600   d) 1

18. For a floating body, the buoyant force passes through the

(a) CG of the body   (b) CG of the submerged part of the body   (a) CG of the body   (b) CG of the submerged part of the body

19. Chezyi's equation is used to find out

(a) Head loss due to friction   (b) Coefficient of discharge   of (a) Head loss due to friction   (b) Coefficient of discharge

20. Orifice meter is used to measure

(a) Rate of flow　　(b) Velocity　　(a) Rate of flow　　(b) Velocity

21. Specific speed of a turbine is defined as the speed at which the turbine runs when

(a) Working under unit head and discharging one litre per second
(b) Working under unit head and develops unit horse power
(a) Working under unit head and discharging one litre per second
(b) Working under unit head and develops unit horse power

22. Air vessel in a reciprocating pump is used

(a) To obtain a continuous supply of water at uniform rate
(b) To reduce suction head
(a) To obtain a continuous supply of water at uniform rate
(b) To reduce suction head

23. The leakages in gear pups are eliminated by

(a) Axial pump　　(b) Vane pump　　(c) Piston pump　　(d) Both b&c

24. Which of the following is sentence is NOT true regarding two stage compressor

(a) First stage is at low pressure
(b) Second stage is at high pressure
(c) First stage is at high pressure
(d) Both a & b

25. Numerator in a valve naming represents number of

(a) Poles　　(b) Zeros　　(c) Ports　　(d) Positions

26. A device used to move, grip or apply a force on an object is called --------------------

(a) Actuator　　(b) Sensor　　(c) Motor　　(d) Gripper

27. Signals in process control are generally represented by a pressure which varies over the range

(a) 0 - 0.5 barr　　(b) 0.2 – 0.5 barr　　(c) 0.2 - 1 barr　　(d) None of these

28. Which of the following is not a fluidic sensor

(a) Back pressure sensor
(b) Interruptible jet sensor
(c) Proximity sensor
(d) None of these

29. A control system in which the control action depends on the output is known as _____

(a) Open loop system
(b) Closed loop system
(c) Semi-closed system
(d) None of the above

30. The basic elements of Mechanical translational system are:

(a) Inertia, Damper, Spring constant
(b) Inductance, Resistance, Capacitance
(c) Mass, Dashpot, spring
(d) None of the above

31. The type 1 system has _____ at the origin.

(a) No pole　　(b) Net pole　　(c) One pole　　(d) Two poles

32. The open loop transfer function of a unity feedback system is given by

$$G(S) = \frac{K}{S(S+2)(S+3)}$$

The centroid is :

(a) -1.67   (b) -2.33   (c) 0.33   (d) 0

33. At what frequency does the magnitude of the system becomes zero dB?

(a) Resonant frequency   (b) Cut-off frequency   (c) Gain crossover frequency   (d) Phase crossover frequency

34. A controller, essentially, is a _____

(a) Sensor   (b) Clipper   (c) Comparator   (d) Amplifier

35. During maximum mode of 8086 the pins S_2,S_1,S_0 shows 011 which indicates

(a) It wants to write an instruction   (b) It wants to read an instruction   (c) It wants to access memory   (d) It wants to enter the HALT state.

36. If the content of AX = 200FH what will be the result after the following instruction is executed

NOT AX

(a) DFF0   (b) 0FFD   (c) FFF0   (d) DF0F

37. In BSR Mode of 8255 bit select flags B3 = 1,B2 = 2,B1 =1 of CWR set then which bit of port C is selected

(a) B5   (b) B6   (c) B4   (d) B7

38. ORG is a

(a) Logical instruction   (b) Assembler derivative   (c) Data derivative   (d) Arithmetic instruction

39. Serial port interrupt is generated when ____ bits are set?

(a) RI   (b) TI   (c) IE   (d) Both (a) and (b)

40. What is the purpose of interfacing 8255 chip to 8051?

(a) Memory   (b) keyboard   (c) Display   (d) Input – Output port

41. If no key is pressed what will be the column readings of a keyboard interfacing

(a) 1   (b) 0   (c) F   (d) H

42. Which of the following is not an element of SCADA

(a) MTU   (b) RTU   (c) PLC   (d) VTU

43. How many equal intervals are present in a 14 bit ADC

(a) 1023   (b) 16383   (c) 65535   (d) 4095

44. If the input analog signal falls outside the range of the quantizer (clipping), $e_q(n)$ becomes unbounded and results in _____

    (a) Granular noise   (b) Overload noise   (c) Particulate noise   (d) Heavy noise

45. In a PLC, scan time refers to the amount of time in which

    (a) one rung of ladder logic takes to get complete
    (b) the entire program takes to execute
    (c) timer and counters are indexed by
    (d) the technicians enters the program

46. An AND function implemented in ladder logic uses

    (a) Normally-open contacts in series
    (b) Normally-open contacts in parallel
    (c) Normally-closed contacts in series
    (d) A single normally-closed contact

47. Example for interlock is

    (a) PID control
    (b) Alarm application
    (c) Traffic signal control
    (d) Motor control

48. Number of lines required for 8 users in mesh topology is

    (a) 24   (b) 28   (c) 32   (d) 64

49. The speed ratio for Pelton wheel varies from

    (a) 0.45 to 0.5   (b) 0.6 to 0.7   (c) 0.3 to 0.4   (d) 0.8 to 0.9

50. An automatic toaster is an example for:

    (a) Open loop system
    (b) Closed loop system
    (c) Partially closed
    (d) All of the above

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