Unit 9 - Week 7

Assignment 7

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-03-18, 23:59 IST.

1) Performing a nail test on a specimen in conventional white light photoelasticity gives: *1 point*

- Magnitude of residual stress in the material
- Magnitude of tangential boundary stress in the material
- Sign of tangential boundary stress in the material
- Magnitude of perpendicular boundary stress in the material
- Sign of perpendicular boundary stress in the material

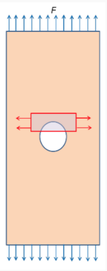
No, the answer is incorrect.
Score: 0
Accepted Answers:
Sign of tangential boundary stress in the material

2) The boundary of a photoelastic specimen observed under white light has a dull-red fringe order. When the boundary was pressed with the thumb nail, the colour of the fringe changed to blue. What does this say about the sign of the boundary stress: *1 point*

- Positive boundary stress
- Negative boundary stress
- Zero boundary stress
- Nail test alone is insufficient to deduce the sign of boundary stress

No, the answer is incorrect.
Score: 0
Accepted Answers:
Positive boundary stress

3) Figure below shows a plate with a hole under tensile load which is observed under a circular polariscope setup in white light. When a tensile specimen is brought in front of the inner boundary of the hole as shown in the figure, what is expected to occur to the fringes in the tensile specimen: *1 point*



- The fringe order in the tensile specimen increases
- The fringe order in the tensile specimen decreases
- The fringe order in the tensile specimen remains the same
- The fringe order in the tensile specimen comes down to zero

No, the answer is incorrect.
Score: 0
Accepted Answers:
The fringe order in the tensile specimen decreases

4) Which experimental technique is capable of deducing the stress field interior to a model: *1 point*

- Holography
- Photoelasticity
- Digital image correlation
- Caustics

No, the answer is incorrect.
Score: 0
Accepted Answers:
Photoelasticity

5) To conduct whole field stress evaluation of a dynamic phenomenon, which of the following digital photoelastic technique can be used: *1 point*

- Three fringe photoelasticity
- Four-step phase shifting technique
- Six-step phase shifting technique
- Ten-step phase shifting technique

No, the answer is incorrect.
Score: 0
Accepted Answers:
Three fringe photoelasticity

6) Which of the following is the correct optical arrangement corresponding to Ten-step phase shifting technique: *1 point*

- 5 plane polariscope arrangement and 5 circular polariscope arrangement
- 6 plane polariscope arrangement and 4 circular polariscope arrangement
- 4 plane polariscope arrangement and 6 circular polariscope arrangement
- 3 plane polariscope arrangement and 7 circular polariscope arrangement

No, the answer is incorrect.
Score: 0
Accepted Answers:
4 plane polariscope arrangement and 6 circular polariscope arrangement

7) In ten-step phase shifting technique, the four isoclinic images are captured at: *1 point*

- $0°, 45°, 90°, 135°$
- $0°, 22.5°, 45°, 67.5°$
- $0°, 15°, 30°, 45°$
- $0°, 30°, 60°, 90°$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$0°, 22.5°, 45°, 67.5°$

8) Identical circular discs made of Epoxy and Aluminium are under the same loading conditions. Which of the following quantities would remain same for both the specimens: *2 points*

- Stress magnitude
- Stress distribution
- Strain distribution
- Deformation field

No, the answer is incorrect.
Score: 0
Accepted Answers:
Stress magnitude
Stress distribution

9) Which of the following statements pertain to integrated photoelasticity: *2 points*

- It works on the principle of optical equivalence
- It works on the principle of mechanical equivalence
- It falls under the category of scalar tomography
- It falls under the category of tensor tomography
- The 3-D model is replaced by a retarder
- The 3-D model is replaced by a rotator
- The 3-D model is replaced by a retarder and rotator combination

No, the answer is incorrect.
Score: 0
Accepted Answers:
It works on the principle of optical equivalence
It falls under the category of tensor tomography
The 3-D model is replaced by a retarder and rotator combination

10) Which of the following digital photoelastic techniques can give whole field isoclinics data: *2 points*

- Three fringe photoelasticity
- Four-step phase shifting technique
- Six-step phase shifting technique5
- Ten-step phase shifting technique

No, the answer is incorrect.
Score: 0
Accepted Answers:
Four-step phase shifting technique
Six-step phase shifting technique5
Ten-step phase shifting technique

11) An Aluminium gear tooth having a characteristic length of 15 cm is subjected to a load of 1200 N under operation. An Epoxy model of the gear tooth having a 5 cm characteristic length is used to quantify the whole field stress using photoelasticity. If the Young's moduli of Aluminium and Epoxy are 70 GPa and 3 GPa respectively, what must be the load (in N) that must be applied to the model such that geometrically similar deformation is ensured?

(Hint: Neglect the Poisson's ratio mismatch between Aluminium and Epoxy)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 5.00,6.50

2 points

A circular disk of 60 mm diameter and 6 mm thickness is subject to diametral compression of 502 N. Total fringe order at point A with coordinates (3.75 mm, 7.96 mm) has to be determined by Three Fringe Photoelasticity (TFP). The RGB values at A are 110, 80, and 32 respectively. Use the calibration table given for some selected data to base your computations and answer the following.

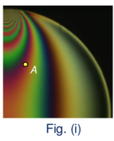


Fig. (i)

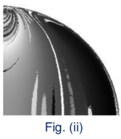


Fig. (ii)

S. No.	Red (R)	Green (G)	Blue (B)	Fringe Order (N)
1	17	19	11	0
2	135	74	23	0.85
3	33	37	46	1.01
4	105	95	28	1.70

12) What is the minimum least squares error computed for point A

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 16.00,17.00

2 points

13) Find the total fringe order at point A

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 1.50,1.90

2 points

14) Grayscale representation of total fringe order evaluated using least squares colour matching method in Three Fringe Photoelasticity is shown in Fig. (i). Abrupt jumps in fringe orders are clearly visible in Fig. (i). Select the appropriate statement which explains this. *1 point*

- Stresses are discontinues in some regions of the model
- Strains are discontinues in some regions of the model
- Colours of isochromatics repeats in some regions of the model
- Stress optic law is not valid in some regions of the model

No, the answer is incorrect.
Score: 0
Accepted Answers:
Colours of isochromatics repeats in some regions of the model